# Children's Intensive Care Drug Directory (CIDD) *[kɪd]*

1st Edition

Queensland Government

**We pay our respects to the Aboriginal and Torres Strait Islander ancestors and custodians of this land, their spirits and their legacy.**

**The foundations laid by these ancestors—First Nations peoples—gives strength, inspiration and courage to current and future generations.**

**We are committed to working towards a stronger and healthier Queensland community for Aboriginal and Torres Strait Islander and non-Aboriginal and Torres Strait Islander people.**

**CHQ-GDL-69000 Children's Intensive Care Drug Directory (CIDD) 1st Edition**

Published by the State of Queensland (Queensland Health), August 2022



Cover artwork produced for Queensland Health by Gilimbaa. The motifs used represent the important network of people from Queensland communities and how they work together to empower Aboriginal and Torres Strait Islander Queenslanders to have long, healthy, productive lives.

**Content Enquiries/Feedback:**

Email the CIDD team at: CIDD@health.qld.gov.au

For further enquiries during business hours, call the Queensland Children's Hospital (QCH) Pharmacy: 0436 694 996

**Printing of this document is not recommended for version control.**

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This book has been designed as a cognitive aid to guide best-practice and safe drug administration for any child admitted to an intensive care unit throughout Queensland. We recommend hospitals follow their usual practice for endorsement locally including presenting it to their local Medicines Advisory Committee (or equivalent) prior to use. It is designed to be used by staff with expertise and skills in the management of critically unwell children. We recommend staff become familiar with and receive training in the use of this book prior to using it. Whilst the information contained herein has gone through a vigorous checking and referencing process it is not a substitute for thinking and checking.

Clinical incidents, risks and near misses should be reported through local HHS clinical incident reporting mechanisms. We encourage local HHSs to report CIDD feedback and concerns via email: CIDD@health.qld.gov.au

# Purpose

**The Children's Intensive Care Drug Directory (CIDD) pronounced 'kid', is a medication infusion guide for managing critically unwell children in an intensive care setting that was sponsored by the Queensland Paediatric Critical Care Pathway Project (QPCCP) in 2021.**

CIDD includes continuous infusion medications used in paediatric critical care, as determined by the CIDD working group and steering committee in 2021.

CIDD is designed for use 'at the bedside' by critical care nursing staff who prepare and administer continuous infusions to paediatric patients.

CIDD contains evidence-based and clearly referenced medicines information and is intended to reduce unwarranted variation in medication preparation and administration in paediatric critical care across Queensland Health.

CIDD aligns with international safety standards for 'best practice' critical care, by promoting the use of standardised-concentration infusions used in conjunction with Dose Error Reduction Software (DERS) on intravenous 'smart pumps'. CIDD will provide a standardised, evidence based reference where sites can further develop, review and align their paediatric 'smart pump'/DERS libraries, critical care electronic prescribing tools and local medication guidelines.

# Aim

CIDD has been developed by a multidisciplinary team of Queensland Health (QH) clinicians with emergency, paediatric, and paediatric and/or adult intensive care expertise.

CIDD provides a user-friendly resource, to reduce the cognitive burden for clinicians administering continuous infusions to critically unwell children.

CIDD provides a concise guide to infusion preparation, concentration, choice of infusion device, 'usual' dose range as well as 'max dose' (listed separately), compatible fluids and critical notes or special considerations.

***CIDD will help you 'tie' all those critical care threads together.***

## Considerations

CIDD is not a substitute for clinically appropriate, carefully checked medication infusions. The content should be used by staff with expertise and skills in the management of critically unwell children. It is designed to be used in conjunction with state and/or local resources which contain information on medicine indication, specific dose, interactions, complex medicine compatibilities, precautions and potential side effects.

Direct links to selected statewide paediatric guidelines have been embedded within CIDD. For example, guidelines for complex or highly specialised medications such as those used in metabolic disease.

To seek further information from Children's Health Queensland (CHQ) Hospital and Health Service (HHS) about access to pre-printed medication infusion labels for use in critical care environments, clinicians can email: CHQMedicationSafety@health.qld.gov.au.

Every effort has been made to align CIDD with the current Queensland Children's Hospital (QCH) Metavision® 'Tips and Tricks' and the infusions described in CHQ Paediatric Intensive Care DERS Profile. The information in CIDD reflects current available evidence and is subject to change. For references and explanations of consensus decisions, go to the supplemental information at the end of the resource.

## CIDD – Putting it to use

CIDD provides a list of standard infusion concentrations suitable to be used in Queensland paediatric critical care units. The list was reviewed and agreed by the 2021 CIDD working group.

**Prerequisite check:**

The CIDD Steering Committee and the Queensland Paediatric Intensive Care Advisory Group (PICAG), advise all Hospital and Health Services (HHS) to **complete a safety check by** comparing the CIDD material with:

- local PICU/ICU guidelines
- local PICU/ICU DERS library
- local Metavision®

This **prerequisite check** is necessary for HHS/local ICUs endorsing the use of CIDD, as differences may exist between CIDD and the existing local guidelines, DERS library and Metavision® which would pose a safety issue.

Where the CIDD does not align with local resources, the CIDD Steering Committee and PICAG recommend HHSs update/review their local DERS libraries to align their DERS with both Metavision® and CIDD for continuous infusions.

To seek further information on DERS software please contact CHQ Medication Safety team at CHQMedicationSafety@health.qld.gov.au

## ‘Smart pump’ and Dose Error Reduction Software (DERS)

Smart intravenous infusion pumps, with Paediatric specific Dose Error Reduction Software (DERS) should be used for all paediatric patients.

The NSQHS Medication Safety Standard 4 recommends ensuring that current and accurate medicines information and decision support tools are readily available to the clinical workforce for clinical decisions relating to medicine use (4.9) and that high-risk medicines are stored, prescribed, dispensed and administered safely (4.11).

Standard infusion concentrations are the gold standard for paediatric critical care, replacing the historical use of a ‘weight-based dose in a standard fluid volume’. Paediatric DERS libraries should include all standard concentrations and additionally, a blank concentration for limited/selected medicines *(see ‘References to support medication recommendations’ table, page 75–83)*.

In DERS language, a ‘blank’ concentration is defined as the ability to modify both the amount of medicine and the volume, to individualise a concentration. Blank concentrations are rarely required (e.g. severely fluid restricted patients or during significant medication shortages).

Consult your pharmacist/published resources for information if preparing any infusion where ‘blank’ concentration will be used. Medical consultant approval is recommended for use of any blank concentration prior to infusion connection.

## ‘Dose over time’ medication

Not all medicines are listed in CIDD. Emergency ‘once only’ and intermittent ‘dose over time’ medication administration is beyond the scope of this resource.

Clinicians should access existing references available via Clinical Knowledge Network (CKN) such as:

- Paediatric Injectable Guidelines (PIG)
- Australian Injectable Drugs Handbook (AIDH)
- Australian Medicines Handbook - Children’s Dosing Companion (AMHc)

In acute paediatric resuscitation situations, use the current version of the Children’s Resuscitation Emergency Drug Dosage (CREDD) guide. CREDD can be accessed via the Queensland Paediatric Emergency Care webpage. Hardcopies are available to purchase.

## Ask for help early!

**When caring for critically unwell paediatric patients, ask for help early.**

**Sites without an onsite paediatric critical care facility:**

Call Retrieval Services Queensland (RSQ) on **1300 799 127**

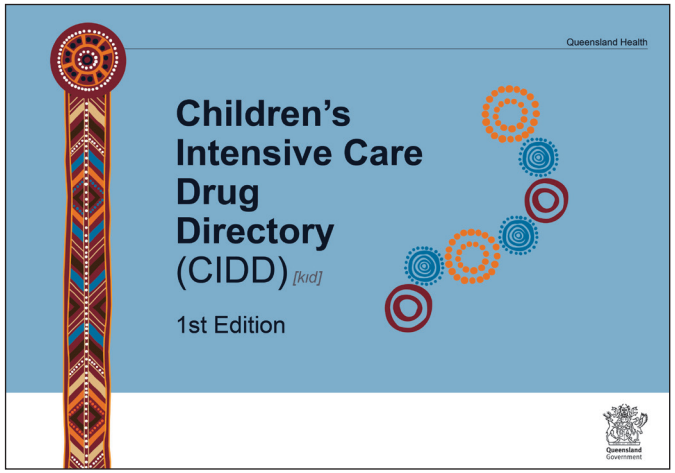
If required, Paediatric Critical Care specialists from your critical care referral site can guide clinicians through medicine preparation.

# CIDD and CREDD – What's the difference?

CIDD and CREDD are complementary resources. Both are recommended for sites treating paediatric patients. Where possible, the infusion concentrations used for individual medicines have been standardised between CIDD and CREDD.

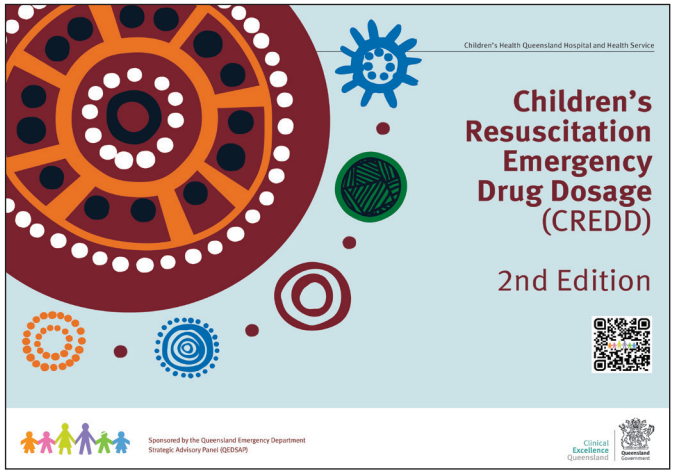
**Children's Intensive Care Drug Directory (CIDD):**

- Use in extended and ongoing paediatric critical care requiring infusion therapy.
- An aid to use standardised continuous medication infusions.
- Aids safe patient transfer to other sites, including to PICU centres.




**Children's Resuscitation Emergency Drug Dosage (CREDD):**

- Resuscitation of paediatric patients in the Emergency Department setting.
- Includes single doses, doses over time, and some medication infusion information.
- Weight based resource designed to ensure prompt medicine preparation and delivery.



# How to use CIDD

CIDD has a landscape presentation with one line per standard concentration and is read from left to right *(example below)*. It is suitable for use in paediatric patients.

**Medication:**

- Medications are listed alphabetically by their generic name.
- For medications with multiple common names or where the DERS library lists under an 'indication + generic' name, an alphabetical name/place holder redirects the user to the required medicine, for example:
  - » ***Fat Emulsion for local anaesthetic toxicity*** – *See TOX Lipid 20% TOX (page 72)*
  - » ***Vasopressin*** – *See Argipressin (page 16)*
- *Italic descriptions* (below main medicine name) guide nursing staff as to when that specific profile may be most applicable.
- Where multiple concentrations for one medication exist, these are banded together down the left-hand side.

**Infusion device:**

- Syringe pump refers to standardised continuous infusions prepared in a syringe and delivered by a syringe pump.
- Large volume pump refers to standardised continuous infusions prepared in a fluid bag and delivered by a large volumetric pump.
- **For infants, it is recommended that a syringe pump and the *Standard Concentration* is used to administer continuous infusions.**

**Final infusion concentration:**

- The intended final concentration is shown both as the amount of medicine in the volume of fluid, and as a standardised concentration per unit volume.
- This concentration results when the preparation instructions are followed.

| Medication | | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| methADONe | **methADONe** | Syringe pump | 100 mg/50 mL (2 mg/mL) | Dilute 100 mg to a total volume of 50 mL | **Sodium Chloride 0.9%** | 0.01 to 0.1 mg/kg/hour<br>Titrate to effect | • *Specialist advice required*<br>• BP, Cardiac and Respiratory rate monitoring<br>• Reference |

**Preparation:**

- Details the amount of medicine required, and the total volume to dilute it to.
- When using an intravenous fluid bag, first consider if you need to remove/discard any fluid (e.g. remove a volume of fluid equivalent to the volume of medicine being added to the bag). For information on initial vial reconstitution, refer to product information.
- For medicines with no dilution, the solution is described as ‘undiluted’.

**Compatible fluids:**

- Compatible base fluids for administration.
- **Preferred fluid** for administration is **bolded** (where appropriate).
- Lists are not exhaustive for all fluid combinations. If listed fluids are not available, check compatibility of the fluid before using or ask your referral site for advice.
- Medicine/fluid compatibility is included. Medicine/Medicine compatibility is not included, refer to QH medicines information resources via CKN.
- Consider use of Micromedex for IV compatibility check.

**Usual dose range for critical care:**

- Weigh the child to ensure a current weight is documented for all paediatric patients. Only in emergent situations where a child cannot be weighed should an estimate be used, with the child weighed as soon as practical (given inaccuracies of estimated weight).
- Clinical judgement regarding the dose prescribed is required when the weight is significantly above or below the normal weight for age and height (i.e. extremes of body weight). Consideration should include the actual weight, adjusted weight and ideal body weight and pharmacist consultation is required.
- The dose may require titration, on medical advice, to achieve clinical effect/target. When titrating medications in critically unwell paediatric patients – escalate early if the required clinical effect is not obtained.
- Usual ‘dose range’ used in critical care. The dosing listed reflects available references and consensus of paediatric critical care consultants and may differ from the absolute maximum dose in published literature.
- Available, published, ‘absolute’ maximum doses are noted in a separate table and not included in the main table. Refer to “Reference” under special notes for a hyperlink to the position and appendix.

- Dosing units in this resource are the ‘usual’ dose units, used in paediatric critical care. Always confirm the dosing units required. When accepting a verbal or telephone instruction, ask for the prescribed dose to be spoken in full (e.g. *start at ‘10 units per kilogram per hour’ or ‘start at 10 units per hour’* rather than *start at ‘10 units’*). For safety, and to ensure unambiguous communication in a high risk situation, ask one person to receive the verbal instruction and document it, then use a second person read back of the documented order (including units) to the person who gave it, to confirm all verbal information.
- For some medicines, ‘dose capping’ at an adult dosage is applied.

## Special notes

- Specific preparation or administration advice
- Type of venous access required
- Monitoring required during infusion
- Extravasation considerations
- Links to specific CHQ procedures or statewide guidelines (where appropriate)

## References

- See Reference List *(page 84–86)* for full list of references used in the CIDD.
- Maximum dose reported in literature (which may differ from the ‘usual clinical’ maximum dose commonly required) is also listed within the Reference section of CIDD.

## Appendices

| | Medication | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| ACETYLCYSTEINE (NAC) | **Acetylcysteine (N-Acetylcysteine)**<br>*For use in **NON-paracetamol** related indications* | Syringe pump | 2,000 mg/50 mL (40 mg/mL) | Dilute 2,000 mg to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9% | 4 mg/kg/hour | • Reference |
| | **Acetylcysteine (N- Acetylcysteine)**<br>**Step 1**<br>*For use in paracetamol toxicity*<br>*To be used in conjunction with CHQ-PMG-01230* | Large volume pump | Variable<br>*Refer to guideline for information on fluid restricted patients* | **Less than or equal 20 kg:** Dilute 200 mg/kg to a total volume of 100 mL<br>**More than 20 kg and less than 50 kg:** Dilute 200 mg/kg to a total volume of 250 mL<br>**More than or equal 50 kg:** Dilute 200 mg/kg to a total volume of 500 mL | **Glucose 5%,** Sodium Chloride 0.9% | 200 mg/kg up to a maximum of 22,000 mg over 4 hours | • CHQ-PROC-01230 Acetylcysteine (Intravenous) for Paracetamol Poisoning<br>• Reference |
| | **Acetylcysteine (N-Acetylcysteine)**<br>**Step 2**<br>*For use in paracetamol toxicity*<br>*To be used in conjunction with CHQ-PMG-01230* | Large volume pump | Variable<br>*Refer to guideline for information on fluid restricted patients* | **Less than or equal 20 kg:** Dilute 100 mg/kg to a total volume of 250 mL<br>**More than 20 kg and less than 50 kg:** Dilute 100 mg/kg to a total volume of 500 mL<br>**More than or equal 50 kg:** Dilute 100 mg/kg to a total volume of 1,000 mL | **Glucose 5%,** Sodium Chloride 0.9% | 100 mg/kg up to a maximum of 11,000 mg over 16 hours | • CHQ-PROC-01230 Acetylcysteine (Intravenous) for Paracetamol Poisoning<br>• Reference |

| | Medication | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| ADRENALINE (EPINEPHRINE) | **Adrenaline (Epinephrine)**<br>*Standard concentration* | Syringe pump | 1 mg/50 mL (20 microg/mL) | Dilute 1 mg to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9% | 0.05 to 0.2 microg/kg/min<br>Titrate to effect | • **Central access preferred**<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• Reference |
| | **Adrenaline (Epinephrine)**<br>*Consider for fluid restricted patients* | Syringe pump | 6 mg/50 mL (120 microg/mL) | Dilute 6 mg to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9% | 0.05 to 0.2 microg/kg/min<br>Titrate to effect | • **Central access required**<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• Reference |
| | **Adrenaline (Epinephrine)**<br>*Standard concentration* | Large volume pump | 6 mg/100 mL (60 microg/mL) | Dilute 6 mg to a total volume of 100 mL | **Sodium Chloride 0.9%,** Glucose 5% | 0.05 to 0.2 microg/kg/min<br>Titrate to effect | • **Central access preferred**<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• Reference |
| | **Adrenaline (Epinephrine)**<br>*Consider for fluid restricted patients* | Large volume pump | 12 mg/100 mL (120 microg/mL) | Dilute 12 mg to a total volume of 100 mL | **Sodium Chloride 0.9%,** Glucose 5% | 0.05 to 0.2 microg/kg/min<br>Titrate to effect | • **Central access required**<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• Reference |

| | Medication | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| | **Alprostadil (PGE1)** | Syringe pump | 100 microg/50 mL (2 microg/mL) | Dilute 100 microg to a total volume of 50 mL<br>*Draw up diluent first to minimise contact of undiluted alprostadil with plastic* | **Glucose 5%,** Sodium Chloride 0.9% | **To open duct:** 50 to 100 nanog/kg/min<br>**To maintain open duct:** 5 to 20 nanog/kg/min | • **Central access preferred**<br>• Kept in fridge<br>• Monitor apnoea<br>• Reference |
| **ALTEPLASE** | **Alteplase**<br>*For patients with thromboembolism* | Syringe pump | 1 mg/mL | CHQ-GDL-01403 Alteplase (rtPA) Infusion for Thromboembolism<br>*Do not shake, swirl to reconstitute* | — | 0.5 mg/kg/hour for 6 hours<br>(Maximum total infused dose = 100 mg/day) | • BP monitoring<br>• CHQ-GDL-01403 Alteplase (rtPA) Infusion for Thromboembolism<br>• Reference |
| | **Alteplase**<br>*For patients with ischaemic stroke* | Syringe pump | 1 mg/mL | CHQ-GDL-00734 Acute Arterial Ischaemic Stroke Management in Children<br>*Do not shake, swirl to reconstitute* | — | **Bolus:** 0.09 mg/kg (up to 9 mg) over 1 minute<br>**Infusion:** 0.81 mg/kg (up to 81 mg) over 60 minutes<br>(Maximum total dose 90 mg) | • BP monitoring<br>• CHQ-GDL-00734 Acute Arterial Ischaemic Stroke Management in Children<br>• Reference |

| Medication | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|
| **Aminocaproic Acid** | Syringe pump | 1,000 mg/50 mL (20 mg/mL) | Dilute 1,000 mg to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9%, Hartmann's | 10 to 30 mg/kg/hour (Maximum 30 gram/day) | • ECMO only<br>• Monitor Activated Clotting Time (ACT)<br>• Reference |
| **amiNOPHYLLIne**<br>*Ensure loading dose is given prior to commencing infusion* | Syringe pump | 250 mg/50 mL (5 mg/mL) | Dilute 250 mg to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9%, Hartmann's Glucose 10% | Titrate according to serum concentrations (Maximum 1,139 mg/day unless guided by serum concentration) | • **Central access preferred**<br>• Cardiac monitoring<br>• Therapeutic drug monitoring<br>• Extravasation caution<br>• Reference |
| | | | | | **1 month to 11 years:** 1 mg/kg/hour | |
| | | | | | **12 years or above:** 0.5 to 0.7 mg/kg/hour | |

| Medication | | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| **amIODAROne** | **amiODAROne**<br>**Less than 45 kg**<br>*Standard concentration for patients less than 45 kg* | Syringe pump | 100 mg/50 mL (2 mg/mL) | Dilute 100 mg to a total volume of 50 mL<br>*Use non-PVC syringes and lines: if unavailable change infusion every 12 hours* | **Glucose 5%** | **Load:**<br>5 to 6 mg/kg over 4 hours = 20 to 25 microg/kg/min for 4 hours<br>(Maximum 300 mg)<br>**Maintenance:**<br>5 to 15 microg/kg/min<br>(Maximum 1,200 mg/day including loading dose) | • **Central access preferred**<br>• 0.22 micron in-line filter recommended<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• Reference |
| | **amiODAROne**<br>**Less than 45 kg**<br>*Consider for fluid restricted patients less than 45 kg* | Syringe pump | 300 mg/50 mL (6 mg/mL) | Dilute 300 mg to a total volume of 50 mL<br>*Use non-PVC syringes and lines: if unavailable change infusion every 12 hours* | **Glucose 5%** | **Load:**<br>5 to 6 mg/kg over 4 hours = 20 to 25 microg/kg/min for 4 hours<br>(Maximum 300 mg)<br>**Maintenance:**<br>5 to 15 microg/kg/min<br>(Maximum 1,200 mg/day including loading dose) | • **Central access required**<br>• 0.22 micron in-line filter recommended<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• Reference |
| **amIODAROne – *continued on next page*** *(page 15)* | | | | | | | |

| Medication | | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| **amIODARONe** | **amiODARONe**<br>**45 kg and above**<br>*Standard concentration for patients 45 kg and above* | Large volume pump | 900 mg/450 mL (2 mg/mL) | Dilute 900 mg to a total volume of 450 mL<br>*Use a 500 mL bag*<br>*Use non-PVC bags and giving sets: if unavailable change infusion every 12 hours* | **Glucose 5%** | **Load:** 5 mg/kg over 4 hours (Maximum 300 mg)<br>**Maintenance:** 37.5 **mg/hour** (Maximum 1,200 mg/day including loading dose) | • **Central access preferred**<br>• 0.22 micron in-line filter recommended<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• Reference |
| | **amiODARONe**<br>**45 kg and above**<br>*Alternative CREDD concentration* | Large volume pump | 500 mg/250 mL (2 mg/mL) | Dilute 500 mg to a total volume of 250 mL<br>*Use a 250 mL bag*<br>*Use non-PVC bags and giving sets: if unavailable change infusion every 12 hours* | **Glucose 5%** | **Load:** 5 mg/kg over 4 hours (Maximum 300 mg)<br>**Maintenance:** 37.5 **mg/hour** (Maximum 1,200 mg/day including loading dose) | • **Central access required**<br>• 0.22 micron in-line filter recommended<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• Reference |
| **Arginine (L-arginine)**<br>*Ensure loading dose is given prior to commencing infusion* | | Large volume pump | 6,300 mg/150 mL (42 mg/mL) | Dilute to 6,300 mg to a total volume of 150 mL | **Glucose 10%,** Glucose 5%, Sodium Chloride 0.9% | 4 to 12.5 mg/kg/hour | • *Metabolic Specialist advice required*<br>• **Central access preferred**<br>• Observe for anaphylaxis<br>• Extravasation caution<br>• Reference |

| | Medication | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| ARGIPRESSIN (VASOPRESSIN) | **Argipressin (Vasopressin)**<br>**Less than 20 kg**<br>*For hypotensive patients less than 20 kg* | Syringe pump | 10 units/50 mL<br>(0.2 units/mL) | Dilute 10 units to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9% | 0.01 to 0.12 unit/kg/hour<br>Titrate to effect | • **Central access preferred**<br>• Taper infusion slowly when discontinuing treatment<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• SAS<br>• Reference |
| | **Argipressin (Vasopressin)**<br>**20 kg and above**<br>*For hypotensive patients 20 kg and above* | Syringe pump | 20 units/50 mL<br>(0.4 units/mL) | Dilute 20 units to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9% | 0.6 to 2.4 **unit/hour**<br>Titrate to effect | • **Central access preferred**<br>• Taper infusion slowly when discontinuing treatment<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• SAS<br>• Reference |
| | **Argipressin DI (Vasopressin)**<br>*For patients with diabetes insipidus* | Syringe pump | 1 unit/50 mL<br>(0.02 units/mL ) | Dilute 1 unit to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9% | 0.001 to 0.003 unit/kg/hour<br>Titrate in 0.001 unit/kg/hour increments at approximately 10-minute intervals to target urine output | • **Central access preferred**<br>• Taper infusion slowly when discontinuing treatment<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• SAS<br>• Reference |

**Argipressin (Vasopressin) – *continued on next page (page 17)***

| | Medication | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| ARGIPRESSIN (VASOPRESSIN) | **Argipressin GI (Vasopressin)**<br>*For patients with gastrointestinal haemorrhage* | Syringe pump | 50 units/50 mL<br>(1 unit/mL) | Dilute 50 units to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9% | 0.12 to 0.3 unit/kg/hour<br>Titrate to effect | • **Central access preferred**<br>• Taper infusion slowly when discontinuing treatment<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• SAS<br>• Reference |
| ARGIPRESSIN (VASOPRESSIN) | **Argipressin GI (Vasopressin)**<br>*For patients with gastrointestinal haemorrhage* | Large volume pump | 100 units/100 mL<br>(1 unit/mL) | Dilute 100 units to a total volume of 100 mL | **Glucose 5%,** Sodium Chloride 0.9% | 0.12 to 0.3 unit/kg/hour<br>Titrate to effect | • **Central access preferred**<br>• Taper infusion slowly when discontinuing treatment<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• SAS<br>• Reference |
| IAL HEP SALINE | **Arterial Heparinised Saline** | Syringe pump | 100 units/50 mL<br>(2 units/mL) | Draw up 100 units to a total volume of 50 mL<br>*Use pre-made bag if available* | Sodium Chloride 0.9% | 1 to 2 mL/hour<br>**Bolus flush:** 1 to 2 mL | • Use syringe driver rather than pressure bag. Ensure bolus flushes are included in fluid balance<br>• Reference |
| ATROPINE | **Atropine** | Syringe pump | 6 mg/20 mL<br>(0.3 mg/mL) | Dilute 6 mg to a total volume of 20 mL | **Sodium Chloride 0.9%** | 0.02 to 0.08 mg/kg/hour<br>Titrate every 5 minutes according to response | • Monitor heart rate<br>• Reference |

| Medication | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|
| **Benzoate/L-arginine** – *See Sodium Benzoate/L-arginine (page 67)* | | | | | | |
| **Benzoate** – *See Sodium Benzoate (page 66)* | | | | | | |
| **Bicarbonate** – *See Sodium Bicarbonate (page 68)* | | | | | | |
| **Bivalirudin** | Syringe pump | 250 mg/50 mL (5 mg/mL) | Dilute 250 mg to a total volume of 50 mL | **Sodium Chloride 0.9%,** Glucose 5% | 0.05 to 0.25 mg/kg/hour<br>Titrate every 3 to 4 hours to achieve target aPTT | • *Haematologist advice required*<br>• Monitor aPTT<br>• Reference |
| **Calcium Chloride** | Syringe pump | 6.8 mmol/10 mL (0.68 mmol/mL) | Undiluted<br>Draw up 6.8 mmol to a total volume of 10 mL | — | 0.02 to 0.1 mmol/kg/hour<br>Titrate to target calcium level | • **Central access required**<br>• Monitor calcium level<br>• Extravasation caution<br>• CHQ-PMG-01270 Intravenous Calcium<br>• Reference |

| | Medication | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| CALCIUM GUCONATE | **Calcium Gluconate** | Syringe pump | 4.4 mmol/40 mL (0.11 mmol/mL) | Dilute 4.4 mmol to a total volume of 40 mL | **Glucose 5%**, Sodium Chloride 0.9%, Hartmann's | 0.02 to 0.1 mmol/kg/hour<br>Titrate to target calcium level | • **Central access preferred**<br>• Monitor calcium level<br>• Extravasation caution<br>• CHQ-PMG-01270 Intravenous Calcium<br>• Reference |
| | **Calcium Gluconate**<br>*For patients undergoing plasma exchange* | Large volume pump | 4.4 mmol/100 mL (0.044 mmol/mL) | Dilute 4.4 mmol to a total volume of 100 mL | **Sodium Chloride 0.9%,** Glucose 5%, Hartmann's | 0.044 mmol/kg/hour<br>Titrate in increments of 0.022 mmol/kg/hour to target calcium level | • **Central access preferred**<br>• Extravasation caution<br>• CHQ-PMG-01270 Intravenous Calcium<br>• CHQ-GDL-14036 Management of patients recieiving Therapeutic Plasma Exchange (TPE)<br>• Reference |

| Medication | | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| CISATRACURIUM | **Cisatracurium** | Syringe pump | 50 mg/50 mL (1 mg/mL) | Dilute 50 mg to a total volume of 50 mL | **5% Glucose,** Sodium Chloride 0.9% | 1 to 4 microg/kg/min<br>Titrate to effect every 5 to 10 minutes<br>Target Train of Four 2/4<br><br>**Bolus:** 100 microg/kg | • **Ventilatory support required**<br>• Kept in fridge<br>• Train of Four monitoring [CHQ-WI-80106]<br>• Reversed by neostigmine<br>• Reference |
| | **Cisatracurium** | Large volume pump | 100 mg/100 mL<br>(1 mg/mL) | Dilute 100 mg to a total volume of 100 mL | **5% Glucose,** Sodium Chloride 0.9% | 1 to 4 microg/kg/min<br>Titrate to effect every 5 to 10 minutes<br>Target Train of Four 2/4<br><br>**Bolus:** 100 microg/kg | • **Ventilatory support required**<br>• Kept in fridge<br>• Train of Four monitoring [CHQ-WI-80106]<br>• Reversed by neostigmine<br>• Reference |
| **Clonidine** | | Syringe pump | 300 microg/50 mL (6 microg/mL) | Dilute 300 microg to a total volume of 50 mL | **Sodium Chloride 0.9%** | 0.5 to 2 microg/kg/hour<br>Titrate to effect | • BP monitoring<br>• Taper infusion slowly when discontinuing treatment **(rapid discontinuation may cause hypertensive crisis)**<br>• Reference |

| Medication | | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| **Danaparoid**<br>*Ensure loading dose is given prior to commencing infusion* | | Syringe pump | 750 units/50 mL (15 units/mL) | Dilute 750 units to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9% | 1.2 to 2 units/kg/hour<br>Titrate to target antiXa levels | • Monitor antiXa<br>• Reference |
| **Desferrioxamine** | | Syringe pump | 2,000 mg/50 mL (40 mg/mL) | Dilute 2,000 mg to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9%, Hartmann's | 15 mg/kg/hour; reduce rate after 4–6 hours<br>(Maximum 80 mg/kg, up to 6 grams in 24 hours) | • BP monitoring<br>• Reduce infusion rate if hypotension occurs<br>• Reference |
| **DEXMEDETOMIDINE** | **Dexmedetomidine** | Syringe pump | 200 microg/50 mL (4 microg/mL) | Dilute 200 microg to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9%, Hartmann's | 0.2 to 1 microg/kg/hour<br>Titrate to effect | • BP and Cardiac monitoring<br>• Avoid bolus, rapid administration may cause sinus arrest<br>• Reference |
| | **Dexmedetomidine** | Large volume pump | 400 microg/100 mL (4 microg/mL) | Dilute 400 microg to a total volume of 100 mL | **Glucose 5%,** Sodium Chloride 0.9%, Hartmann's | 0.2 to 1 microg/kg/hour<br>Titrate to effect | • BP and Cardiac monitoring<br>• Avoid bolus, rapid administration may cause sinus arrest<br>• Reference |

| Medication | | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| DOBUTAMINE | **Dobutamine**<br>*Standard Concentration* | Syringe pump | 75 mg/50 mL (1.5 mg/mL) | Dilute 75 mg to a total volume 50 mL | **Glucose 5%,** Sodium Chloride 0.9%, Glucose 10% | 2 to 10 microg/kg/min<br>Titrate to effect every 2 to 3 minutes | • **Central access preferred**<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• Reference |
| | **Dobutamine**<br>*Consider for fluid restricted patients* | Syringe pump | 250 mg/50 mL (5 mg/mL) | Dilute 250 mg to a total volume 50 mL | **Glucose 5%,** Sodium Chloride 0.9%, Glucose 10% | 2 to 10 microg/kg/min<br>Titrate to effect every 2 to 3 minutes | • **Central access preferred**<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• Reference |
| | **Dobutamine** | Large volume pump | 250 mg/100 mL (2.5 mg/mL) | Dilute 250 mg to a total volume 100 mL | **Glucose 5%,** Sodium Chloride 0.9%, Glucose 10% | 2 to 10 microg/kg/min<br>Titrate to effect every 2 to 3 minutes | • **Central access preferred**<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• Reference |

| | Medication | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| DOPAMINE | **Dopamine**<br>*Standard concentration* | Syringe pump | 60 mg/50 mL (1.2 mg/mL) | Dilute 60 mg to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9%, Hartmann's | 2 to 10 microg/kg/min<br>Titrate in increments of 1 microg/kg/min every 10 minutes to effect | • **Central access preferred**<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• Reference |
| | **Dopamine**<br>*Consider for fluid restricted patients* | Syringe pump | 200 mg/50 mL (4 mg/mL) | Dilute 200 mg to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9%, Hartmann's | 2 to 10 microg/kg/min<br>Titrate in increments of 1 microg/kg/min every 10 minutes to effect | • **Central access required**<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• Reference |
| | **Dopamine** | Large volume pump | 200 mg/100 mL (2 mg/mL) | Dilute 200 mg to a total volume of 100 mL | **Glucose 5%,** Sodium Chloride 0.9%, Hartmann's | 2 to 10 microg/kg/min<br>Titrate in increments of 1 microg/kg/min every 10 minutes to effect | • **Central access preferred**<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• Reference |
| **Epinephrine** – *See Adrenaline (page 11)* | | | | | | | |

| Medication | | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| EPOPROSTENOL (FLOLAN®) | **Epoprostenol (Flolan® brand)**<br>*To be used in conjunction with CHQ-GDL-01027* | Syringe pump | 150 microg/50 mL (3 microg/mL) | Dilute 150 microg to a total volume of 50 mL<br>***Complex preparation required – refer to PIG*** | **Provided diluent only** (glycine buffer) | Initial rate: 0.5 to 2 nanog/kg/min<br>Titrate in increments of 0.5 to 2 nanog/kg/min every 15 minutes, up to 40 nanog/kg/min to achieve desired clinical effect | • **Central line preferred**<br>• Use 0.22 micron in-line filter<br>• BP monitoring<br>• Extravasation caution<br>• Taper infusion slowly when discontinuing treatment<br>• CHQ-GDL-01027 Epoprostenol Infusion for Pulmonary Arterial Hypertension<br>• Reference |
| | **Epoprostenol (Flolan® brand)**<br>*To be used in conjunction with CHQ-GDL-01027* | Syringe pump | 500 microg/50 mL (10 microg/mL) | Dilute 500 microg to a total volume of 50 mL<br>***Complex preparation required – refer to PIG*** | **Provided diluent only** (glycine buffer) | Initial rate: 0.5 to 2 nanog/kg/min<br>Titrate in increments of 0.5 to 2 nanog/kg/min every 15 minutes, up to 40 nanog/kg/min to achieve desired clinical effect | • **Central line preferred**<br>• Use 0.22 micron in-line filter<br>• BP monitoring<br>• Extravasation caution<br>• Taper infusion slowly when discontinuing treatment<br>• CHQ-GDL-01027 Epoprostenol Infusion for Pulmonary Arterial Hypertension<br>• Reference |

**Epoprostenol (Flolan®) – *continued on next page*** *(page 25)*

| Medication | | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| **EPOPROSTENOL CHRONIC (FLOLAN®)** | **Epoprostenol Chronic (Flolan® brand)**<br>*For use in patients with chronic pulmonary hypertension* | Syringe pump | 500 microg/50 mL (10 microg/mL) | Dilute 500 microg to a total volume of 50 mL<br>*****Complex preparation required – refer to PIG***** | **Provided diluent only** (glycine buffer) | 5 to 80 nanog/kg/min<br>Titrate to effect | • **Central line preferred**<br>• Use 0.22 micron in-line filter<br>• BP monitoring<br>• Extravasation caution<br>• CHQ-GDL-01027 Epoprostenol Infusion for Pulmonary Arterial Hypertension<br>• Reference |
| | **Epoprostenol Chronic (Flolan® brand)**<br>*For use in patients with chronic pulmonary hypertension* | Large volume pump | 1,000 microg/100 mL (10 microg/mL) | Dilute 1,000 microg to a total volume of 100 mL<br>*****Complex preparation required – refer to PIG***** | **Provided diluent only** (glycine buffer) | 5 to 80 nanog/kg/min<br>Titrate to effect | • **Central line preferred**<br>• Use 0.22 micron in-line filter<br>• BP monitoring<br>• Extravasation caution<br>• CHQ-GDL-01027 Epoprostenol Infusion for Pulmonary Arterial Hypertension<br>• Reference |

| | Medication | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| **EPOPROSTENOL (VELETRI®)** | **Epoprostenol (Veletri® brand)**<br>*To be used in conjunction with CHQ-GUDL-01027* | Syringe pump | 150 microg/50 mL (3 microg/mL) | Dilute 150 microg to a total volume of 50 mL | **Sodium Chloride 0.9%** | Initial rate: 0.5 to 2 nanog/kg/min<br>Titrate in increments of 0.5 to 2 nanog/kg/min every 15 minutes, up to 40 nanog/kg/min to achieve desired clinical effect | • **Central line preferred**<br>• Use 0.22 micron in-line filter<br>• BP monitoring<br>• Extravasation caution<br>• Taper infusion slowly when discontinuing treatment<br>• CHQ-GDL-01027 Epoprostenol Infusion for Pulmonary Arterial Hypertension<br>• Reference |
| | **Epoprostenol (Veletri® brand)**<br>*To be used in conjunction with CHQ-GUDL-01027* | Syringe pump | 500 microg/50 mL (10 microg/mL) | Dilute 500 microg to a total volume of 50 mL | **Sodium Chloride 0.9%** | Initial rate: 0.5 to 2 nanog/kg/min<br>Titrate in increments of 0.5 to 2 nanog/kg/min every 15 minutes, up to 40 nanog/kg/min to achieve desired clinical effect | • **Central line preferred**<br>• Use 0.22 micron in-line filter<br>• BP monitoring<br>• Extravasation caution<br>• Taper infusion slowly when discontinuing treatment<br>• CHQ-GDL-01027 Epoprostenol Infusion for Pulmonary Arterial Hypertension<br>• Reference |

**Epoprostenol Chronic (Veletri®) – *continued on next page*** *(page 27)*

| Medication | | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| **EPOPROSTENOL CHRONIC (VELETRI®)** | **Epoprostenol Chronic (Veletri® brand)**<br>*For use in patients with chronic pulmonary hypertension* | Syringe pump | 500 microg/50 mL (10 microg/mL) | Dilute 500 microg to a total volume of 50 mL | **Sodium Chloride 0.9%** | 5 to 80 nanog/kg/min<br>Titrate to effect | • **Central line preferred**<br>• Use 0.22 micron in-line filter<br>• BP monitoring<br>• Extravasation caution<br>• CHQ-GDL-01027 Epoprostenol Infusion for Pulmonary Arterial Hypertension<br>• Reference |
| | **Epoprostenol Chronic (Veletri® brand)**<br>*For use in patients with chronic pulmonary hypertension* | Large volume pump | 1,000 microg/100 mL (10 microg/mL) | Dilute 1,000 microg to a total volume of 100 mL | **Sodium Chloride 0.9%** | 5 to 80 nanog/kg/min<br>Titrate to effect | • **Central line preferred**<br>• Use 0.22 micron in-line filter<br>• BP monitoring<br>• Extravasation caution<br>• CHQ-GDL-01027 Epoprostenol Infusion for Pulmonary Arterial Hypertension<br>• Reference |

| Medication | | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| **ESMOLOL** | **Esmolol** | Syringe pump | 500 mg/50 mL (10 mg/mL) | Undiluted<br>Draw up 500 mg to a total volume of 50 mL | — | Initial rate: 25 to 100 microg/kg/min<br>Titrate in increments of 25 to 50 microg/kg/min every 5 minutes to effect<br>**Bolus**: 500 microg/kg | • BP and Cardiac monitoring<br>• Extravasation caution<br>• Taper infusion slowly when discontinuing treatment<br>• Reference |
| | **Esmolol**<br>*Consider for patients 45 kg and above* | Large volume pump | 1,000 mg/100 mL (10 mg/mL) | Undiluted<br>Draw up 1,000 mg to a total volume of 100 mL<br>*Use 100 mL empty bag or bottle* | — | Initial rate: 25 to 100 microg/kg/min<br>Titrate in increments of 25 to 50 microg/kg/min every 5 minutes to effect<br>**Bolus:** 500 microg/kg | • BP and Cardiac monitoring<br>• Extravasation caution<br>• Taper infusion slowly when discontinuing treatment<br>• Reference |
| **Ethacrynic Acid** | | Syringe pump | 50 mg/50 mL (1 mg/mL) | Dilute 50 mg to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9%, Hartmann's | 0.1 to 0.5 mg/kg/hour<br>Titrate to effect | • BP and Electrolyte monitoring<br>• SAS<br>• Reference |

| Medication | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|
| **Ethanol 10%**<br>*Ensure loading dose is given prior to commencing infusion* | Large volume pump | 50 mL/500 mL (10%) | Dilute 50 mL of ethanol 100% to a total volume of 500 mL | **Glucose 5%** | 1 to 2 mL/kg/hour<br>(Maximum 100 mL/hour) | • **Central access required**<br>• Ensure adequate mixing during preparation<br>• CNS and Respiratory monitoring<br>• Blood glucose monitoring<br>• Monitor serum ethanol level<br>• Reference |
| **Fat Emulsion for local anaesthetic toxicity** – *See TOX Lipid 20% TOX (page 72)* | | | | | | |

| | Medication | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| FENTANYL | **Fentanyl**<br>**Less than 35 kg**<br>*Standard concentration for patients less than 35 kg* | Syringe pump | 500 microg/50 mL (10 microg/mL) | Dilute 500 microg to total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9% | 0.5 to 5 microg/kg/hour<br>Titrate to effect<br>**Bolus:** 0.5 to 1 microg/kg | • Respiratory rate monitoring<br>• Reference |
| | **Fentanyl**<br>**Less than 35 kg**<br>*Consider for fluid restricted patients less than 35 kg* | Syringe pump | 1,000 microg/50 mL (20 microg/mL) | Dilute 1,000 microg to total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9% | 0.5 to 5 microg/kg/hour<br>Titrate to effect<br>**Bolus:** 0.5 to 1 microg/kg | • Respiratory rate monitoring<br>• Reference |
| | **Fentanyl**<br>**35 kg and above**<br>*Standard concentration for patients 35 kg and above* | Syringe pump | 1,000 microg/50 mL (20 microg/mL) | Dilute 1,000 microg to total volume of 50mL | **Glucose 5%,** Sodium Chloride 0.9% | 25 to 200 **microg/hour**<br>Titrate to effect<br>**Bolus:** 25 microg | • Respiratory rate monitoring<br>• Reference |
| | **Fentanyl**<br>**35 kg and above**<br>*Consider for fluid restricted patients 35 kg and above* | Syringe pump | 2,500 microg/50 mL (50 microg/mL) | Undiluted<br>Draw up 2,500 microg to a total volume of 50 mL | — | 25 to 200 **microg/hour**<br>Titrate to effect<br>**Bolus:** 25 microg | • Respiratory rate monitoring<br>• Reference |

| Medication | | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| **Flumazenil** | | Syringe pump | 500 microg/20 mL (25 microg/mL) | Dilute 500 microg to a total volume of 20 mL | **Glucose 5%,** Sodium Chloride 0.9%, Hartmann's | 2 to 10 microg/kg/hour (Maximum 500 microg/hour) Titrate to effect<br>**Bolus:** 5 microg/kg (Maximum 200 microg) | • Monitor for seizures<br>• Extravasation caution<br>• Reference |
| **Fomepizole** | | Large volume pump | 1,500 mg/500 mL (3 mg/mL) | Dilute 1,500 mg to a total volume of 500 mL<br>*If solidified, run the vial under warm water or hold in the hand until it forms a solution* | **Glucose 5%** Sodium Chloride 0.9% | 1 to 1.5 mg/kg/hour | • Reference |
| **FUROSEMIDE** | **Furosemide** *Standard concentration* | Syringe pump | 100 mg/50 mL (2 mg/mL) | Dilute 100 mg to a total volume of 50 mL | **Sodium Chloride 0.9%,** Hartmann's | 0.05 to 0.5 mg/kg/hour Titrate to effect | • BP and Electrolyte monitoring<br>• Reference |
| | **Furosemide** *Consider for use in fluid restricted patients* | Syringe pump | 250 mg/50 mL (5 mg/mL) | Dilute 250 mg to a total volume of 50 mL | **Sodium Chloride 0.9%,** Hartmann's | 0.05 to 0.5 mg/kg/hour Titrate to effect | • BP and Electrolyte monitoring<br>• Reference |

| Medication | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|
| **Glucagon**<br>*For use in patients with hyperinsulinism* | Syringe Pump | 1 mg/50 mL (0.02 mg/mL) | Dilute 1 mg to a total volume of 50 mL | **Glucose 5%** | 1 to 20 microg/kg/hour<br>Titrate to effect | • *Specialist advice required when used for toxicology indications*<br>• Monitor closely for precipitation in the syringe<br>• Reference |
| **Glucose 50%** | Syringe Pump | 25 g/50 mL (500 mg/mL) | Undiluted<br>Draw up 25 gram to a total volume of 50 mL | — | 3 to 12 mg/kg/min<br>Titrate to target glucose level | • **Central access required**<br>• Blood glucose monitoring<br>• Reference |

| | Medication | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| GLYCERYL TRINITRATE | **Glyceryl Trinitrate**<br>**Less than 45 kg**<br>*Standard concentration for patients less than 45 kg* | Syringe pump | 50 mg/50 mL (1 mg/mL) | Dilute 50 mg to a total volume of 50 mL<br>*Use non-PVC syringe and lines if available* | **Glucose 5%,** Sodium Chloride 0.9% | Initial rate: 0.2 microg/kg/min<br>Titrate to effect in increments of 0.2 microg/kg/min every 3 to 5 minutes, up to 5 microg/kg/min | • **Central access required**<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• Reference |
| | **Glyceryl Trinitrate**<br>**Less than 45 kg**<br>*Standard concentration for patients less than 45 kg* | Large volume pump | 100 mg/100 mL (1 mg/mL) | Dilute 100 mg to a total volume of 100 mL<br>*Use non-PVC bags and giving sets if available* | **Glucose 5%,** Sodium Chloride 0.9% | Initial rate: 0.2 microg/kg/min<br>Titrate to effect in increments of 0.2 microg/kg/min every 3 to 5 minutes, up to 5 microg/kg/min | • **Central access required**<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• Reference |
| | **Glyceryl Trinitrate**<br>**45 kg and above**<br>*Standard concentration for patients 45 kg and above* | Syringe pump | 50 mg/50 mL (1 mg/mL) | Dilute 50 mg to a total volume of 50 mL<br>*Use non-PVC syringe and lines if available* | **Glucose 5%,** Sodium Chloride 0.9% | Initial rate: 5 to 10 **microg/min**<br>Titrate to effect in increments of 5 **microg/min** every 3 to 5 minutes, up to 80 **microg/min** | • **Central access required**<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• Reference |
| | **Glyceryl Trinitrate**<br>**45 kg and above**<br>*Standard concentration for patients 45 kg and above* | Large volume pump | 200 mg/250 mL (0.8 mg/mL) | Dilute 200 mg to a total volume of 250 mL<br>*Use non-PVC bags and giving sets if available* | **Glucose 5%,** Sodium Chloride 0.9% | Initial rate: 5 to 10 **microg/min**<br>Titrate to effect in increments of 5 **microg/min** every 3 to 5 minutes, up to 80 **microg/min** | • **Central access required**<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• Reference |

| | Medication | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| HEPARIN | **Heparin**<br>*Standard concentration*<br>*Check whether loading dose is required prior to commencing infusion* | Syringe pump | 5,000 units/50 mL (100 unit/mL) | Dilute 5,000 units to a total volume of 50 mL | **Sodium Chloride 0.9%,** Glucose 5% | *Variable initial rate, refer to policy*<br>Usual range: 5 to 40 unit/kg/hour<br>Titrate to target aPTT or antiXa every 4 to 6 hours | • Monitor aPTT or antiXa<br>• CHQ-PMG-01200 Heparin Sodium (Unfractionated Heparin)<br>• Reference |
| | **Heparin**<br>*Consider for fluid restricted patients*<br>*Check whether loading dose is required prior to commencing infusion* | Syringe pump | 25,000 units/50 mL (500 unit/mL) | Dilute 25,000 units to a total volume of 50 mL<br>*Use pre-made syringe if available* | **Sodium Chloride 0.9%,** Glucose 5% | *Variable initial rate, refer to policy*<br>Usual range: 5 to 40 unit/kg/hour<br>Titrate to target aPTT or antiXa every 4 to 6 hours | • Monitor aPTT or antiXa<br>• CHQ-PMG-01200 Heparin Sodium (Unfractionated Heparin)<br>• Reference |
| | **Heparin ECLS**<br>*For use in patients on ECLS* | Syringe pump | 5,000 units/50 mL (100 units/mL) | Dilute 5,000 units to a total volume of 50 mL | **Sodium Chloride 0.9%,** Glucose 5% | 10 to 50 unit/kg/hour<br>Titrate to target antiXa every 4 hours | • ECMO only – QCH Local Guideline<br>• Monitor antiXa<br>• Reference |
| | | | 25,000 units/50 mL (500 units/mL) | Dilute 25,000 units to a total volume of 50 mL<br>*Use pre-made syringe if available* | | | |
| **Heparinised Saline for arterial lines** – *See Arterial Heparinised Saline (page 17)* | | | | | | | |
| **Heparinised Saline for pulmonary artery lines** – *See PA Heparinised Saline (page 56)* | | | | | | | |
| **Heparinised Saline for venous lines** – *See Venous Heparinised Saline (page 74)* | | | | | | | |

| Medication | | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| hydrALAZINe | **hydrALAZINe** | Syringe pump | 20 mg/50 mL (0.4 mg/mL) | Dilute 20 mg to a total volume of 50 mL | **Sodium Chloride 0.9%,** Hartmann's | 12.5 to 50 microg/kg/hour<br>Titrate to effect | • BP and Cardiac monitoring<br>• Extravasation caution<br>• Reference |
| hydrALAZINe | **hydrALAZINe** | Large volume pump | 40 mg/100 mL (0.4 mg/mL) | Dilute 40 mg to a total volume of 100 mL | **Sodium Chloride 0.9%,** Hartmann's | 12.5 to 50 microg/kg/hour<br>Titrate to effect | • BP and Cardiac monitoring<br>• Extravasation caution<br>• Reference |
| HYDROmorphone | **HYDROmorphone** | Syringe pump | 10 mg/50 mL (0.2 mg/mL) | Dilute 10 mg to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9%, Hartmann's | Initial rate:<br>2 to 5 microg/kg/hour<br>Titrate to effect up to 12 microg/kg/hour<br>**Bolus:**<br>1 microg/kg | • Respiratory rate monitoring<br>• BP monitoring<br>• Reference |
| **Hypertonic Saline** – *See Sodium Chloride 3% (page 69)* | | | | | | | |
| INSULIN | **Insulin (Actrapid®)** | Syringe pump | 50 units/50 mL (1 unit/mL) | Dilute 50 units to a total of 50 mL | **Sodium Chloride 0.9%,** Glucose 5%, Glucose 10% | 0.05 to 0.1 unit/kg/hour | • Kept in fridge<br>• Blood glucose monitoring<br>• Electrolyte monitoring<br>• Reference |

| Medication | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|
| **ISOPRENALINE** | | | | | | |
| **Isoprenaline**<br>**Less than 10 kg** | Syringe pump | 1 mg/50 mL<br>(20 microg/mL) | Dilute 1 mg to a total volume of 50 mL | **Glucose 5%,**<br>Sodium Chloride 0.9%,<br>Glucose 10% | 0.05 to 0.5 microg/kg/min<br>Titrate to effect | • **Central access preferred**<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• Reference |
| **Isoprenaline**<br>**10 kg and above** | Syringe pump | 3 mg/50 mL<br>(60 microg/mL) | Dilute 3 mg to a total volume of 50 mL | **Glucose 5%,**<br>Sodium Chloride 0.9%,<br>Glucose 10% | 0.5 to 10 **microg/min**<br>Titrate to effect | • **Central access preferred**<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• Reference |
| **Isoprenaline**<br>**10 kg and above** | Large volume pump | 6 mg/100 mL<br>(60 microg/mL) | Dilute 6 mg to a total volume of 100 mL | **Glucose 5%,**<br>Sodium Chloride 0.9%,<br>Glucose 10% | 0.5 to 10 **microg/min**<br>Titrate to effect | • **Central access preferred**<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• Reference |
| **KETAMINE** | | | | | | |
| **Ketamine**<br>**Less than 30 kg**<br>*Standard concentration* | Syringe pump | 200 mg/50 mL<br>(4 mg/mL) | Dilute 200 mg to a total of 50 mL | **Glucose 5%,**<br>Sodium Chloride 0.9% | **Analgesia:**<br>1 to 5 microg/kg/min<br>Titrate to effect<br>**Sedation and Asthma:**<br>1 to 20 microg/kg/min<br>Titrate to effect<br>**Bolus:** 100 microg/kg | • Cardiac and Respiratory rate monitoring<br>• Extravasation caution<br>• Reference |
| **Ketamine – *continued on next page*** *(page 37)* | | | | | | |

| | Medication | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| KETAMINE | **Ketamine**<br>**Less than 30 kg**<br>*Consider for fluid restricted patients* | Syringe pump | 400 mg/50 mL (8 mg/mL) | Dilute 400 mg to a total of 50 mL | **Glucose 5%,** Sodium Chloride 0.9% | **Analgesia:** 1 to 5 microg/kg/min Titrate to effect<br>**Sedation and Asthma:** 1 to 20 microg/kg/min Titrate to effect<br>**Bolus:** 100 microg/kg | • Cardiac and Respiratory rate monitoring<br>• Extravasation caution<br>• Reference |
| | **Ketamine**<br>**30 kg and above**<br>*Standard concentration* | Syringe pump | 200 mg/50 mL (4 mg/mL) | Dilute 200 mg to a total of 50 mL | **Glucose 5%,** Sodium Chloride 0.9% | **Analgesia and Opioid Tolerance:** 2 to 8 **mg/hour** Titrate to effect<br>**Sedation:** 6 to 30 **mg/hour** Titrate to effect<br>**Bolus:** 5 mg | • Cardiac and Respiratory rate monitoring<br>• Extravasation caution<br>• Reference |
| | **Ketamine**<br>**30 kg and above**<br>*Consider for fluid restricted patients* | Syringe pump | 400 mg/50 mL (8 mg/mL) | Dilute 400 mg to a total of 50 mL | **Glucose 5%,** Sodium Chloride 0.9% | **Analgesia and Opioid Tolerance:** 2 to 8 **mg/hour** Titrate to effect<br>**Sedation:** 6 to 30 **mg/hour** Titrate to effect<br>**Bolus:** 5 mg | • Cardiac and Respiratory rate monitoring<br>• Extravasation caution<br>• Reference |
| **Ketamine – *continued on next page*** *(page 38)* | | | | | | | |

| Medication | | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| KETAMINE | **Ketamine**<br>**30 kg and above** | Large volume pump | 400 mg/100 mL (4 mg/mL) | Dilute 400 mg to a total of 100 mL | **Glucose 5%,** Sodium Chloride 0.9% | **Analgesia and Opioid Tolerance:** 2 to 8 **mg/hour**<br>Titrate to effect<br>**Sedation:** 6 to 30 **mg/hour**<br>Titrate to effect<br>**Bolus:** 5 mg | • Cardiac and Respiratory rate monitoring<br>• Extravasation caution<br>• Reference |
| | **Ketamine STATUS**<br>*For use in patients with refractory status epilepticus* | Syringe pump | 400 mg/50 mL (8 mg/mL) | Dilute 400 mg to a total of 50 mL | **Sodium Chloride 0.9%,** Glucose 5% | **Initial bolus:** 100 to 200 microg/kg<br>**Maintenance:** commence at 10 microg/kg/min<br>Every increment increase needs to be preceded by a bolus of 100 to 200 microg/kg<br>Titrate in increments of 5 to 10 microg/kg/min every 10 minutes to effect<br>**Bolus:** 100 microg/kg | • Cardiac and Respiratory rate monitoring<br>• Extravasation caution<br>• CHQ-GDL-80028 Management of Refractory Status Epilepticus in Children<br>• Reference |
| **L-arginine** – *See Arginine (page 15)* | | | | | | | |
| **L-arginine with Sodium Benzoate** – *See Sodium Benzoate/L-arginine (page 67)* | | | | | | | |

| Medication | | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| LABETALOL | **Labetalol** | Syringe pump | 100 mg/20 mL (5 mg/mL) | Undiluted<br>Draw up 100 mg to a total volume of 20 mL | — | 0.25 to 1 mg/kg/hour<br>Titrate in increments of 0.1 to 0.25 mg/kg/hour every 15 minutes to effect<br>**Bolus:** 0.25 mg/kg | • **Central access preferred**<br>• BP and Cardiac monitoring<br>• Taper infusion slowly when discontinuing treatment<br>• Reference |
| | **Labetalol**<br>*Consider for patients 70 kg and above* | Large volume pump | 500 mg/100 mL (5 mg/mL) | Undiluted<br>Draw up 500 mg to a total volume of 100 mL | — | 0.25 to 1 mg/kg/hour<br>Titrate in increments of 0.1 to 0.25 mg/kg/hour every 15 minutes to effect<br>**Bolus:** 0.25 mg/kg | • **Central access preferred**<br>• BP and Cardiac monitoring<br>• Taper infusion slowly when discontinuing treatment<br>• Reference |
| LA HEP SALINE | **LA Heparinised Saline**<br>*For patients with left atrial line* | Syringe pump | 100 units/50 mL (2 units/mL) | Draw up 100 units to a total volume of 50 mL<br>*Use pre-made bag if available* | Sodium Chloride 0.9% | 1 to 2 mL/hour | • Use syringe driver rather than pressure bag |
| **Levocarnitine** | | Syringe pump | 1,000 mg/50 mL (20 mg/mL) | Dilute 1,000 mg to a total volume of 50 mL | **Glucose 10%,** Glucose 5%, Sodium Chloride 0.9%, Hartmann's | **Load:** 50 to 100 mg/kg over 30 minutes<br>**Maintenance:** 4 mg/kg/hour | • *Metabolic specialist advice required*<br>• SAS<br>• Reference |

| | Medication | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| LEVOSIMENDAN | **Levosimendan** | Syringe pump | 2.5 mg/50 mL (50 microg/mL) | Dilute 2.5 mg to a total volume of 50 mL<br><br>Prepare total 24 hour dose | **Glucose 5%** | **Load:** 12.5 microg/kg over 10 minutes<br><br>**Maintenance:** 0.2 microg/kg/min for 24 hours; dose may be reduced if not tolerated | • **Central line preferred**<br>• Kept in fridge<br>• BP and Cardiac monitoring<br>• SAS<br>• CHQ-PMG-01459 Levosimendan<br>• Reference |
| | **Levosimendan**<br>*Consider for patients 45 kg and above* | Large volume pump | 12.5 mg/250 mL (50 microg/mL) | Dilute 12.5 mg to a total volume of 250 mL | **Glucose 5%** | **Load:** 12.5 microg/kg over 10 minutes<br><br>**Maintenance:** 0.2 microg/kg/min for 24 hours; dose may be reduced if not tolerated | • **Central line preferred**<br>• Kept in fridge<br>• BP and Cardiac monitoring<br>• SAS<br>• CHQ-PMG-01459 Levosimendan<br>• Reference |

| Medication | | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| LIDOCAINE | **Lidocaine (Lignocaine)** | Syringe pump | 200 mg/50 mL (4 mg/mL) | Dilute 200 mg to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9% | Arrhythmias:<br>**Load:** 0.5 to 1 mg/kg over 2 minutes<br>**Maintenance**: 0.6 to 3 mg/kg/hour<br><br>Refractory Status Epilepticus:<br>**Load:** 1 to 3 mg/kg over 2 minutes<br>**Maintenance:** 1 to 6 mg/kg/hour | • BP and Cardiac monitoring<br>• ECG monitoring<br>• CHQ-GDL-01458 Common arrhythmias and their management in the PICU<br>• CHQ-GDL-80028 Refractory Status Epilepticus Management in Children<br>• Reference |
| LIOTHYRONINE | **Liothyronine** | Syringe pump | 20 microg/50 mL (0.4 microg/mL) | Dilute 20 microg to total volume of 50 mL<br>*Use equal parts Sodium Chloride 0.9% and Albumin 4% for dilution* | **Sodium Chloride 0.9% and Albumin 4%** | 0.1 to 0.15 microg/kg/hour | • BP and Cardiac monitoring<br>• SAS<br>• Reference |
| **Lipid Emulsion for local anaesthetic toxicity** – *See TOX Lipid 20% TOX (page 72)* | | | | | | | |

| Medication | | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| **LORazepam** | **LORazepam** | Syringe pump | 4 mg/50 mL (80 microg/mL) | Dilute 4 mg to a total volume of 50 mL<br>*Invert to mix, do not shake* | **Glucose 5%,** Sodium Chloride 0.9% | 25 to 50 microg/kg/hour<br>Titrate to effect<br><br>**Bolus:** 50 microg/kg | • *Specialist advice required*<br>• Kept in fridge<br>• Midazolam is preferred due to propylene glycol accumulation<br>• Respiratory rate monitoring<br>• Extravasation caution<br>• SAS<br>• Reference |
| **MAGNESIUM SULFATE** | **Magnesium Sulfate** | Syringe pump | 25 mmol/50 mL (0.5 mmol/mL) | Dilute 25 mmol to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9%, Hartmann's | 0.08 to 0.3 mmol/kg/hour | • BP monitoring<br>• Monitor serum magnesium<br>• CHQ-PMG 01246 Magnesium Sulfate Intravenous<br>• CHQ-GDL-80028 Refractory Status Epilepticus Management in Children<br>• Reference |
| | **Magnesium Sulfate**<br>*Consider for patients 45 kg and above* | Large volume pump | 50 mmol/100 mL (0.5 mmol/mL) | Dilute 50 mmol to a total volume of 100 mL | **Glucose 5%,** Sodium Chloride 0.9%, Hartmann's | 0.08 to 0.3 mmol/kg/hour | • BP monitoring<br>• Monitor serum magnesium<br>• CHQ-PMG 01246 Magnesium Sulfate Intravenous<br>• CHQ-GDL-80028 Refractory Status Epilepticus Management in Children<br>• Reference |

| Medication | | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| METARAMINOL | **Metaraminol**<br>*Standard concentration* | Syringe pump | 2 mg/50 mL (0.04 mg/mL) | Dilute 2 mg to a total volume of 50 mL<br>*Do NOT place prefilled syringes in pumps* | **Glucose 5%,** Sodium Chloride 0.9%, Hartmann's | 0.05 to 0.5 microg/kg/min<br>Titrate in increments of 0.05 microg/kg/min every 5 minutes to effect | • **Central access preferred**<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• Reference |
| | **Metaraminol**<br>*Consider for fluid restricted patients* | Large volume pump | 20 mg/100 mL (0.2 mg/mL) | Dilute 20 mg to a total volume of 100 mL<br>*Do NOT place prefilled syringes in pumps* | **Glucose 5%,** Sodium Chloride 0.9%, Hartmann's | 0.05 to 0.5 microg/kg/min<br>Titrate in increments of 0.05 microg/kg/min every 5 minutes to effect | • **Central access preferred**<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• Reference |
| methADONe | **methADONe** | Syringe pump | 100 mg/50 mL (2 mg/mL) | Dilute 100 mg to a total volume of 50 mL | **Sodium Chloride 0.9%** | 0.01 to 0.1 mg/kg/hour<br>Titrate to effect | • *Specialist advice required*<br>• BP, Cardiac and Respiratory rate monitoring<br>• Reference |
| METHYLENE BLUE | **Methylene Blue (Methylthioninium)** | Syringe pump | 50 mg/50 mL (1 mg/mL) | Dilute 50 mg to a total volume of 50 mL | **Glucose 5%** | 0.25 mg/kg/hour | • **Central access preferred**<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• Reference |
| | **Methylene Blue (Methylthioninium)** | Large volume pump | 100 mg/100 mL (1 mg/mL) | Dilute 100 mg to a total volume of 100 mL | **Glucose 5%** | 0.25 mg/kg/hour | • **Central access preferred**<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• Reference |

| Medication | | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| METOPROLOL | **Metoprolol** | Syringe pump | 20 mg/50 mL (0.4 mg/mL) | Dilute 20 mg to a total volume of 50 mL | **Glucose 5%** Sodium Chloride 0.9% | **Load:** 0.1 mg/kg up to a maximum of 5 mg; repeat every 5 minutes for a maximum of 3 doses<br>**Maintenance:** 0.5 to 5 microg/kg/min<br>Titrate in increments of 0.5 microg/kg/min every 30 minutes to effect<br>(Maximum 110 **microg/min**) | • BP and Cardiac monitoring<br>• ECG monitoring<br>• Reference |
| | **Metoprolol**<br>*Consider for patients 45 kg and above* | Large volume pump | 40 mg/100 mL (0.4 mg/mL) | Dilute 40 mg to a total volume of 100 mL | **Glucose 5%,** Sodium Chloride 0.9% | **Load:** 0.1 mg/kg up to a maximum of 5 mg; repeat every 5 minutes for a maximum of 3 doses<br>**Maintenance:** 0.5 to 5 microg/kg/min<br>Titrate in increments of 0.5 microg/kg/min every 30 minutes to effect<br>(Maximum 110 **microg/min**) | • BP and Cardiac monitoring<br>• ECG monitoring<br>• Reference |

| | Medication | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| MIDAZOLAM | **Midazolam**<br>*Standard concentration* | Syringe pump | 10 mg/50 mL (0.2 mg/mL) | Dilute 10 mg to a total volume of 50 mL | **Glucose 5%**, Sodium Chloride 0.9%, Glucose 10% | **Less than 6 months:** 10 to 60 microg/kg/hour; titrate to effect<br>**6 months or above:** 10 to 120 microg/kg/hour; titrate to effect<br>**Bolus:** 20 microg/kg | • BP and Respiratory rate monitoring<br>• Extravasation caution<br>• Reference |
| | **Midazolam**<br>*Consider for fluid restricted patients* | Syringe pump | 50 mg/50 mL (1 mg/mL) | Dilute 50 mg to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9%, Glucose 10% | **Less than 6 months:** 10 to 60 microg/kg/hour; titrate to effect<br>**6 months or above:** 10 to 120 microg/kg/hour; titrate to effect<br>**Bolus:** 20 microg/kg | • BP and Respiratory rate monitoring<br>• Extravasation caution<br>• Reference |
| | **Midazolam**<br>**70 kg and above** | Syringe pump | 50 mg/50 mL (1 mg/mL) | Dilute 50 mg to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9%, Glucose 10% | 1 to 8 **mg/hour**<br>Titrate to effect<br>**Bolus:** 1 mg | • BP and Respiratory rate monitoring<br>• Extravasation caution<br>• Reference |

**Midazolam – *continued on next page*** *(page 46)*

| Medication | | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| MIDAZOLAM | **Midazolam**<br>**70 kg and above** | Large volume pump | 100 mg/100 mL (1 mg/mL) | Dilute 100 mg to a total volume of 100 mL | **Glucose 5%,** Sodium Chloride 0.9%, Glucose 10% | 1 to 8 **mg/hour**<br>Titrate to effect<br><br>**Bolus:**<br>1 mg | • BP and Respiratory rate monitoring<br>• Extravasation caution<br>• Reference |
| | **Midazolam STATUS**<br>*Standard concentration* | Syringe pump | 60 mg/50 mL (1.2 mg/mL) | Dilute 60 mg to a total volume of 50 mL | **Sodium Chloride 0.9%,** Glucose 5%, Glucose 10% | 100 to 400 microg/kg/hour<br>Titrate in increments of 100 microg/kg/hour every 5 minutes to effect<br><br>**Bolus:**<br>100 microg/kg | • BP and Respiratory rate monitoring<br>• Extravasation caution<br>• CHQ-GDL-80028 Refractory Status Epilepticus Management in Children<br>• Reference |
| | **Midazolam STATUS**<br>*Consider for fluid restricted patients* | Large volume pump | 250 mg/100 mL (2.5 mg/mL) | Dilute 250 mg to a total volume of 100 mL | **Sodium Chloride 0.9%,** Glucose 5%, Glucose 10% | 100 to 400 microg/kg/hour<br>Titrate in increments of 100 microg/kg/hour every 5 minutes to effect<br><br>**Bolus:**<br>100 microg/kg | • BP and Respiratory rate monitoring<br>• Extravasation caution<br>• CHQ-GDL-80028 Refractory Status Epilepticus Management in Children<br>• Reference |

| Medication | | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| MILRINONE | **Milrinone**<br>*Standard concentration* | Syringe pump | 10 mg/50 mL (0.2 mg/mL) | Dilute 10 mg to a total volume of 50 mL | **Glucose 5%**, Sodium Chloride 0.9%, Hartmann's | 0.2 to 0.75 microg/kg/min<br>Titrate to effect | • **Central access preferred**<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• Reference |
| | **Milrinone**<br>*Consider for fluid restricted patients* | Syringe pump | 20 mg/50 mL (0.4 mg/mL) | Dilute 20 mg to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9%, Hartmann's | 0.2 to 0.75 microg/kg/min<br>Titrate to effect | • **Central access preferred**<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• Reference |
| | **Milrinone** | Large volume pump | 20 mg/100 mL (0.2 mg/mL) | Dilute 20 mg to a total volume of 100 mL | **Glucose 5%,** Sodium Chloride 0.9%, Hartmann's | 0.2 to 0.75 microg/kg/min<br>Titrate to effect | • **Central access preferred**<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• Reference |

| Medication | | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| MORPHINE | **Morphine**<br>*Standard concentration* | Syringe pump | 5 mg/50 mL (0.1 mg/mL) | Dilute 5 mg to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9% | 5 to 60 microg/kg/hour<br>Titrate to effect<br>**Bolus:** 20 microg/kg | • Respiratory rate monitoring<br>• Reference |
| | **Morphine**<br>*Consider for fluid restricted patients* | Syringe pump | 30 mg/50 mL (0.6 mg/mL) | Dilute 30 mg to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9% | 5 to 60 microg/kg/hour<br>Titrate to effect<br>**Bolus:** 20 microg/kg | • Respiratory rate monitoring<br>• Reference |
| | **Morphine**<br>*Consider for fluid restricted patients on high doses* | Syringe pump | 50 mg/50 mL (1 mg/mL) | Dilute 50 mg to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9% | 5 to 60 microg/kg/hour<br>Titrate to effect<br>**Bolus:** 20 microg/kg | • Respiratory rate monitoring<br>• Reference |
| **N-Acetylcysteine (NAC)** – *See Acetylcysteine (page 10)* | | | | | | | |

| Medication | | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| **Naloxone** | | Syringe pump | 200 microg/50 mL (4 microg/mL) | Dilute 200 microg to a total of 50 mL | **Glucose 5%,** Sodium Chloride 0.9% | **Opioid-induced itch:** 0.5 to 2 microg/kg/hour<br>Titrate in increments of 0.5 microg/kg/hour every 2 hours to effect<br>**Opioid overdose (full reversal):** 10 to 40 microg/kg/hour<br>Titrate to effect<br>**Bolus**: 1 microg/kg | • Monitor for opioid withdrawal<br>• Reference |
| **NESIRITIDE** | **Nesiritide**<br>*Standard concentration* | Syringe pump | 150 microg/50 mL (3 microg/mL) | Dilute 150 microg to a total volume of 50 mL<br>*Do not shake, rotate vial gently to dissolve powder* | **Glucose 5%,** Sodium Chloride 0.9% | 0.01 to 0.03 microg/kg/min<br>Titrate in increments of 0.005 microg/kg/min every 3 hours to effect | • BP monitoring<br>• SAS<br>• Reference |
| | **Nesiritide**<br>*Consider for fluid restricted patients* | Syringe pump | 1,500 microg/250 mL (6 microg/mL) | Dilute 1,500 microg to a total volume of 250 mL<br>*Do not shake, rotate vial gently to dissolve powder* | **Glucose 5%,** Sodium Chloride 0.9% | 0.01 to 0.03 microg/kg/min<br>Titrate in increments of 0.005 microg/kg/min every 3 hours to effect | • BP monitoring<br>• SAS<br>• Reference |

| Medication | | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| **niCARdipine** | **niCARdipine** | Syringe pump | 10 mg/50 mL (0.2 mg/mL) | Dilute 10 mg to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9% | 0.5 to 4 microg/kg/min up to maximum of 5 **mg/hour**<br>Titrate in increments of 0.5 microg/kg/min every 15 minutes to effect | • **Central access preferred**<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• SAS<br>• Reference |
| | **niCARdipine** | Large volume pump | 20 mg/100 mL (0.2 mg/mL) | Dilute 20 mg to a total volume of 100 mL | **Glucose 5%,** Sodium Chloride 0.9% | 0.5 to 4 microg/kg/min up to maximum of 5 **mg/hour**<br>Titrate in increments of 0.5 microg/kg/min every 15 minutes to effect | • **Central access preferred**<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• SAS<br>• Reference |

| Medication | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|
| **niMODIPine**<br>**niMODIPine**<br>**35 kg and less** | Syringe pump | 10 mg/50 mL (0.2 mg/mL) | Undiluted<br>Draw up 10 mg to a total volume of 50 mL<br>*Use non-PVC syringe and lines if available*<br>*Protect infusion from light* | *****Complex administration; refer to AIDH*****<br>**Y-site only:**<br>Sodium Chloride 0.9%,<br>Glucose 5%,<br>Hartmann's | Initial rate:<br>15 microg/kg/hour<br>If tolerated, increase after 2 hours to<br>30 microg/kg/hour | • **Central access required**<br>• BP monitoring<br>• Solution contains alcohol 23.7% (23.7 gram/100 mL)<br>• Reference |
| **niMODIPine**<br>**niMODIPine**<br>**35 kg and less** | Large volume pump | 20 mg/100 mL (0.2 mg/mL) | Undiluted<br>Draw up 20 mg to a total volume of 100 mL<br>*Use non-PVC tubing and empty bags*<br>*Protect infusion from light* | *****Complex administration; refer to AIDH*****<br>**Y-site only:**<br>Sodium Chloride 0.9%,<br>Glucose 5%,<br>Hartmann's | Initial rate:<br>15 microg/kg/hour<br>If tolerated, increase after 2 hours to<br>30 microg/kg/hour | • **Central access required**<br>• BP monitoring<br>• Solution contains alcohol 23.7% (23.7 gram/100 mL)<br>• Reference |

**niMODIPine – *continued on next page*** *(page 52)*

| Medication | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|
| **niMODIPine**<br>**niMODIPine**<br>**Above 35 kg and less than 70 kg** | Syringe pump | 10 mg/50 mL (0.2 mg/mL) | Undiluted<br>Draw up 10 mg to a total volume of 50 mL<br>*Use non-PVC syringe and lines if available*<br>*Protect infusion from light* | *****Complex administration; refer to AIDH*****<br>**Y-site only:**<br>Sodium Chloride 0.9%,<br>Glucose 5%,<br>Hartmann's | Initial rate:<br>0.5 **mg/hour**<br>If tolerated, increase after 2 hours to<br>1 **mg/hour** | • **Central access required**<br>• BP monitoring<br>• Solution contains alcohol 23.7% (23.7 gram/100 mL)<br>• Reference |
| **niMODIPine**<br>**Above 35 kg and less than 70 kg** | Large volume pump | 20 mg/100 mL (0.2 mg/mL) | Undiluted<br>Draw up 20 mg to a total volume of 100 mL<br>*Use non-PVC tubing and empty bags*<br>*Protect infusion from light* | *****Complex administration; refer to AIDH*****<br>**Y-site only:**<br>Sodium Chloride 0.9%,<br>Glucose 5%,<br>Hartmann's | Initial rate:<br>0.5 **mg/hour**<br>If tolerated, increase after 2 hours to<br>1 **mg/hour** | • **Central access required**<br>• BP monitoring<br>• Solution contains alcohol 23.7% (23.7 gram/100 mL)<br>• Reference |

**niMODIPine – *continued on next page*** *(page 53)*

| Medication | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|
| niMODIPine<br>**niMODIPine**<br>**70 kg and above** | Syringe pump | 10 mg/50 mL (0.2 mg/mL) | Undiluted<br>Draw up 10 mg to a total volume of 50 mL<br>*Use non-PVC syringe and lines if available*<br>*Protect infusion from light* | *****Complex administration; refer to AIDH***** <br>**Y-site only:**<br>Sodium Chloride 0.9%,<br>Glucose 5%,<br>Hartmann's | Initial rate:<br>1 **mg/hour**<br>If tolerated, increase after 2 hours to<br>2 **mg/hour** | • **Central access required**<br>• BP monitoring<br>• Solution contains alcohol 23.7% (23.7 gram/100 mL)<br>• Reference |
| niMODIPine<br>**niMODIPine**<br>**70 kg and above** | Large volume pump | 20 mg/100 mL (0.2 mg/mL) | Undiluted<br>Draw up 20 mg to a total volume of 100 mL<br>*Use non-PVC tubing and empty bags*<br>*Protect infusion from light* | *****Complex administration; refer to AIDH***** <br>**Y-site only:**<br>Sodium Chloride 0.9%,<br>Glucose 5%,<br>Hartmann's | Initial rate:<br>1 **mg/hour**<br>If tolerated, increase after 2 hours to<br>2 **mg/hour** | • **Central access required**<br>• BP monitoring<br>• Solution contains alcohol 23.7% (23.7 gram/100 mL)<br>• Reference |

| Medication | | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| NORADRENALINE | **Noradrenaline (Norepinephrine)** *Standard concentration* | Syringe pump | 1 mg/50 mL (0.02 mg/mL) | Dilute 1 mg to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9%* | 0.05 to 0.2 microg/kg/min Titrate to effect | • **Central access preferred** • BP and Cardiac monitoring • Extravasation caution • Reference |
| | **Noradrenaline (Norepinephrine)** *Consider for fluid restricted patients* | Syringe pump | 4 mg/50 mL (0.08 mg/mL) | Dilute 4 mg to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9%* | 0.05 to 0.2 microg/kg/min Titrate to effect | • **Central access required** • BP and Cardiac monitoring • Extravasation caution • Reference |
| | **Noradrenaline (Norepinephrine)** *Standard concentration* | Large volume pump | 4 mg/100 mL (0.04 mg/mL) | Dilute 4 mg to a total volume of 100 mL | **Glucose 5%,** Sodium Chloride 0.9%* | 0.05 to 0.2 microg/kg/min Titrate to effect | • **Central access preferred** • BP and Cardiac monitoring • Extravasation caution • Reference |
| | **Noradrenaline (Norepinephrine)** *Consider for fluid restricted patients* | Large volume pump | 12 mg/100 mL (0.12 mg/mL) | Dilute 12 mg to a total volume of 100 mL | **Glucose 5%,** Sodium Chloride 0.9%* | 0.05 to 0.2 microg/kg/min Titrate to effect | • **Central access required** • BP and Cardiac monitoring • Extravasation caution • Reference |

| Medication | | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| **Octreotide** | | Syringe pump | 500 microg/10 mL (50 microg/mL) | Dilute 500 microg to a total volume of 10 mL | **Sodium Chloride 0.9%**, Glucose 5% | **Oesophageal varices and bleeding:** 1 to 2 microg/kg/hour (Maximum 50 **microg/hour)**<br><br>**Chylothorax:** 3 to 4 microg/kg/hour (Maximum 200 **microg/hour)**<br>Titrate to effect | • Kept in fridge<br>• Blood glucose monitoring<br>• Taper infusion slowly when discontinuing treatment<br>• Reference |
| **OMEPRAZOLE** | **Omeprazole** | Syringe pump | 40 mg/50 mL (0.8 mg/mL) | Dilute 40 mg to a total volume of 50 mL<br>*Replace infusion every 12 hours* | **Sodium Chloride 0.9%,** Glucose 5% | 0.1 to 0.2 mg/kg/hour up to a maximum of 8 **mg/hour** | • Extravasation caution<br>• Reference |
| | **Omeprazole** | Large volume pump | 80 mg/100 mL (0.8 mg/mL) | Dilute 80 mg to a total volume of 100 mL<br>*Replace infusion every 12 hours* | **Sodium Chloride 0.9%,** Glucose 5% | 0.1 to 0.2 mg/kg/hour up to a maximum of 8 **mg/hour** | • Extravasation caution<br>• Reference |

| Medication | | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| oxyCODONE | **oxyCODONE**<br>*Standard concentration* | Syringe pump | 10 mg/50 mL (0.2 mg/mL) | Dilute 10 mg to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9% | 1 to 40 microg/kg/hour<br>Titrate to effect<br>**Bolus**: 20 microg/kg | • *Pain specialist review required*<br>• Respiratory rate monitoring<br>• Reference |
| | **oxyCODONE**<br>*Consider for fluid restricted patients* | Syringe pump | 50 mg/50 mL (1 mg/mL) | Dilute 50 mg to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9% | 1 to 40 microg/kg/hour<br>Titrate to effect<br>**Bolus**: 20 microg/kg | • *Pain specialist review required*<br>• Respiratory rate monitoring<br>• Reference |
| PA HEP SALINE | **PA Heparinised Saline**<br>*For patients with pulmonary artery line* | Syringe pump | 100 units/50 mL (2 units/mL) | Draw up 100 units to a total volume of 50 mL<br>*Use pre-made bag if available* | Sodium Chloride 0.9% | 1 to 2 mL/hour | • Use syringe driver rather than pressure bag |
| PANTOPRAZOLE | **Pantoprazole** | Syringe pump | 40 mg/50 mL (0.8 mg/mL) | Dilute 40 mg to a total volume of 50 mL<br>*Replace infusion every 12 hours* | **Glucose 5%,** Sodium Chloride 0.9% | 0.1 to 0.2 mg/kg/hour up to a maximum of 8 **mg/hour** | • Extravasation caution<br>• Reference |
| | **Pantoprazole** | Large volume pump | 80 mg/100 mL (0.8 mg/mL) | Dilute 80 mg to a total volume of 100 mL<br>*Replace infusion every 12 hours* | **Glucose 5%,** Sodium Chloride 0.9% | 0.1 to 0.2 mg/kg/hour up to a maximum of 8 **mg/hour** | • Extravasation caution<br>• Reference |

| Medication | | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| PHENTOLAMINE | **Phentolamine** | Syringe pump | 100 mg/50 mL (2 mg/mL) | Dilute 100 mg to a total volume of 50 mL | **Sodium Chloride 0.9%** | Initial rate: 5 to 10 microg/kg/min<br>*(Maximum initial rate 40 **mg/hour**)*<br>Titrate to effect | • BP and Cardiac monitoring<br>• SAS<br>• Reference |
| | **Phentolamine**<br>*Consider for patients 70 kg and above* | Large volume pump | 200 mg/100 mL (2 mg/mL) | Dilute 200 mg to a total volume of 100 mL | **Sodium Chloride 0.9%** | Initial rate: 5 to 10 microg/kg/min<br>*(Maximum initial rate 40 **mg/hour**)*<br>Titrate to effect | • BP and Cardiac monitoring<br>• SAS<br>• Reference |
| PHENYLEPHRINE | **Phenylephrine** | Syringe pump | 10 mg/50 mL (0.2 mg/mL) | Dilute 10 mg to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9% | 0.1 to 0.5 microg/kg/min<br>Titrate to effect<br>**Bolus:** 2 microg/kg | • **Central access preferred**<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• Reference |
| | **Phenylephrine** | Large volume pump | 20 mg/100 mL (0.2 mg/mL) | Dilute 20 mg to a total volume of 100 mL | **Glucose 5%,** Sodium Chloride 0.9% | 0.1 to 0.5 microg/kg/min<br>Titrate to effect<br>**Bolus:** 2 microg/kg | • **Central access preferred**<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• Reference |

| Medication | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|
| **Phosphate (Sodium Dihydrogen Phosphate)** | Syringe pump *OR* Large volume pump | Variable | **Peripheral line:** Dilute exact dose to 0.05 mmol/mL or weaker<br><br>**Central line:** Dilute exact dose to 0.12 mmol/mL or weaker | **Glucose 5%,** Sodium Chloride 0.9% | Initial rate: 0.05 mmol/kg/hour<br><br>Titrate to target phosphate levels, up to a maximum of 0.2 mmol/kg/hour | • Electrolyte monitoring<br>• BP and Cardiac monitoring when infused at rate greater than 0.06 mmol/kg/hour<br>• Extravasation caution<br>• Reference |

| | Medication | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| POTASSIUM CHLORIDE | **Potassium Chloride**<br>**Less than 50 kg**<br>*High concentration* | Syringe pump | 20 mmol/20 mL (1 mmol/mL) | Undiluted<br>Draw up 20 mmol to a total volume of 20 mL | — | 0.1 to 0.3 mmol/kg/hour up to a maximum of 20 **mmol/hour**<br>Titrate to target potassium levels | • **Central access required**<br>• Monitoring serum potassium<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• CHQ-PMG-01213 Potassium for Paediatric Patients – oral and intravenous<br>• Reference |
| | **Potassium Chloride**<br>**50 kg and above**<br>*High concentration* | Syringe pump | 40 mmol/40 mL (1 mmol/mL) | Undiluted<br>Draw up 40 mmol to a total volume of 40 mL | — | 0.1 to 0.3 mmol/kg/hour up to a maximum of 20 **mmol/hour**<br>Titrate to target potassium levels | • **Central access required**<br>• Monitoring serum potassium<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• CHQ-PMG-01213 Potassium for Paediatric Patients – oral and intravenous<br>• Reference |
| **Potassium Chloride – *continued on next page*** *(page 60)* | | | | | | | |

| Medication | | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| POTASSIUM CHLORIDE | **Potassium Chloride**<br>*Standard concentration* | Large volume pump | 10 mmol/100 mL (0.1 mmol/mL) | Undiluted<br>*Use the 10 mmol potassium chloride in 100 mL sodium chloride 0.29% pre-made bag* | — | 0.1 to 0.3 mmol/kg/hour up to a maximum of 20 **mmol/hour**<br>Titrate to target potassium levels | • BP and Cardiac monitoring<br>• Monitoring serum potassium<br>• Extravasation caution<br>• CHQ-PMG-01213 Potassium for Paediatric Patients – oral and intravenous<br>• Reference |
| | **Potassium Chloride**<br>*Consider for fluid restricted patients* | Large volume pump | 40 mmol/100 mL (0.4 mmol/mL) | Undiluted<br>*Use the 40 mmol potassium chloride in 100 mL sodium chloride 0.9% pre-made bag* | — | 0.1 to 0.3 mmol/kg/hour up to a maximum of 20 **mmol/hour**<br>Titrate to target potassium levels | • **Central access required**<br>• Monitoring serum potassium<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• CHQ-PMG-01213 Potassium for Paediatric Patients – oral and intravenous<br>• Reference |

| Medication | | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| **PRALIDOXIME** | **Pralidoxime** | Syringe pump | 1,000 mg/50 mL (20 mg/mL) | Dilute 1,000 mg to a total volume of 50 mL | **Sodium Chloride 0.9%** | **Load:** 15 mg/kg up to a maximum of 1,000 mg over 15 minutes<br>**Maintenance:** 10 mg/kg/hour up to a maximum of 250 **mg/hour** | • *Toxicologist advice required*<br>• SAS<br>• Reference |
| | **Pralidoxime** | Large volume pump | 2,000 mg/100 mL (20 mg/mL) | Dilute 2,000 mg to a total volume of 100 mL | **Sodium Chloride 0.9%** | **Load:** 15 mg/kg up to a maximum of 1,000 mg over 15 minutes<br>**Maintenance:** 10 mg/kg/hour up to a maximum of 250 **mg/hour** | • *Toxicologist advice required*<br>• SAS<br>• Reference |

| Medication | | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| **PROCAINAMIDE** | **Procainamide** | Syringe pump | 200 mg/50 mL (4 mg/mL) | Dilute 200 mg to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9% | **Load:** 5 mg/kg up to a maximum of 100 mg over 10 minutes<br>**Maintenance:** 20 to 80 microg/kg/min up to a maximum of 4,000 **microg/min**<br>Titrate to effect | • BP and Cardiac monitoring<br>• SAS<br>• Reference |
| | **Procainamide** | Large volume pump | 1000 mg/250 mL (4 mg/mL) | Dilute 1,000 mg to a total volume of 250 mL | **Glucose 5%,** Sodium Chloride 0.9% | **Load:** 5 mg/kg up to a maximum of 100 mg over 10 minutes<br>**Maintenance:** 20 to 80 microg/kg/min up to a maximum of 4,000 **microg/min**<br>Titrate to effect | • BP and Cardiac monitoring<br>• SAS<br>• Reference |

| Medication | | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| **propOFol** | **propOFol** | Syringe pump | 500 mg/50 mL (10 mg/mL) | Undiluted<br>Draw up 500 mg to a total volume of 50 mL<br>*Replace infusion every 12 hours* | — | 0.3 to 3 mg/kg/hour up to a maximum of 200 **mg/hour**<br>Titrate to effect<br>**Bolus:** 0.5 mg/kg<br>Cumulative bolus and infusion dose must not exceed 4 mg/kg/hour | • BP, Cardiac and Respiratory rate monitoring<br>• Reference |
| | **propOFol** | Large volume pump | 1,000 mg/100 mL (10 mg/mL) | Undiluted<br>*Use the 1,000 mg in 100 mL pre-made vial*<br>*Replace infusion every 12 hours* | — | 0.3 to 3 mg/kg/hour up to a maximum of 200 **mg/hour**<br>Titrate to effect<br>**Bolus:** 0.5 mg/kg<br>Cumulative bolus and infusion dose must not exceed 4 mg/kg/hour | • BP, Cardiac and Respiratory rate monitoring<br>• Reference |
| **Prostin** – *See Alprostadil (page 12)* | | | | | | | |

| | Medication | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| REMIFENTANIL | **Remifentanil**<br>*Standard concentration* | Syringe pump | 2 mg/50 mL (0.04 mg/mL) | Dilute 2 mg to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9% | 0.05 to 0.3 microg/kg/min<br>Titrate to effect<br><br>**Bolus:** 0.1 microg/kg | • BP, Cardiac and Respiratory rate monitoring<br>• Do not flush after administration as may cause respiratory depression<br>• Reference |
| | **Remifentanil**<br>*Consider for fluid restricted patients* | Syringe pump | 5 mg/50 mL (0.1 mg/mL) | Dilute 5 mg to a total volume of 50 mL | **Glucose 5%**, Sodium Chloride 0.9% | 0.05 to 0.3 microg/kg/min<br>Titrate to effect<br><br>**Bolus:** 0.1 microg/kg | • BP, Cardiac and Respiratory rate monitoring<br>• Do not flush after administration as may cause respiratory depression<br>• Reference |
| | **Remifentanil** | Large volume pump | 20 mg/100 mL (0.2 mg/mL) | Dilute 20 mg to a total volume of 100 mL | **Glucose 5%,** Sodium Chloride 0.9% | 0.05 to 0.3 microg/kg/min<br>Titrate to effect<br><br>**Bolus**: 0.1 microg/kg | • BP, Cardiac and Respiratory rate monitoring<br>• Do not flush after administration as may cause respiratory depression<br>• Reference |

| Medication | | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| ROCURONIUM | **Rocuronium**<br>*Standard concentration* | Syringe pump | 100 mg/50 mL (2 mg/mL) | Dilute 100 mg to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9%, Hartmann's | 5 to 10 microg/kg/min<br>Titrate to effect<br>Target Train of Four 2 /4<br><br>**Bolus:** 100 microg/kg | • Kept in fridge<br>• Ventilatory support required<br>• Train of Four monitoring [CHQ-WI-80106]<br>• Reversed by sugammadex<br>• Extravasation caution<br>• Reference |
| | **Rocuronium**<br>*Consider for fluid restricted patients* | Syringe pump | 250 mg/50 mL (5 mg/mL) | Dilute 250 mg to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9%, Hartmann's | 5 to 10 microg/kg/min<br>Titrate to effect<br>Target Train of Four 2 /4<br><br>**Bolus:** 100 microg/kg | • Kept in fridge<br>• Ventilatory support required<br>• Train of Four monitoring [CHQ-WI-80106]<br>• Reversed by sugammadex<br>• Extravasation caution<br>• Reference |

| Medication | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|
| **Salbutamol** | Syringe pump | 50 mg/50 mL (1 mg/mL) | Undiluted<br>Draw up 50 mg to a total volume of 50 mL | — | **Load:**<br>5 microg/kg/min for 20 minutes<br><br>**Maintenance:**<br>1 to 2 microg/kg/min<br>Titrate to effect | • **Central line preferred**<br>• BP and heart rate monitoring<br>• Blood glucose monitoring<br>• Monitor serum lactate and potassium<br>• CHQ-GDL-80112 Management of Severe Acute and Life-Threatening Asthma in PICU<br>• Reference |
| **Sodium Benzoate**<br>*Ensure loading dose is given prior to commencing infusion* | Large volume pump | 7,500 mg/150 mL (50 mg/mL) | Dilute 7,500 mg to a total volume of 150 mL | **Glucose 10%,**<br>Glucose 5% | 10.4 mg/kg/hour (usual maximum 12 gram/day) | • *Metabolic Specialist advice required*<br>• **Central access preferred**<br>• Extravasation caution<br>• Reference |

| Medication | | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| SODIUM BENZOATE/L-ARGININE | **Sodium Benzoate/ L-arginine**<br>*Ensure loading dose is given prior to commencing infusion* | Syringe pump | Sodium benzoate 50 mg/mL<br>L-arginine 42 mg/mL | Dilute 2,500 mg of Sodium Benzoate, and 2,100 mg of L-arginine to a total volume of 50 mL<br>*****Complex administration; refer to Policy*****<br>*Dose in DERS reflects Sodium Benzoate component* | **Glucose 10%** | **Sodium benzoate:** 10.4 mg/kg/hour (usual maximum 12 gram/day)<br>**L-arginine:** 8.75 mg/kg/hour (usual maximum 10 gram/day) | • *Metabolic Specialist advice required*<br>• **Central access preferred**<br>• Observe for anaphylaxis<br>• Extravasation caution<br>• CHQ-GDL-04313 Administration of Intravenous SODIUM BENZOATE and L-ARGININE HYDROCHLORIDE in children with hyperammonaemia associated with a urea cycle defect<br>• Reference |
| | **Sodium Benzoate/ L-arginine**<br>*Ensure loading dose is given prior to commencing infusion* | Large volume pump | Sodium benzoate 50 mg/mL<br>L-arginine 42 mg/mL | Dilute 6,000 mg of Sodium Benzoate, and 5,040 mg of L-arginine to a total volume of 120 mL<br>*****Complex administration; refer to Policy*****<br>*Dose in DERS reflects Sodium Benzoate component* | **Glucose 10%** | **Sodium benzoate**: 10.4 mg/kg/hour (usual maximum 12 gram/day)<br>**L-arginine:** 8.75 mg/kg/hour (usual maximum 10 gram/day) | • *Metabolic Specialist advice required*<br>• **Central access preferred**<br>• Observe for anaphylaxis<br>• Extravasation caution<br>• CHQ-GDL-04313 Administration of Intravenous SODIUM BENZOATE and L-ARGININE HYDROCHLORIDE in children with hyperammonaemia associated with a urea cycle defect<br>• Reference |

| Medication | | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| SODIUM BICARBONATE | **Sodium Bicarbonate**<br>*For ALL patients with peripheral access* | Syringe pump | 5 mmol/50 mL (0.1 mmol/mL) | Dilute 5 mmol to a total volume of 50 mL | **Glucose 5%**, Sodium Chloride 0.9%, Glucose 10% | 0.25 to 1 mmol/kg/hour | • **Peripheral line**<br>• Electrolyte monitoring<br>• Extravasation caution<br>• Reference |
| | **Sodium Bicarbonate**<br>**Less than 2 years** | Syringe pump | 25 mmol/50 mL (0.5 mmol/mL) | Dilute 25 mmol to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9%, Glucose 10% | 0.25 to 1 mmol/kg/hour | • **Central access required**<br>• Electrolyte monitoring<br>• Extravasation caution<br>• Reference |
| | **Sodium Bicarbonate**<br>**2 years and above** | Syringe pump | 50 mmol/50 mL (1 mmol/mL) | Undiluted<br>Draw up 50 mmol to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9%, Glucose 10% | 0.25 to 1 mmol/kg/hour | • **Central access required**<br>• Electrolyte monitoring<br>• Extravasation caution<br>• Reference |
| | **Sodium Bicarbonate**<br>**2 years and above** | Large volume pump | 100 mmol/100 mL (1 mmol/mL) | Undiluted<br>Draw up 100 mmol to a total volume of 100 mL | **Glucose 5%,** Sodium Chloride 0.9%, Glucose 10% | 0.25 to 1 mmol/kg/hour | • **Central access required**<br>• Electrolyte monitoring<br>• Extravasation caution<br>• Reference |

| Medication | | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| **SODIUM CHLORIDE 3%** | **Sodium Chloride 3%** | Syringe pump | 25 mmol/50 mL (0.5 mmol/mL) | Undiluted<br>Draw up 50 mL of sodium chloride 3% solution<br>*Use pre-made bag* | — | **Severe hyponatraemia:**<br>0.05 to 0.25 mmol/kg/hour<br>Titrate to target sodium level<br>Rates over 0.25 mmol/kg/hour can be used for symptom management<br>Following resolution of symptoms, maintenance infusion should not exceed 0.25 mmol/kg/hour<br>**ICP control:**<br>0.05 to 0.5 mmol/kg/hour<br>Titrate to target ICP<br>**For rapid control of ICP:**<br>1 to 2.5 mmol/kg (= 2 to 5 mL/kg) over 10 to 20 minutes<br>**For refractory ICP:**<br>refer to sodium chloride 23.4% | Severe hyponatraemia:<br>• **Central access preferred**<br>• Monitor serum sodium level<br>• CHQ-GDL-04112<br>• Extravasation caution<br>• Reference<br>ICP control:<br>• **Central access preferred**<br>• Monitor ICP and serum sodium level<br>• CHQ-GDL-80114<br>• Extravasation caution<br>• Reference |
| | **Sodium Chloride 3%** | Large volume pump | 125 mmol/250 mL (0.5 mmol/mL) | Undiluted<br>Prepare 125 mmol in a total volume of 250 mL<br>*Use pre-made bag* | — | | |
| **Sodium Dihydrogen Phosphate** – *See Phosphate (page 58)* | | | | | | | |

| Medication | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|
| **SODIUM nitroPRUSSide**<br>**Sodium nitroPRUSSide**<br>*Standard concentration* | Syringe pump | 10 mg/50 mL (0.2 mg/mL) | Dilute 10 mg to a total volume of 50 mL<br>*Protect infusion from light* | **Glucose 5%** | 0.2 to 4 microg/kg/min<br>Titrate to effect | • BP and Cardiac monitoring<br>• Monitor for cyanide toxicity<br>• Extravasation caution<br>• Reference |
| **Sodium nitroPRUSSide**<br>*Consider for fluid restricted patients* | Syringe pump | 50 mg/50 mL (1 mg/mL) | Dilute 50 mg to a total volume of 50 mL<br>*Protect infusion from light* | **Glucose 5%** | 0.2 to 4 microg/kg/min<br>Titrate to effect | • BP and Cardiac monitoring<br>• Monitor for cyanide toxicity<br>• Extravasation caution<br>• Reference |
| **SODIUM THIOSULFATE**<br>**Sodium Thiosulfate**<br>***For cyanide toxicity*** | Syringe pump | 500 mg/50 mL (10 mg/mL) | Dilute 500 mg to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9%[8] | 1 to 2.4 mg/kg/hour<br>*For treatment of sodium nitroprusside toxicity, infuse at 5 to 10 times the rate of sodium nitroprusside* | • BP and Cardiac monitoring<br>• SAS<br>• Reference |
| **Sodium Thiosulfate**<br>***To prevent cisplatin toxicity*** | Large volume pump | 7,500 mg/100 mL (75 mg/mL) | Dilute 7,500 mg to a total volume of 100 mL | **Glucose 5%,** Sodium Chloride 0.9% | 30 to 50 mg/kg/hour for 6 hours | • BP and Cardiac monitoring<br>• SAS<br>• Reference |

| Medication | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|
| **Sodium Valproate** | Syringe pump | 400 mg/50 mL (8 mg/mL) | Dilute 400 mg to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9% | **Load:** 40 mg/kg over 10 minutes<br>**Maintenance:** 1 to 3 mg/kg/hour<br>Titrate to target serum concentration | • Therapeutic drug monitoring<br>• Extravasation caution<br>• CHQ-GDL-80028 Refractory Status Epilepticus Management in Children<br>• Reference |
| **TACrolimus** | Large volume pump | 2.5 mg/250 mL (10 microg/mL) | Dilute 2.5 mg to a total volume of 250 mL<br>*Use non-PVC and non-DEHP bags and giving sets* | **Sodium Chloride 0.9%,** Glucose 5% | 0.4 to 2 microg/kg/hour<br>Titrate to target serum concentration | • Therapeutic drug monitoring<br>• CHQ-PMG-01235 Intravenous Tacrolimus<br>• Reference |
| **THIOPENTAL (THIOPENTONE)** **Thiopental (Thiopentone)** | Syringe pump | 470 mg/47 mL (10 mg/mL)<br>*470 mg of thiopental is equivalent to 500 mg thiopental sodium* | Dilute 470 mg to a total volume of 47 mL | **Glucose 5%,** Sodium Chloride 0.9% | 1 to 8 mg/kg/hour<br>Titrate to effect<br>**Bolus**: 2 mg/kg | • **Central access preferred**<br>• BP and Cardiac monitoring<br>• Extravasation caution<br>• CHQ-GDL-80028 Refractory Status Epilepticus Management in Children<br>• Reference |

| Medication | | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| **TOX LIPID 20% TOX** | **TOX Lipid 20% TOX (Fat Emulsion 20%)**<br>*To be used in conjunction with Local Anaesthetic Systemic Toxicity Guideline* | Syringe pump | 20% | Undiluted<br>Draw up a total volume of 50 mL | — | **Load:**<br>1.5 mL/kg<br>Repeat every 5 minutes if required to maximum 3 doses<br>**Maintenance:**<br>15 mL/kg/hour<br>Maximum cumulative dose including boluses is 12 mL/kg | • Use 1.2 micron filter and filter extension sets<br>• CHQ-GDL-00731 Local Anaesthetic Systemic Toxicity<br>• Reference |
| | **TOX Lipid 20% TOX (Fat Emulsion 20%)**<br>*To be used in conjunction with Local Anaesthetic Systemic Toxicity Guideline* | Large volume pump | 20% | Undiluted<br>*Use pre-made bag* | — | **Load:**<br>1.5 mL/kg<br>Repeat every 5 minutes if required to maximum 3 doses<br>**Maintenance:**<br>15 mL/kg/hour<br>Maximum cumulative dose including boluses is 12 mL/kg | • Use 1.2 micron filter and filter extension sets<br>• CHQ-GDL-00731 Local Anaesthetic Systemic Toxicity<br>• Reference |

| Medication | | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|---|
| **TRANEXAMIC ACID** | **Tranexamic Acid** | Syringe pump | 1,000 mg/50 mL (20 mg/mL) | Dilute 1,000 mg to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9% | **Load:** 10 mg/kg up to a maximum of 1,000 mg over 10 min<br>**Maintenance:** 1.875 mg/kg/hour | • CHQ-WI-80113 PICU: Acute Bleeding Guideline<br>• Reference |
| | **Tranexamic Acid** | Large volume pump | 2,000 mg/100 mL (20 mg/mL) | Dilute 2,000 mg to a total volume of 100 mL | **Glucose 5%,** Sodium Chloride 0.9% | **Load:** 10 mg/kg up to a maximum of 1,000 mg over 10 min<br>**Maintenance**: 1.875 mg/kg/hour | • CHQ-WI-80113 PICU: Acute Bleeding Guideline<br>• Reference |
| **Triiodothyronine** – *See Liothyronine (page 41)* | | | | | | | |
| **Vancomycin** | | Syringe pump *OR* Large volume pump | Variable | **Peripheral line**: Dilute exact dose to 5 mg/mL or weaker<br>**Central line:** Dilute exact dose to 10 mg/mL or weaker | **Glucose 5%,** Sodium Chloride 0.9% | Variable<br>Titrate to target serum concentration | • *Infectious Diseases specialist advice required*<br>• Rapid infusion may cause red man syndrome<br>• Therapeutic drug monitoring<br>• Extravasation caution<br>• CHQ Vancomycin Therapeutic Drug Monitoring<br>• Reference |

| Medication | Infusion device | Final infusion concentration | Preparation | Compatible fluids | Usual dose range | Special notes |
|---|---|---|---|---|---|---|
| **Valproate** – *See Sodium Valproate (page 71)* | | | | | | |
| **Vasopressin** – *See Argipressin (page 16)* | | | | | | |
| VECURONIUM **Vecuronium Less than 20 kg** | Syringe pump | 50 mg/50 mL (1 mg/mL) | Dilute 50 mg to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9% | 0.3 to 3 microg/kg/min Titrate to effect Target Train of Four 2 /4<br>**Bolus:** 100 microg/kg | • **Ventilatory support required**<br>• Train of Four monitoring [CHQ-WI-80106]<br>• Reversed by sugammadex<br>• Extravasation caution<br>• Reference |
| VECURONIUM **Vecuronium 20 kg and above** | Syringe pump | 50 mg/50 mL (1 mg/mL) | Dilute 50 mg to a total volume of 50 mL | **Glucose 5%,** Sodium Chloride 0.9% | 0.5 to 5 **mg/hour** Titrate to effect Target Train of Four 2 /4<br>**Bolus**: 2 to 4 mg | • **Ventilatory support required**<br>• Train of Four monitoring [CHQ-WI-80106]<br>• Reversed by sugammadex<br>• Extravasation caution<br>• Reference |
| VENOUS HEP SALINE **Venous Heparinised Saline** | Syringe pump | 100 units/50 mL (2 units/mL) | Draw up 100 units to a total volume of 50 mL<br>*Use pre-made bag if available* | Sodium Chloride 0.9% | 1 to 2 **mL/hour**<br>**Bolus flush:** 1 to 2 mL | • Use syringe driver rather than pressure bag. Ensure bolus flushes are included in fluid balance |

# References to support medication recommendations

| Medication | Usual maximum dose | Reference *(refer to page 84–86)* |
|---|---|---|
| **Acetylcysteine** | Step 1: 22,000 mg over 4 hours | 1, 2, 10<br>CHQ-PROC-01230 Acetylcysteine (Intravenous) for Paracetamol Poisoning |
| | Step 2: 11,000 mg over 16 hours<br>In massive overdose or on the advice of a toxicologist: 22,000 mg over 16 hours | |
| | 10 mg/kg/hour | 7, 1, 2 |
| **Adrenaline**<br>*Child* | 1 microg/kg/min<br>Maximum 2 microg/kg/min at discretion of intensivist | 5, 1, 2 |
| **Adrenaline**<br>*Adolescent* | 40 microg/min | 5, 1, 2 |
| **Alprostadil (PEG1)** | 400 nanog/kg/min | 7, 1, 2, 6 |
| **Alteplase** | 100 mg/day | 6, 5, 1, 2<br>CHQ-GDL-01403 Alteplase (rtPA) Infusion for Thromboembolis |
| **Alteplase**<br>*STROKE* | Bolus: 9 mg<br>Infusion: 81 mg<br>Maximum total dose: 90 mg | 5, 1, 2<br>CHQ-GDL-00734 Acute Arterial Ischaemic Stroke Management in Children |
| **Aminocaproic Acid** | 30 g/day or 18 g/m$^2$/day | 5, 7, 2 |
| **amINOPHYLLIne** | 1,139 mg/day unless guided by serum concentrations | 5, 6, 1, 2 |
| **amiODAROne** | Load: 300 mg<br>Maintenance: 900 mg/day<br>Total dose over 24 hours: 1,200 mg | 9, 6, 5, 4, 2, 1, |
| **Arginine (L-arginine)** | ≤40 kg: 25 mg/kg/hour<br>>40 kg: 21 mg/kg/hour | 6, 1, 2 |
| **Argipressin DI** | 0.01 units/kg/hour | 4, 5, 7, 1, 2 |

| Medication | Usual maximum dose | Reference *(refer to page 84–86)* |
|---|---|---|
| **Argipressin BP** | 0.48 unit/kg/hour | 5, 7, 1, 2 |
| **Argipressin BP**<br>*>20kg* | 6 unit/hour | 5, 1, 2 |
| **Argipressin GI** | 1 unit/kg/hour | 5, 6, 1, 2 |
| **Argipressin GI** | 48 unit/hour | 5, 1, 2 |
| **Arterial Heparinised Saline** | | 5 |
| **Atropine** | 2.4 mg/kg/hour | 10 |
| **Bivalirudin** | 1.8 mg/kg/hour | 13, 1, 2 |
| **Calcium Chloride** | Usual maximum 0.34 mmol/kg/hour<br>Rate up to 0.68 mmol/kg/hour may be required for citrated CVVH | 5, 7, 1, 2<br>CHQ-PMG-01270 Intravenous Calcium |
| **Calcium Gluconate** | Usual max 0.34 mmol/kg/hour<br>Rate up to 0.68 mmol/kg/hour may be required for citrated CVVH | 5, 6, 7, 1, 2<br>CHQ-PMG-01270 Intravenous Calcium |
| **Calcium Gluconate**<br>*Plasma exchange* | 0.68 mmol/kg/hour | 7<br>CHQ-PMG-01270 Intravenous Calcium<br>CHQ-GDL-14036 Management of patients recieiving Therapeutic Plasma Exchange (TPE) |
| **Cisatracurium** | 10 microg/kg/min | 5, 7, 1, 2, 21, 55 |
| **Clonidine** | 3 microg/kg/hour | 15, 16, 17 |
| **Danaparoid** | 7 unit/kg/hour | 6, 18, 1, 2 |
| **Desferrioxamine** | 80 mg/kg in 24 hours, not to exceed 6 gram in 24 hours | 4, 6, 1 ,2 |

| Medication | Usual maximum dose | Reference *(refer to page 84–86)* |
|---|---|---|
| **Dexmedetomidine** | Usual max 1.5 microg/kg/hour<br>Rates as high as 2.5 microg/kg/hour have been used | 4, 5, 1 ,2 |
| **Dobutamine** | 20 microg/kg/min<br>Maximum 30 microg/kg/min at discretion of intensivist | 4, 5, 7, 1, 2 |
| **Dopamine** | 20 microg/kg/min<br>Maximum 30 microg/kg/min at discretion of intensivist | 6, 7, 1, 2 |
| **Epoprostenol**<br>*(Flolan® brand)* | 80 nanog/kg/min | 4, 5, 54<br>CHQ-GDL-01027 Epoprostenol Infusion for Pulmonary Arterial Hypertension |
| **Epoprostenol**<br>*Chronic*<br>*(Flolan® brand)* | 195 nanog/kg/min | 19<br>CHQ-GDL-01027 Epoprostenol Infusion for Pulmonary Arterial Hypertension |
| **Epoprostenol**<br>*(Veletri® brand)* | 80 nanog/kg/min | 4, 5, 54<br>CHQ-GDL-01027 Epoprostenol Infusion for Pulmonary Arterial Hypertension |
| **Epoprostenol**<br>*Chronic*<br>*(Veletri® brand)* | 195 nanog/kg/min | 19<br>CHQ-GDL-01027 Epoprostenol Infusion for Pulmonary Arterial Hypertension |
| **Esmolol** | 1,000 microg/kg/min | 4, 5, 7 |
| **Ethacrynic Acid** | 0.8 mg/kg/hour | 8, 5, 20 |
| **Ethanol 10%** | 100 mL/hour<br>On haemodialysis: 4 mL/kg/hour (Maximum 200 mL/hour) | 11, 1 |
| **Fentanyl** | 20 microg/kg/hour | 5, 6, 7, 1, 2 |
| **Fentanyl**<br>*>35kg* | Usual maximum 300 microg/hour<br>Rates as high as 700 microg/hour have been used | 5, 1, 2 |
| **Flumazenil** | 10 microg/kg/hour (Maximum 500 mg/hour) | 11,1 ,2 |

| Medication | Usual maximum dose | Reference *(refer to page 84–86)* |
|---|---|---|
| **Fomepizole** | 1.5 mg/kg/hour | 7, 1 |
| **Furosemide** | 2 mg/kg/hour | 4, 6,1, 2 |
| **Glucagon** | 50 microg/kg/hour<br>For beta-blocker poisoning: 150 microg/kg/hour<br>(Maximum 10 mg/hour) – consider alternative dilution | 5, 6, 10, 1, 2 |
| **Glucose 50%** | 25 mg/kg/min | 7, 1 |
| **Glyceryl Trinitrate** | 10 microg/kg/min<br>Maximum 15 microg/kg/min at discretion of intensivist | 6, 7, 1, 2, 8 |
| **Glyceryl Trinitrate**<br>*>45kg* | 200 microg/min | 5, 6, 7 |
| **Heparin** | 60 unit/kg/hour<br>Refer to haematologist if the rate exceeds 40 unit/kg/hour | 5, 1, 2<br>CHQ-PMG-01200 Heparin Sodium (Unfractionated Heparin) |
| **Heparin**<br>*ECLS* | 100 unit/kg/hour | 6, 1, 2<br>CHQ ECLS manual and clinical guideline |
| **hydrALAZINe** | 360 microg/kg/hour (Maximum 18,000 microg/hour) | 6, 21, 1, 2 |
| **HYDROmorphone** | 160 microg/kg/hour | 4, 5, 22, 1, 2 |
| **Insulin** *(Actrapid®)* | 0.2 unit/kg/hour | 4, 7, 1, 2 |
| **Isoprenaline** | 2 microg/kg/min | 5, 7, 1, 2, 21 |
| **Isoprenaline**<br>*≥10kg* | Usual maximum 20 microg/min<br>Rates as high as 30 microg/min have been used | 5, 7, 1, 2, 21 |

| Medication | Usual maximum dose | Reference *(refer to page 84–86)* |
|---|---|---|
| **Ketamine** | Analgesia and opioid tolerance: Usual maximum 17 microg/kg/min | 23, 24, 1, 2 |
| | 60 microg/kg/min | 5, 1, 2 |
| | Refractory Status Epilepticus: 100 microgram/kg/min<br>Rates as high as 167 microg/kg/min have been used | 25<br>CHQ-GDL-80028 Management of Refractory Status Epilepticus in Children |
| | Metabolism of medications and pharmacokinetics are often different between children and adults. Therefore higher doses of Ketamine are require in children compared to adults | |
| **Labetalol** | Neonates: 4 mg/kg/hour<br>Infants, children and adolescents: 3 mg/kg/hour | 5, 6, 1, 2 |
| **Levocarnitine** | 12 mg/kg/hour | 5, 6, 7, 1, 2 |
| **Levosimendan** | 0.3 microg/kg/min | 8, 1, 2<br>CHQ-PMG-01459 Levosimendan |
| **Lidocaine** | Arrhythmias: 3 mg/kg/hour<br>Refractory Status Epilepticus: 7 mg/kg/hour | 6, 7, 1 ,2<br>CHQ-GDL-01458 Common arrhythmias and their management in the PICU<br>5, 6, 7<br>CHQ-GDL-80028 Refractory Status Epilepticus Management in Children |
| **Liothyronine** | 0.2 microg/kg/hour<br>Rates as high as 0.6 microg/kg/hour have been used | 5, 9, 26, 1, 2 |
| **LORazepam** | Usual maximum 120 microg/kg/hour<br>Rates as high as 330 microg/kg/hour have been used<br>High doses increase the risk of propylene glycol toxicity: monitor closely | 27, 28, 29, 7 |
| **Magnesium Sulfate** | 0.5 mmol/kg/hour | 2, 6, 7<br>CHQ-PMG 01246 Magnesium Sulfate Intravenous<br>CHQ-GDL-80028 Refractory Status Epilepticus Management in Children |

| Medication | Usual maximum dose | Reference *(refer to page 84–86)* |
|---|---|---|
| **Metaraminol** | 5 microg/kg/min | 8, 9, 1, 2 |
| **methADONe** | Guided by palliative care consultant and/or intensivists<br>For terminal illness: Highest rate at QCH 0.54 mg/kg/hour<br>Highest rate documented in case reports: 2 mg/kg/hour | 30, 31, 32 |
| **Methylene Blue** | 2 mg/kg/hour | 9, 33, 1 2 |
| **Metoprolol** | 5 microg/kg/min (Maximum 110 microg/min) | 6, 9, 34, 1, 2 |
| **Midazolam** | 300 mg/kg/hour | 6, 7, 1, 2 |
| **Midazolam** | 20 mg/hour<br>Maximum of 40 mg/hour at the discretion of the intensivist | 5, 35, 36, 1, 2 |
| **Midazolam**<br>*Status* | Usual maximum 2,000 microg/kg/hour<br>Rates as high as 3,000 microg/kg/hour have been used | 7, 1, 2<br>CHQ-GDL-80028 Management of Refractory Status Epilepticus in Children |
| **Milrinone** | 1 microg/kg/min<br>Maximum 1.25 microg/kg/min at discretion of intensivist | 4, 7, 1 ,2 |
| **Morphine** | 150 microg/kg/hour | 7, 1,2 |
| **Morphine** | 20 mg/hour<br>Maximum of 40 mg/hour at the discretion of the intensivist | 50 |
| **Naloxone** | Opioid-induced itch: 3 microg/kg/hour<br>Opioid overdose (full reversal): Usual maximum 40 microg/kg/hour<br>Rates as high as 160 microg/kg/hour have been used | 5, 7, 1, 2 |
| **Nesiritide** | Usual maximum 0.03 microg/kg/min<br>Rates as high as 0.09 microg/kg/min have been used in ECMO (may be related to nesiritide incompatibility with heparin) | 7, 37 |
| **niCARdipine** | 6 microg/kg/min (Maximum 15 mg/hour)<br>Rates as high as 10 microg/kg/min (Maximum 15 mg/hour) have been used | 5, 7, 1 |

| Medication | Usual maximum dose | Reference *(refer to page 84–86)* |
|---|---|---|
| **niMODIPine** | 30 microg/kg/hour (Maximum 2,000 microg) | 6, 1, 21 |
| **Noradrenaline** | 1 microg/kg/min<br>Maximum 2 microg/kg/min at discretion of intensivist | 5, 1, 2 |
| **Noradrenaline** | 40 microg/min<br>Maximum 100 microg/min at discretion of intensivist | |
| **Octreotide** | Oesophageal varices and bleeding: 2 microg/kg/hour (Maximum 50 microg/hour)<br>Chylothorax: Usual maximum 10 microg/kg/hour (Maximum 200 microg/hour)<br>Rates as high as 20 microg/kg/hour (Maximum 200 microg/hour) have been used | 5, 6, 7, 52, 53 |
| **Omeprazole** | 0.2 mg/kg/hour (Maximum 8 mg/hour) | 6, 1, 38, 39, 40 |
| **oxyCODONE** | Rate guided by Acute Pain Service | www.rch.org.au/anaes/pain_management/Opioid_Infusion/ |
| **Pantoprazole** | 0.2 mg/kg/hour (Maximum 8 mg/hour) | 41, 1 ,2<br>[extrapolation from adults, based on population pharmacokinetic study] |
| **Phentolamine** | 50 microg/kg/min (Maximum 120 mg/hour)<br>For phentolamine infusions we recommend caution to not exceed 40 mg/hour as an initial dose, which would be reached at a body weight of above 65 kg and 10 microg/kg/min infusion rate | 5, 8, 9, 2 |
| **Phenylephrine** | 5 microg/kg/min (Maximum 180 microg/min)<br>Rates as high as 15 microg/kg/min (Maximum 200 microg/min) have been used | 5, 6, 7, 42, 2 |
| **Phosphate**<br>*(Sodium Dihydrogen Phosphate)* | 0.2 mmol/kg/hour (Maximum 20 mmol/hour) | 2, 6, 1 |
| **Potassium** | 0.5 mmol/kg/hour (Maximum 40 mmol/hour) | CHQ-PMG-01213 Potassium for Paediatric Patients – oral and intravenous |
| **Pralidoxime** | 20 mg/kg/hour (Maximum 500 mg/hour) | 7, 11, 1, 2 |
| **Procainamide** | 120 microg/kg/min (6 mg/min)<br>Total of 2g per day | 5, 7, 2, 8 |

| Medication | Usual maximum dose | Reference *(refer to page 84–86)* |
|---|---|---|
| **propOFol** | Usual 4 mg/kg/hour (Maximum 300 mg/hour)<br>Maximum 7 mg/kg/hour (Maximum 450 mg/hour) at discretion of intensivist<br>Infusion durations over 48 hours or doses over 3mg/kg/hour increase the risk of propofol infusion syndrome | 6, 7, 4, 1 |
| **Remifentanil** | Usual 1 microg/kg/min<br>Rates as high as 5 microg/kg/min have been used | 1, 2, 9, 43, 44 |
| **Rocuronium** | 15 microg/kg/min | 5, 6, 7, 9 |
| **Salbutamol** | 5 microg/kg/min | 6, 1<br>CHQ-GDL-80112 Management of Severe Acute and Life-Threatening Asthma in PICU |
| **Sodium Benzoate** | 20.8 mg/kg/hour (Maximum 12 gram/day) | 12 |
| **Sodium Benzoate/ L-arginine** | Sodium benzoate: 12 gram/day<br>L-arginine: 12 gram/day | 12<br>CHQ-GDL-04313 Administration of Intravenous SODIUM BENZOATE and L-ARGININE HYDROCHLORIDE in children with hyperammonaemia associated with a urea cycle defect |
| **Sodium Bicarbonate** | Usual 1 mmol/kg/hour<br>Rates as high as 2 mmol/kg/hour has been used (when pH <6.9) | 5, 7, 1, 2 |
| **Sodium Chloride 3%** | Acutely symptomatic hyponatraemia: 1 mmol/kg/hour (Maximum 100 mL/hour)<br>Non-symptomatic: 0.25 mmol/kg/hour | 5, 7 |
| | 2.4 mmol/kg/hour | 7, 45, 46 |
| **Sodium nitroPRUSSide** | 4 microg/kg/min for infusion longer than 24 hours<br>10 microg/kg/min for infusion 10 minutes or less | 6, 7, 1, 2 |
| **Sodium Thiosulfate** | To prevent cyanide toxicity: 6 mg/kg/hour<br>To prevent cisplatin toxicity: 2 gram/m2/hour (approx. 50 mg/kg/hour) for 5 to 12 hours | 8, 10, 47, 5 |

| Medication | Usual maximum dose | Reference *(refer to page 84–86)* |
|---|---|---|
| **Sodium Valproate** | 6 mg/kg/hour | 5, 7, 1, 2<br>CHQ-GDL-80028 Refractory Status Epilepticus Management in Children |
| **TACrolimus** | 6.25 microg/kg/hour | 7, 1, 2<br>CHQ-PMG-01235 Intravenous Tacrolimus |
| **Thiopental** | 12 mg/kg/hour<br>Rates as high as 55 mg/kg/hour have been used for Refractory Status Epilepticus | 6, 7, 8, 1, 2<br>CHQ-GDL-80028 Refractory Status Epilepticus Management in Children |
| **TOX Lipid 20%**<br>*(Fat emulsion 20%)* | 30 mL/kg/hour<br>Maximum cumulative dose of 12 mL/kg | 48, 1<br>CHQ-GDL-00731 Local Anaesthetic Systemic Toxicity |
| **Tranexamic Acid** | 10 mg/kg/hour | 7<br>CHQ-WI-80113 PICU: Acute Bleeding Guideline |
| **Vancomycin** | Dose guided by vancomycin steady state serum concentrations<br>(Aim 20 to 25 mg/L) | 1,2<br>CHQ Vancomycin Therapeutic Drug Monitoring |
| **Vecuronium** | Usual 4.5 microg/kg/min<br>Rates as high as 10 microg/kg/min have been used | 7, 9, 49, 5, 1, 2 |
| **Vecuronium**<br>*≥20kg* | 10 mg/hour | 5, 1, 2 |

# Reference list

**This document does not include the complete information, consult published references regarding duration of infusion and line changes.**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# Appendix 1: Consensus rationale

CIDD contains evidence-based and clearly referenced medicines information and is intended to reduce unwarranted variation in medication preparation and administration. Throughout CIDD, we have endeavoured to meet the preferences of all facilities providing care to critically unwell paediatric patients. For some medications, the following rationales are provided and have been discussed at length and endorsed with paediatric staff specialists, pharmacy, and nursing expertise.

**Use of weight limits:**

There is no clear guidance or evidence for when to change to an adult dosing regimen in paediatric patients. We recommend seeking advice from the pharmacist for large-for-age or large-for-height patients.

For some medications, we have decided to use a certain weight cut-off to avoid excessive dosages in larger patients; whereby usual adult dosing range would be exceeded if weight-based dosing regimens were continued to be used. Above this cut-off, adult dosing regimens should be used, (i.e. change from unit/kg/unit to unit/unit).

The medication infusions for which we have decided to do this for (in version one of CIDD) are **amiodarone, argipressin (vasopressin), fentanyl, glyceryl trinitrate, isoprenaline, ketamine, midazolam and vecuronium.**

Vice versa, we recommend using unit/kg/unit dosing as provided in CIDD for patients below the specified weight.

**Propofol:**

The recommended dose for propofol in children and adults are both dosed in mg/kg/hour and is therefore left in this dosing regimen.

**Morphine:**

For morphine we decided to not change to mg/hour, because for patients up to 100 kg bodyweight, the paediatric dosing would not exceed the usual adult dose range.

**Inotropes and vasopressors:**

Inotropes and vasopressors were deliberately left in paediatric dosage units, as the dose should be guided by the desired effect of the drug.

**Neuro-muscular blockage**:

In patients requiring continuous neuro-muscular paralysis with vecuronium or cisatracurium infusions we emphasise the use of Train of Four (TOF) monitoring. We recommend targeting two evoked muscular responses out of four peripheral nerve stimulations (2/4) as per QCH guidelines CHQ-WI-80106.

# Appendix 2: Glossary

| Term | Definition |
|---|---|
| **Access (IV)** | Intravenous (IV) cannulation is a technique in which a cannula is placed inside a vein to provide venous access. Allowing intravenous medication administration |
| **ACT** | Activated Clotting Time |
| **anti-Xa** | Test to monitor blood clotting in patients given anticoagulant therapy (e.g. low molecular weight heparin) |
| **aPTT** | Activated partial thromboplastin time - measure of clotting time |
| **Blood pressure (BP)** | Pressure of blood within the arteries in mmHg. Monitoring includes Systolic and Diastolic pressures. |
| **Bolus** | Single large dose of medicine, given at one time |
| **Cardiac monitoring** | Cardiac telemetry – ECG, heart rate, respiratory rate, oxygen saturation monitoring |
| **Central access preferred** | Preferred route of administration preferred is via large central vein |
| **Central access required** | Required route of administration required is via large central vein |
| **DERS** | Dose Error Reduction Software |
| **ECG** | Electrocardiogram |
| **ECLS** | Extracorporeal Life Support |
| **ECMO** | Extracorporeal Membrane Oxygenation |
| **Extravasation** | Leakage of medication/fluids from vein, into surrounding tissue. Can cause blistering, tissue sloughing or necrosis if fluid is vesicant |
| **Glucose monitoring** | Capillary blood analysed to show blood glucose level |

| Term | Definition |
|---|---|
| **ICP** | Intracranial pressure |
| **In-line filter** | Filter membrane on IV access line. Can prevent air or particles entering the venous circulation |
| **Loading dose** | Initial higher dose to rapidly attain a required medicine concentration |
| **Large volume pump** | Infusion pump capable of delivering large volume fluid/medicine infusions |
| **Precipitation** | Undesirable formation of an insoluble solid in an IV solution |
| **Pressure bag** | Device applied to an IV fluid bag - increases deliver rate |
| **Special access scheme (SAS)** | Scheme to access medications that are not licensed for use in Australia under the Australian Register of Therapeutic Goods |
| **Respiratory monitoring** | Respiratory rate, pattern and effort of breathing evaluation, Oxygen saturation and delivery |
| **Standard concentration** | Concentration suitable for most, non-fluid restricted patients |
| **Syringe pump** | Small infusion pump. Gradually administer small volume medication or fluid infusions (usually up to maximum 50 mL) |
| **Taper** | Gradual reduction or discontinuation of a medication over a specified period or time |
| **Therapeutic drug monitoring** | Measurement of medicine (drug) concentration in plasma, serum or blood, to individualise dosage and maintain medicine concentrations within a target range |
| **Titrate** | Process of adjusting medication dose – up or down |
| **Train of Four monitoring** | Peripheral nerve stimulator used to assess neuromuscular transmission when neuromuscular blocking agents are being administered |

# Appendix 3: Blank concentration medicines

Blank Concentration Medicines administered by continuous infusion in standard concentrations that additionally require blank concentrations built into Dose Error Reduction Software (DERS). In DERS language a ‘blank’ concentration is defined as the ability to modify both the amount of medicine, and the volume to individualise a concentration. Blank concentrations are rarely required and should only used in severely fluid restricted patients, or during significant medication shortages. Consultant approval is recommended for the use of any blank concentration for patient safety.

- Acetylcysteine
- Adrenaline (epinephrine)
- Aminocaproic acid
- Aminophylline
- Amiodarone
- Arginine
- Argipressin
- Atropine
- Bivalirudin
- Botulism immune globulin
- Calcium chloride
- Calcium gluconate
- Cisatracurium
- Danaparoid
- Desferrioxamine
- Dexmedetomidine
- Dobutamine
- Dopamine
- Epoprostenol
- Esmolol
- Ethacyrinic Acid
- Fentanyl
- Flumazenil
- Furosemide (frusemide)
- Glucagon
- Glyceryl trinitrate
- Hydralazine
- Hydromorphone
- Insulin (ACTRAPID)
- Isoprenaline
- Ketamine
- Labetalol
- Levocarnitine
- Levomepromazine
- Lidocaine (lignocaine)
- Lorazepam
- Magnesium sulfate
- Metaraminol
- Methadone
- Methylene blue
- Metoprolol
- Midazolam
- Milrinone
- Morphine
- Naloxone
- Nesiritide
- Nicardipine
- Noradrenaline (norepinephrine)
- Octreotide
- Omeprazole
- Oxycodone
- Pantoprazole
- Phentolamine
- Phenylephrine
- Pralidoxime
- Procainamide
- Propofol
- Remifentanil
- Rocuronium
- Sodium benzoate
- Sodium bicarbonate
- Sodium nitroprusside
- Sodium thiosulfate
- Sodium valproate
- Tacrolimus
- Thiopentone
- Tranexemic acid
- Vecuronium

# Appendix 4: Authors and acknowledgments

The CIDD team would like to:

- Thank the Queensland Paediatric Critical Care Pathway (QPCCP) project for funding and supporting the CIDD project.
- Acknowledge the support of the Queensland Paediatric Intensive Care Advisory Group (PICAG).
- Acknowledge the generous sharing of knowledge and 'lessons learned' from the 'Children's Resuscitation Emergency Drug Dosage (CREDD)' team/authors.

The CIDD concept and layout have been endorsed by the Children's Health Queensland Medicines Advisory Committee and is suitable to be considered for use at all Queensland Health facilities treating critically unwell paediatric patients.

## CIDD steering committee

**Executive Sponsor:**

- Steven McTaggart – Executive Sponsor, Staff Specialist, Executive Director Medical Services CHQ

**CIDD Project Team and Authors:**

- Chloe Hall – CIDD Clinical Lead, Nurse Educator Children's Critical Care Unit (CCCU) Gold Coast University Hospital (GCUH)
- Quyen Tu – Senior Pharmacist, Critical Care, CHQ
- Eloise Lloyd – Senior Pharmacist, CCCU GCUH
- Fiona Gregory – Pharmacist, Safety and Quality QCH
- Vanessa Muller – Pharmacist, ICU Cairns Base Hospital (CBH)
- Sebastian Rimpau – Staff Specialist, CCCU GCUH
- Meghan Fitzpatrick – Senior Pharmacist, ED Townsville University Hospital (TUH)
- Christian Stocker – Director PICU QCH, Medical Co-Lead QPCCP CEQ
- Lilian Tamas – Principal Project Officer, QPCCP CEQ

**Queensland Paediatric Critical Care Pathways Project:**

- Jane Harnischfeger – Nurse Educator PICU QCH, CNC QPCCP
- Lynette Adams – Project Manager, QPCCP CEQ
- Marcelo Lucha – A/Project Support Officer, QPCCP CEQ

**Endorsed for state-wide use, with thanks by:**

- Paediatric Intensive Care Advisory Group (PICAG)
- Children's Health Queensland Medication Advisory Group (CHQ MAC)
- Queensland Child & Youth Clinical Network (QCYCN) Clinicians' Collaborative

**Cairns and Hinterland Hospital and Health Service:**

- Tamasine Philp – Pharmacist, Medication Safety CBH

**Children's Health Queensland Hospital and Health Service:**

- Sonya Stacey – Director, Pharmacy CHQ
- Ann-Maree Brady – CNC, CHQ Retrieval Service
- Claire Marks – Clinical Nurse, PICU QCH
- Melissa Johnson – Nurse Educator, CHQ Retrieval Service
- Michele Cree – Pharmacist Lead Critical Care, CHQ
- Natalie Tasker – Deputy Director, Pharmacy CHQ

**Gold Coast Hospital and Health Service:**

- Christa Bell – CREDD Medical Lead, Paediatric Emergency Physician & Emergency Physician GCUH
- Philip Sargent - Director, CCCU GCUH
- Anand Namasivayam – CN, CCCU GCUH
- Corrie Bakker – CN, CCCU, GCUH
- Dee Jenkins – A/NUM, CCCU GCUH
- Karyn Dahms – Clinical Pharmacist, GCUH
- Lucie Scott – CNC, Children's ED, GCUH
- Nathan Goddard – CN, Children's ED, GCUH
- Phillipa Lees – RN, CCCU GCUH

**Mackay Hospital and Health Service:**

- Michael Rampton – Critical Care Educator, ICCU Mackay Base Hospital

**Sunshine Coast Hospital and Health Service:**

- Lauren Morgan – CNC/NUM, Paediatric Critical Care SCUH
- Eleanor Humphreys – Pharmacist SCUH
- Elizabeth Upton – Pharmacist, Women's and Families Sunshine Coast University Hospital (SCUH)
- Kayla Doyle – Pharmacist, Women's and Families SCUH

**Townsville Hospital and Health Service:**

- Chris Florence – Senior Pharmacist, ICU TUH
- Kirsten White – CNC, PICU TUH
- Samantha Tenison-Woods – Yalurin (Townsville Paediatric Retrieval Service), CNC PICU TUH