APPENDIX 1 - Medication Formulary

The Medication Formulary is published by the Pre-Hospital Emergency Care Council (PHECC) to enable pre-hospital emergency care practitioners to be competent in the use of medications permitted under Medicinal Products 7th Schedule (SI 300 of 2014). This is a summary document only and practitioners are advised to consult with official publications to obtain detailed information about the medications used.

The Medication Formulary is recommended by the Medical Advisory Committee (MAC) prior to publication by Council.

The medications herein may be administered provided:

1 The practitioner is in good standing on the PHECC practitioner's Register.

2 The practitioner complies with the Clinical Practice Guidelines (CPGs) published by PHECC.

3 The practitioner is acting on behalf of an organisation (paid or voluntary) that is a PHECC licensed CPG provider.

4 The practitioner is privileged, by the organisation on whose behalf he/she is acting, to administer the medications.

5 The practitioner has received training on, and is competent in, the administration of the medication.

6 The medications are listed on the Medicinal Products 7th Schedule.

The context for administration of the medications listed here is outlined in the CPGs.

Every effort has been made to ensure accuracy of the medication doses herein. The dose specified on the relevant CPG shall be the definitive dose in relation to practitioner administration of medications. The principle of titrating the dose to the desired effect shall be applied. The onus rests on the practitioner to ensure that he/she is using the latest versions of CPGs which are available on the PHECC website www.phecc.ie

Sodium Chloride 0.9% (NaCl) is the IV/IO fluid of choice for pre-hospital emergency care.

Water for injection shall be used when diluting medications, however if not available NaCl (0.9%) may be used if not contraindicated.

All medication doses for patients ≤ 15 years shall be calculated on a weight basis unless an age related dose is specified for that medication.

The route of administration should be appropriate to the patient's clinical presentation. IO access is authorised for advanced paramedics for Life Threatening Emergencies (or under medical direction).

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The dose for paediatric patients may never exceed the adult dose.

Paediatric weight estimations acceptable to PHECC are:

Neonate =	3.5 Kg
Six months =	6 Kg
One to five years =	(age x 2) + 8 Kg
Greater than 5 years =	(age x 3) + 7 Kg

Pregnancy caution:

Medications should be prescribed in pregnancy only if the expected benefit to the mother is thought to be greater than the risk to the foetus, and all medications should be avoided if possible during the first trimester.

PHECC practitioners therefore should avoid using medications in early pregnancy unless absolutely essential and where possible medical advice should be sought prior to administration.

Paramedic authorisation for IV infusion continuation

PHECC registered paramedics are authorised to continue an established IV infusion in the absence of an advanced paramedic or doctor during transportation.

This version contains 47 medications.

Please visit www.phecc.ie for the latest edition/version

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Amendments to the Advanced Paramedic 2014 Edition:

New Medications introduced:

- Adenosine
- Ceftriaxone
- Chlorphenamine
- Glycopyrronium Bromide
- Haloperidol
- Hyoscine Butylbromide
- Ketamine
- Methoxyflurane
- Oxytocin

Medications removed:

- Benzylpenicillin / Syntometrine

Changes in blue text relate to the 2018 updates.

Adenosine		
Heading	**Add**	**Delete**
Contra-indications	Wolff-Parkinson-White syndrome	

Amiodarone		
Heading	**Add**	**Delete**
Presentation	300 mg (30 mg/mL)	10 mL (30 mg/mL)
Administration		**CPG:** 5/6.4.7
Indications	(pVT)	(VT)
Side Effects	Hypotension (usually moderate/transient) but can be severe after rapid injection	
Additional Information	For ease of use in paediatric calculations when using 150 mg in 3 mL, add 2 mL D_5W, making the concentration 150 mg in 5 mL	

Aspirin		
Heading	**Add**	**Delete**
Indications	Management of unstable angina and non ST-segment elevation myocardial infarction (NSTEMI) Management of ST-segment elevation myocardial infarction (STEMI)	
Contra-Indicated	(risk of Reye's syndrome)	
Side Effects	Increased bleeding time Skin reactions in hypersensitive patients	

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Atropine		
Heading	**Add**	**Delete**
Administration	**CPG:** 5/6.4.21	**CPG:** 5/6.4.7
Indications	(from Organophosphorous insecticides)	
Additional Information	Do not administer Atropine if temperature < 34°C	

Cyclizine		
Heading	**Add**	**Delete**
Clinical Level		
Administration	Intramuscular (IM) / Subcutaneous (SC) / Oral (PO) (**CPG:** 5/6.4.26, 5/6.8.7)	
Usual Dosages	IM **Palliative Care:** 50 mg PO/SC (Repeat x 1 prn) (**AP**) **Paramedic:** Administer IM route	

Ceftriaxone		
Heading	**Add**	**Delete**
Administration	Reconstitute each 1 g vial with 3.5 mL of 1% Lidocaine Hydrochloride injection	Reconstitute each 1 g vial with 2 mL of 1% Lidocaine Hydrochloride injection
Additional Information	(reconstitute in 2 mL and add 8 mL water for injection). Intramuscular route may be used only in exceptional circumstances. Up to 1 g (3.5 mL) divide into more than one injection site. IM injection should be mixed as 1 g and 3.5 mL of 1% Lidocaine Hydrochloride injection to reduce pain at the IM injection site	IM injection may be mixed with 2 mL of 1% Lidocaine Hydrochloride injection to reduce pain at the IM injection site.

Diazepam Injection:		
Heading	**Add**	**Delete**
Usual Dosages	Maximum 4 doses of Benzodiazepine for adult and paediatric patients regardless of route	Repeat prn to Max 10 mg Repeat prn to Max 0.4 mg/Kg or 10 mg, whichever is least
Additional Information	Can cause injection site reactions/thrombophlebitis, ensure large vein is used. Administer slowly (5 mg/1 ml over 1 minute) If a patient recommences seizing regard it as a new event, administer one dose of Benzodiazepine then consult medical advice	

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Diazepam Rectal Solution		
Heading	**Add**	**Delete**
Usual Dosages	Maximum 4 doses for adult and paediatric regardless of route	Repeat x 1 prn Max 20 mg PR Repeat all x 1 after 5 mins if seizure persists or reoccurs
Additional Information	If a patient recommences seizing regard it as a new event, administer one dose of Benzodiazepine then consult medical advice	

Enoxaparin		
Heading	**Add**	**Delete**
Contraindication	Patient on oral anticoagulant (Warfarin or NOAC) as thrombolytic contra-indicated	
Side Effect	(do not rub injection site)	

Epinephrine (1:1,000)		
Heading	**Add**	**Delete**
Presentation		(for EMT use)
Administration	(**CPG:** 2/3.4.15, 4/5/6.4.11, 4/5/6.7.13)	**CPG:** 4.4.15, 2/3.4.16, 4.7.31
Indications	Stridor, Symptomatic Bradycardia and Cardiogenic Shock	
Usual Dosages	**Paediatric:** **Stridor (AP):** < 1 Year: 2.5 mg NEB / ≥ 1 year: 5 mg NEB (repeat after 30 minutes prn) (AP) **Adult:** Symptomatic Bradycardia/Cardiogenic Shock (AP): 0.01 mg IV/IO repeat prn (Dilute 1 mg Epinephrine in 100 mL NaCl and draw up in 1 mL syringe, administer the dose over 1 minute)	

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Fentanyl		
Heading	**Add**	**Delete**
Administration	Intravenous (IV)	
Usual Dosages	Adults 0.05 mg (50 mcg) IV	
Contra-Indicated	< 1-year-old	
Additional Information	Following Fentanyl IN, the next dose may be either Fentanyl or Morphine IV, but not both (Adults) In the absence of acquiring IV access, a second dose of IN Fentanyl may be administered Controlled under schedule 2 of the Misuse of Drugs Regulations S.I. No. 328 of 1988	

Furosemide:		
Heading	**Add**	**Delete**
Contra-Indications	Known Hypokalaemia	
Additional information	The SPC recommends administration at 4 mg/min IV	

Glucagon:		
Heading	**Add**	**Delete**
Administration		**CPG:** 4.4.19, 4.7.32
Contra-indications	< 1 year	
Usual dosages	1 - 8 years - 0.5 mg (500 mcg) IM.	≤ 8 years - 0.5 mg (500 mcg) IM
Additional information	Hypoglycaemic paediatrics patients who are not diagnosed as diabetic should not be administered Glucagon (this does not preclude the administration of Glucose gel or Dextrose to treat hypoglycaemia)	

Glucose gel		
Heading	**Add**	**Delete**
Administration		CPG: 4.4.19, 4.7.32

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Glyceryl trinitrate (GTN)		
Heading	**Add**	**Delete**
Administration	(**CPG:** 1/2/3.4.10)	
Indications	**EMT:** Systolic BP ≥ 110	
Contra-Indications	Severe mitral stenosis	
Additional Information	Caution with inferior wall MI with right ventricular involvement as this may lead to profound hypotension	

Hartmann's Solution		
Heading	**Add**	**Delete**
Contra-Indications	Do not use with Ceftriaxone	

Hydrocortisone		
Heading	**Add**	**Delete**
Administration	(**CPG:** 4/5/6.4.15, 4/5/6.7.31)	
Usual Dosages	**Adult:** **Anaphylactic reaction:** (AP) 200 mg IV (infusion in 100 mL NaCl) or IM injection (P & AP) **Exacerbation of COPD:** 200 mg IV (infusion in 100 mL NaCl) or IM (AP) **Asthma:** 100 mg slow IV (infusion in 100 mL NaCl) (AP) **Adrenal insufficiency:** (AP) 100 mg IV (infusion in 100 mL NaCl) or IM (P & AP) **Paediatric:** **Anaphylactic reaction:** < 1 year: (AP) - 25 mg IV (infusion in 100 mL NaCl) or IM injection (P & AP) 1 to 5 years: (AP) - 50 mg IV (infusion in 100 mL NaCl) or IM injection (P & AP) > 5 years: (AP) - 100 mg IV (infusion in 100 mL NaCl) or IM injection (P & AP) **Asthma:** (AP) < 1 year: 25 mg / 1 to 5 years: 50 mg / > 5 years: 100 mg IV - (infusion in 100 mL NaCl) **Adrenal insufficiency:** 6 months to ≤ 5 years: (AP) 50 mg IV (infusion in 100 mL NaCl) or IM injection (P & AP) > 5 years: (AP) 100 mg IV (infusion in 100 mL NaCl) or IM injection (P & AP)	**Asthma (AP) and Adrenal insufficiency (P & AP):** 100 mg IV (infusion in 100 mL NaCl) or IM **6 mths to ≤ 5 yrs:** 50 mg IV (infusion in 100 mL NaCl) or IM **> 5 years:** 100 mg IV (infusion in 100 mL NaCl) or IM
Additional Information	If the patient, in an adrenal crisis, is still unwell following Hydrocortisone administration prior to arrival of the practitioner the standard dose of Hydrocortisone should be administered.	

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Ibuprofen		
Heading	**Add**	**Delete**
Presentation	200 mg in 5 mL	
Contra-Indications	Known renal failure / Known severe liver failure / Known severe heart failure / Concurrent NSAID use (e.g. Diclofenac, Naproxen)	
Usual Dosages	400 mg PO (Mild pain) 600 mg PO (Moderate pain) **Paediatric:** 10 mg/Kg PO to a maximum of 400 mg.	
Additional Information	Caution if on oral anticoagulant (e.g. Warfarin, Rivaroxaban, Apixaban, Edoxaban) due to increased bleeding risk	

Ketamine		
Heading	**Add**	**Delete**
Presentation	Vial	Ampoule (draw up 1 mL and dilute in 9 mL of NaCl)

Lidocaine		
Heading	**Add**	**Delete**
Presentation	5 mg/ 5 mL 1%	
Administration	(**CPG:** 4/5/6.7.22)	
Indications	VF/pVT Solvent for Ceftriaxone IM	VF/VT
Usual Dosages	**Adult:** 100 mg IV Solvent 3.5 mL for Ceftriaxone IM **Paediatric:** 1-1.5 mg/Kg IV Solvent 3.5 mL for Ceftriaxone IM	1-1.5 mg/Kg IV Max: 3 mg/Kg Not Indicated

Lorazepam		
Heading	**Add**	**Delete**
Administration	(**CPG**: 4/5/6.4.30)	CPG: 6.4.29
Usual Dosages	Repeat x 1 prn	
Additional Information	Must seek medical advice prior to administration	

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Magnesium Sulphate Injection		
Heading	**Add**	**Delete**
Indications	Life-threatening Asthma	
Administration		**CPG:** 4/5/6.4.3
Usual Dosages	**Life-threatening Asthma:** 2 g IV (infusion in 100 mL NaCl) given over 20 minutes **Infusion times added for the following:** Persistent bronchospasm: given over 20 minutes Tachycardia – Irregular: Torsades de pointes with a pulse: given over 10 - 15 minutes Seizure associated with pre-eclampsia: given over 15 minutes	
Side effects	-Bradycardia can occur during administration; this can be minimised by slowing the rate of infusion -Arrhythmias / Coma / Confusion / Drowsiness / Flushing of skin / Hypotension / Muscle weakness / Nausea / Thirst / Vomiting	Bradycardia Hypothermia
Additional Information	5 g in 10 mL is equivalent to 20 mmol/mg	

Methoxyflurane		
Heading	**Add**	**Delete**
Contra-Indications	Renal Failure or Impairment	
Additional Information		Do not use in patients with renal impairment or renal failure.

Midazolam Solution		
Heading	**Add**	**Delete**
Administration	(**CPG:** 5/6.8.7, 4/5/6.4.30)	
Indications	Sedation (following medical advice)	
Usual Dosages	**Palliative Care:** 2.5 mg SC (AP) Alternatively 2.5 - 5 mg buccal (P & AP) repeat x 1 prn Maximum 4 doses of Benzodiazepine for adult and paediatric seizing patients regardless of route. Repeat at no < 5 minutes prn. **Behavioural Emergency:** AP - Seek medical advice regarding sedation **Adults:** 5 mg IN/IM - (Repeat x 2 prn) (AP) **Paediatric:** 0.1 mg/Kg IN - (Repeat x 2 prn) (AP) Seizure < 3 months: - 1.25 mg buccal 3 months to < 1 year: - 2.5 mg buccal	Repeat x 1 prn Seizure: < 1 year: - 2.5 mg buccal
Additional Information	Contraindications, other than KSAR, refer to non-seizing patients. If patient recommences seizing regard it as a new event, administer additional dose then consider medical advice (AP)	No more than two doses by practitioners

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Morphine Sulphate		
Heading	**Add**	**Delete**
Presentation	Oral	
Administration	(**CPG:** 5/6.8.7)	
Usual Dosages	4 mg IV, initial dose Repeat Morphine 2 mg at not < 2 min intervals prn if indicated (Max 16 mg) For musculoskeletal pain (Max 20 mg) **Palliative Care:** 2.5 – 5 mg SC/PO (Repeat x 1 prn)	2 mg IV/IO Repeat at not < 2 min intervals prn if indicated to Max 10 mg For musculoskeletal pain, Max 16 mg
Additional Information	N.B. Controlled under Schedule 2 of the Misuse of Drugs Regulations 1988 (SI. no 328)	

Naloxone		
Heading	**Add**	**Delete**
Administration	(**CPG:** 5/6.4.7)	

Nifedipine		
Heading	**Add**	**Delete**
Presentation	10 mg tablet (standard preparation).	20 mg tablet
Side effects	Asthenia / Dizziness / Palpitation / Vasodilatation	Bradycardia

Ondansetron		
Heading	**Add**	**Delete**
Clinical Level		
Administration	IM **(CPG:** 5/6.4.26)	CPG: 4/5/6.2.6
Usual Dosages	IM 4 mg IM (P/AP) or slow IV (AP).	4 mg slow IV or IM (AP/P)
Side effects	Injection site reactions (rash, urticaria, itching) **Uncommon:** Arrhythmias / Bradycardia / Hypotension / Seizures	
Additional Information	Caution in patients with a known history or family history of cardiac conduction intervals (QT prolongation) or if patient has history of arrhythmias or electrolyte imbalance	

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Oxygen		
Heading	**Add**	**Delete**
Administration	CPAP device	
Indications	SpO_2 < 90% for patients with acute onset of Pulmonary Oedema	
Usual Dosages	Neonatal Resuscitation (< 4 weeks) Consider supplemental O_2 (≤ 30%)	

Oxytocin		
Heading	**Add**	**Delete**
Usual Dosages	Paediatric: 5 international units IM.	Paediatric: Not indicated.

Paracetamol		
Heading	**Add**	**Delete**
Presentation	Rectal suppository 1 g, 500 mg, 250 mg, 240 mg, 125 mg, 120 mg, 80 mg glass vial, 1 g of Paracetamol in 100 mL solution for infusion	180 mg and 60 mg
Administration	IV infusion (**CPG:** 5/6.8.7, 5/6.7.34)	
Indications	**Adult:** Pyrexia / Temperature > 38.3°C / Minor to moderate pain for adult patients **Paediatric:** Pyrexia / Temperature > 38.5°C / Minor to moderate pain for paediatric patients	
Usual Dosages	1 g IV infusion (AP) If estimated weight < 50 Kg, 15 mg/Kg (administered slowly over 15 minutes) **Palliative Care:** 1 g PO (Repeat x 1 prn) **Paediatric: IV Infusion** (AP) < 1 year – 7.5 mg/Kg IV (slowly) ≥ 1 year – 15 mg/Kg IV (slowly)	
Side effects	If Paracetamol IV is administered too fast it may result in hypotension.	None
Additional information	Caution with IV Paracetamol in the absence of a buretrol.	

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Salbutamol		
Heading	**Add**	**Delete**
Administration		**CPG:** 4.4.15, 2/3.4.16, 4.7.31, 3.7.12
Usual Dosages	0.1 mg metered aerosol spray (repeat aerosol x 11 prn) Repeat NEB at 5 minute intervals prn **EFR:** assist patient with Asthma/Anaphylaxis 0.1 mg metered aerosol spray (repeat aerosol x 11 prn) **Paediatric:** < 5 yrs - 0.1 mg metered aerosol spray (repeat aerosol x 5 prn) > 5 yrs - 0.1 mg metered aerosol spray (repeat aerosol x 11 prn) Repeat NEB at 5 minute intervals prn **EFR:** assist patient with Asthma/Anaphylaxis < 5 yrs - 0.1 mg metered aerosol spray (repeat aerosol x 5 prn) ≥ 5 yrs - 0.1 mg metered aerosol spray (repeat aerosol x 11 prn)	(0.1 mg metered aerosol spray x 5) **EFRs:** (0.1 mg metered aerosol spray x 2) **Paediatric:** < 5 yrs - (0.1 mg metered aerosol spray x 3) > 5 yrs - (0.1 mg metered aerosol spray x 5)

Sodium Chloride 0.9% (NaCl)		
Heading	**Add**	**Delete**
Usual Dosages	**Asystole / PEA** - Consider fluid challenge 1 L IV/IO (repeat prn) **Suspension Trauma** - 2 L IV (Maintain systolic BP > 90 mmHg) **Tachycardia** - (Torsades de pointes) 250 mL IV infusion	

Tranexamic Acid		
Heading	**Add**	**Delete**
Administration	(**CPG:** 4/5/6.5.4)	
Contra-Indications	Known severe renal impairment	
Indications	Postpartum Haemorrhage	

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Index of medication formulary (Adult ≥ 16 and Paediatric ≤ 15 unless otherwise stated)

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Clinical level: AP

Medication	Adenosine
Class	Antiarrhythmic agent.
Descriptions	Antiarrhythmic agent used to treat supraventricular tachycardia.
Presentation	6 mg in 2 mL solution. 3 mg per 1 mL (30 mg/10 mL) solution for infusion vials.
Administration	Intravenous (IV). (***CPG:*** 5/6.4.12).
Indications	Paroxysmal supraventricular tachycardia (> 150) with signs of poor perfusion.
Contra-Indications	Asthma / Wolff-Parkinson-White syndrome / Chronic obstructive lung disease / Decompensated heart failure / Long QT syndrome / Second or third degree AV block / Severe hypotension / Sick sinus syndrome (unless pacemaker fitted) / KSAR.
Usual Dosages	***Adult:*** 6 mg IV. ***Initial Adenosine unsuccessful:*** Repeat at 12 mg x 2 prn Max. ***Paediatric:*** Not indicated.
Pharmacology / Action	***Antiarrhythmic*** Rapid reversion to sinus rhythm of paroxysmal supraventricular tachycardia.
Side effects	Angina (discontinue). Apprehension - arrhythmia (discontinue if asystole or severe bradycardia occur). AV block / Dizziness / Dyspnoea / Flushing / Headache / Nausea / Sinus pause. ***Uncommon:*** Blurred vision / Hyperventilation / Metallic taste / Palpitation / Sweating / Weakness.
Additional information	Initially 6 mg, administered into large peripheral vein and given over 2 seconds, followed by rapid 10 mL NaCl 0.9% flush. Repeat doses of 12 mg administered rapidly also. Cardiac monitoring required. ***Cautions:*** Atrial fibrillation with accessory pathway / Atrial flutter with accessory pathway Autonomic dysfunction / Bundle branch block / First-degree AV block / Heart transplant / Recent MI / Severe heart failure / Stenotic valvular heart disease / Uncorrected hypovolaemia.

Clinical level: AP

Medication	Amiodarone
Class	Antiarrhythmic agent.
Descriptions	Class III antiarrhythmic agent used to treat ventricular arrhythmia.
Presentation	150 mg in 3 mL solution. Pre-filled syringe of 300 mg (30 mg/mL).
Administration	Intravenous (IV). Intraosseous (IO). (***CPG:*** 4/5/6.4.3, 5/6.4.12, 4/5/6.7.22)**.**
Indications	Ventricular Fibrillation (VF) and Pulseless Ventricular Tachycardia (pVT). Symptomatic Tachycardia (> 150).
Contra-Indications	Known hypersensitivity to Iodine / KSAR.
Usual Dosages	***Adult:*** ***VF/pVT:*** 5 mg/Kg IV/IO. ***Loading dose for cardiac arrest:*** 300 mg and one supplemental dose of 150 mg. ***Symptomatic tachycardia:*** 150 mg - IV infusion in 100 mL D_5W (over 10 minutes). ***Paediatric:*** ***VF/pVT:*** 5 mg/Kg IV/IO. If refractory ***VF/pVT*** post Epinephrine and 3rd shock
Pharmacology / Action	***Antiarrhythmic:*** Prolongs the action potential / Prolongs the refractory period / Prolongs atrioventricular conduction / Prolongs QT interval.
Side effects	Inflammation of peripheral veins / Bradycardia / AV conducting abnormalities. Hypotension (usually moderate / transient) but can be severe after rapid injection.
Additional information	If diluted mix with Dextrose 5% (for infusion use 100 mL D_5W). May be flushed with NaCl. For cardiac arrest do not dilute, administer directly followed by a flush. For ease of use in paediatric calculations when using 150 mg in 3 mL, add 2 mL D_5W, making the concentration 150 mg in 5 mL.

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Clinical level: 

Medication	Aspirin
Class	Platelet aggregation inhibitor.
Descriptions	Anti-inflammatory agent and an inhibitor of platelet function. Useful agent in the treatment of various thromboembolic diseases such as acute myocardial infarction.
Presentation	300 mg dispersible tablet.
Administration	Orally (PO) - dispersed in water, or to be chewed - if not dispersible form. (***CPG:*** 5/6.4.10, 4.4.10, 1/2/3.4.10).
Indications	Cardiac chest pain or suspected myocardial infarction. Management of unstable angina and non ST-segment elevation myocardial infarction (NSTEMI). Management of ST-segment elevation myocardial infarction (STEMI).
Contra-Indications	Active symptomatic gastrointestinal (GI) ulcer / Bleeding disorder (e.g. haemophilia) / Known severe adverse reaction / Patients < 16 years old (risk of Reye's syndrome) .
Usual Dosages	***Adult:*** 300 mg tablet. ***Paediatric:*** Contraindicated.
Pharmacology / Action	***Antithrombotic:*** Inhibits the formation of thromboxane A2, which stimulates platelet aggregation and artery constriction. This reduces clot/thrombus formation in an MI.
Side effects	Epigastric pain and discomfort / Bronchospasm / Gastrointestinal haemorrhage / Increased bleeding time / Skin reactions in hypersensitive patients.
Long term effects	Generally mild and infrequent but incidence of gastro-intestinal irritation with slight asymptomatic blood loss, increased bleeding time, bronchospasm and skin reaction in hypersensitive patients.
Additional information	Aspirin 300 mg is indicated for cardiac chest pain regardless if patient is on anti-coagulants or is already on Aspirin. If the patient has swallowed an Aspirin (enteric coated) preparation without chewing it, the patient should be regarded as not having taken any Aspirin; administer 300 mg PO.

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Clinical level: AP

Medication	Atropine
Class	Anticholinergic (parasympatholytic).
Descriptions	Parasympatholytic (Anticholinergic) that is derived from parts of the *Atropa belladonna* plant.
Presentation	Pre-filled disposable syringe 1 mg/10 mL. Ampoule 0.6 mg in 1 mL.
Administration	Intravenous (IV). Intraosseous (IO). (***CPG:*** 5/6.3.5, 4/5/6.4.11, 5/6.4.21, 6.4.22).
Indications	***Adult:*** Symptomatic bradycardia. Cholinergic poison (from Organophosphorus insecticides) with bradycardia and salivation.
Contra-Indications	Known severe adverse reaction / Post-cardiac transplantation.
Usual Dosages	***Adult:*** ***Cholinergic poison with bradycardia and salivation:*** 1 mg IV. (Repeat at 3-5 min intervals to ensure minimal salivary secretions). ***Symptomatic Bradycardia:*** 0.6 mg (600 mcg) IV. (Repeat at 3-5 min intervals to Max 3 mg). ***Paediatric:*** Not indicated.
Pharmacology / Action	***Anticholinergic agent:*** Blocks acetylcholine receptors. Enhances SA node automaticity. Enhance AV node conduction. Increases heart rate.
Side effects	Tachycardia / Dry mouth / Dilated pupils.
Additional information	Accidental exposure to the eye causes blurred vision. Do not administer Atropine if temperature < 34°C

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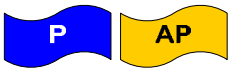
Clinical level: AP

Medication	Ceftriaxone
Class	Antibiotic, Antibacterial.
Descriptions	Antibacterial for systemic use.
Presentation	Ceftriaxone (as Ceftriaxone sodium) powder for solution for injection vials, 250 mg / 1 g / 2 g for IV administration. Powder and solvent for solution, for IM injection. White to yellowish-orange crystalline powder.
Administration	IV/IO/IM. ***IV/IO:*** Reconstitute each 1 g vial in 10 mL of water for injection BP. Should be administered over 2-4 minutes. ***Intravenous infusion:*** Reconstitute 2 g of Ceftriaxone in 100 mL of one of the following calcium-free solutions: • Dextrose 5% or 10% • Sodium chloride (NaCl 0.9%) The Infusion should be administered over at least 30 minutes. ***IM:*** Reconstitute each 1g vial with 3.5 mL of 1% Lidocaine Hydrochloride injection and administer by deep intramuscular injection. (***CPG:*** 4/5/6.4.24, 5/6.7.34)
Indications	Severe sepsis – Adult and Paediatric.
Contra-Indications	Age < 1 month Known severe adverse reaction. Hx of severe hypersensitivity (e.g. anaphylactic reaction) to any beta-lactam antibacterial (Penicillins, Cephalosporins, Aztreonam, Meropenem, Ertapenem). Ceftriaxone solutions containing Lidocaine should never be administered IV.
Usual Dosages	***Adult:*** 2 g IV/IO/IM. ***Paediatric:*** *1 Month – 11 years: 50 mg/Kg IV/IO/IM* *> 11 years or body weight > 50 Kg: 2 g IV/IO/IM* *IV injection over 2-4 minutes or deep IM Injection.*
Pharmacology / Action	Antibacterial spectrum.
Side effects	Diarrhoea / Rash / Headache / Dizziness / Nausea / Vomiting / Pruritus.
Additional information	Ceftriaxone ***must not*** be mixed or administered simultaneously with any calcium-containing intravenous solutions. Preferred route >1 g by IV infusion. (reconstitute in 2 mL and add 8 mL water for injection). Intramuscular route may be used only in exceptional circumstances. Up to 1 g (3.5 mL) divide into more than one injection site. IM injection should be mixed as 1 g and 3.5 mL of 1% Lidocaine Hydrochloride injection to reduce pain at the IM injection site. The resulting solution should never be administered intravenously.

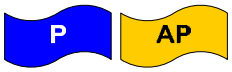
Clinical level: EMT P AP

Medication	Chlorphenamine
Class	Antihistamine
Descriptions	H_1 antagonist to counteract the effects of histamine release.
Presentation	10 mg in 1 mL ampoule. 4 mg tablet.
Administration	Intravenous (IV), Intramuscular (IM) and Orally (PO). (***CPG:*** 4/5/6.4.15, 4/5/6.7.31).
Indications	Anaphylaxis or allergic reaction.
Contra-Indications	Known severe adverse reaction / Pre-coma states.
Usual Dosages	**Adult:** *Allergic reaction* Mild: - 4 mg PO (EMT / P / AP). Moderate: - 4 mg PO or 10 mg IM (EMT / P) or 10 mg IV (AP). Severe/Anaphylaxis: - 10 mg IM (EMT / P) or 10 mg IV (AP). **Paediatric:** *Allergic reaction*: Mild: 6 to 11 years – 2 mg PO (EMT / P / AP). ≥ 12 years – 4 mg PO (EMT / P / AP). Moderate: < 1 year – 0.25 mg/Kg IM (EMT / P) or 0.25 mg/Kg IV (AP). 1 to 5 years – 2.5 mg IM (EMT / P) or 2.5 mg IV (AP). 6 to 11 years – 2 mg PO or 5 mg IM (EMT / P) or 5 mg IV (AP). ≥ 12 years – 4 mg PO or 10 mg IM (EMT / P) or 10 mg IV (AP). Severe / Anaphylaxis: < 1 year – 0.25 mg/Kg IM (EMT / P) or 0.25 mg/Kg IV (AP). 1 to 5 years – 2.5 mg IM (EMT / P) or 2.5 mg IV (AP). 6 to 11 years – 5 mg IM (EMT / P) or 5 mg IV (AP). ≥ 12 years – 10 mg IM (EMT / P) or 10 mg IV (AP).
Pharmacology / Action	Chlorphenamine is a potent antihistamine (H_1-receptor antagonist). Antihistamines diminish or abolish the action of histamine in the body by competitive reversible blockade of histamine 1 receptor sites on tissues. Chlorphenamine also has anticholinergic activity.
Side effects	Causes drowsiness and patients receiving it should not drive or operate machinery.
Additional information	Use with caution in epilepsy / Prostatic hypertrophy / Glaucoma / Hepatic disease / Bronchitis / Bronchiectasis / Thyrotoxicosis / Raised intra-ocular pressure / Severe hypertension / Cardiovascular disease / Bronchial asthma. For IV route, administer over 1 minute. If small dose required, dilute with NaCl 0.9%.

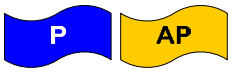
Clinical level: 

Medication	Clopidogrel
Class	Platelet aggregation inhibitor.
Descriptions	An inhibitor of platelet function.
Presentation	300 mg tablet. 75 mg tablet.
Administration	Orally (PO). (***CPG:*** 5/6.4.10).
Indications	ST elevation myocardial infarction (STEMI) if the patient is not for PPCI.
Contra-Indications	Known severe adverse reaction / Active pathological bleeding / Severe liver impairment.
Usual Dosages	***Adult:*** 300 mg PO. *(≥ 75 years*: 75 mg PO). ***Paediatric:*** Not indicated.
Pharmacology / Action	Clopidogrel selectively inhibits the binding of adenosine diphosphate (ADP) to its platelet receptor, and the subsequent ADP-mediated activation of the GPIIb/IIIa complex, thereby inhibiting platelet aggregation. Biotransformation of Clopidogrel is necessary to produce inhibition of platelet aggregation. Clopidogrel acts by irreversibly modifying the platelet ADP receptor.
Side effects	Abdominal pain / Dyspepsia / Diarrhoea.
Additional information	If a patient has been loaded with an anti-platelet medication (other than Aspirin), prior to the arrival of the practitioner, the patient should not have Clopidogrel administered.

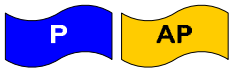
APPENDIX 1 - Medication Formulary

Clinical level: 

Medication	Cyclizine
Class	Antiemetic.
Descriptions	Used in management of nausea & vomiting.
Presentation	Ampoule 50 mg in 1 mL.
Administration	Intravenous (IV). Intraosseous (IO). Intramuscular (IM). Subcutaneous (SC). Oral (PO). (***CPG:*** 5/6.4.26, 5/6.8.7).
Indications	Management, prevention and treatment of nausea and vomiting.
Contra-Indications	Known severe adverse reaction.
Usual Dosages	***Adult:*** 50 mg slow IV/IO or IM. ***Palliative Care:*** 50 mg SC/PO. (Repeat x 1 prn - AP). ***Paediatric:*** Not indicated.
Pharmacology / Action	Anti-emetic.
Side effects	Tachycardia / Dry Mouth / Sedation.
Additional information	IM route should only be utilised where IV or IO access is not available.

Clinical level: 

Medication	Dextrose 10% Solution
Class	Carbohydrate.
Descriptions	Dextrose is used to describe the six-carbon sugar d-glucose, which is the principal form of carbohydrate used by the body. $D_{10}W$ is a hypertonic solution.
Presentation	Soft pack for infusion 250 mL and 500 mL.
Administration	Intravenous (IV) Infusion/bolus. Intraosseous (IO). ***Paramedic:*** Maintain infusion once commenced. (***CPG:*** 5/6.4.19, 4/5/6.7.32).
Indications	Hypoglycaemic Emergency. Blood glucose level < 4 mmol/L.
Contra-Indications	Known severe adverse reaction.
Usual Dosages	***Adult:*** 250 mL IV/IO infusion (repeat x 1 prn). ***Paediatric:*** 5 mL/Kg IV/IO (repeat x 1 prn).
Pharmacology / Action	Hypertonic glucose solution. Dextrose is a readily utilisable energy source.
Side effects	Necrosis of tissue around IV access.
Additional information	Also called Glucose. Cannula patency will reduce the effect of tissue necrosis. Advanced paramedics should use as large a vein as possible.

Clinical level: 

Medication	DEXTROSE 5% SOLUTION
Class	Carbohydrate.
Descriptions	Dextrose is used to describe the six-carbon sugar d-glucose, which is the principal form of carbohydrate used by the body. D_5W is a hypertonic solution and is used as an infusion medium for Amiodarone.
Presentation	Soft pack for infusion 100 mL and 500 mL.
Administration	Intravenous (IV) infusion. Intraosseous (IO) infusion. ***Paramedic:*** Maintain infusion once commenced. (***CPG****:* May be used for medication dilution on CPGs).
Indications	Use as a dilutant for Amiodarone infusion.
Contra-Indications	Known severe adverse reaction.
Usual Dosages	***Adult:*** Dilute appropriate dose of Amiodarone in 100 mL or 500 mL. ***Paediatric:*** Not indicated.
Pharmacology / Action	Dextrose 5% (D_5W) is used as an infusion medium for the administration of Amiodarone.
Side effects	Necrosis of tissue around IV access.
Additional information	

Clinical level: AP

Medication	Diazepam injection
Class	Benzodiazepine.
Descriptions	It is a Benzodiazepine that is used to terminate seizures.
Presentation	Ampoule 10 mg in 2 mL.
Administration	Intravenous (IV). Intraosseous (IO). (***CPG:*** 5/6.4.23, 5/6.7.33).
Indications	Seizure.
Contra-Indications	Known severe adverse reaction / Respiratory depression / Shock / Depressed vital signs or alcohol-related altered level of consciousness
Usual Dosages	***Adult:*** 5 mg IV/IO. ***Paediatric:*** 0.1 mg/Kg IV/IO. Maximum 4 doses of Benzodiazepine for adult and paediatric patients regardless of route.
Pharmacology / Action	***Benzodiazepine sedative:*** Inhibits the firing of hyper excitable neurones through enhancement of the action of the inhibitory transmitter, GABA. This results in CNS depressant, anticonvulsant, sedative and skeletal muscle relaxant effects.
Side effects **Long term side effects**	Hypotension / Respiratory depression / Drowsiness and light-headedness (the next day). Confusion and ataxia (especially in the elderly) / Amnesia / Dependence / Paradoxical increase in aggression and muscle weakness.
Additional information	Diazepam IV should be titrated to effect. Can cause injection site reactions/thrombophlebitis, ensure large vein is used. Administer slowly (5 mg/1 mL over 1 minute). The maximum dose of Diazepam includes that administered by carer prior to arrival of practitioner. If a patient recommences seizing regard it as a new event, administer one dose of Benzodiazepine then consult medical advice.

Clinical level: AP

Medication	Diazepam Rectal Solution
Class	Benzodiazepine.
Descriptions	It is a Benzodiazepine that is used to terminate seizures.
Presentation	***Rectal tube***: *Available as:* 2.5 mg / 1.25 mL (2 mg/mL). 5 mg / 2.5 mL (2 mg/mL). 10 mg / 2.5 mL (4 mg/mL).
Administration	Per Rectum (PR). (***CPG:*** 5/6.4.23, 5/6.7.33).
Indications	Seizure.
Contra-Indications	Known severe adverse reaction / Respiratory depression / Shock / Depressed vital signs or alcohol related altered level of consciousness.
Usual Dosages	***Adult:*** 10 mg (PR). ***Paediatric:*** *< 3 years:* 2.5 mg (PR). *3 to 7 years:* 5 mg (PR). *≥ 8 years:* 10 mg (PR). Maximum 4 doses of Benzodiazepine for adult and paediatric patients regardless of route.
Pharmacology / Action	***Benzodiazepine sedative:*** Inhibits the firing of hyper excitable neurones through enhancement of the action of the inhibitory transmitter, GABA. This results in CNS depressant, anticonvulsant, sedative and skeletal muscle relaxant effects.
Side effects **Long term side effects**	Hypotension / Respiratory depression / Drowsiness and light-headedness (the next day). Confusion and ataxia (especially in the elderly) / Amnesia / Dependence / Paradoxical increase in aggression and muscle weakness.
Additional information	Be aware of modesty of patient. Should be administered in the presence of a 2nd person. Egg and soya proteins are used in the manufacture of Diazepam Rectal Solution; allergies to these proteins may be encountered. The maximum dose of Diazepam includes that administered by carer prior to arrival of practitioner. If a patient recommences seizing regard it as a new event, administer one dose of Benzodiazepine then consult medical advice.

APPENDIX 1 - Medication Formulary

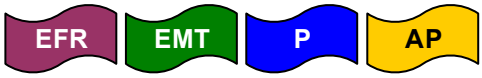
Clinical level: MP

Medication	Enoxaparin Sodium Solution
Class	Anticoagulant.
Descriptions	Enoxaparin is a Low Molecular Weight Heparin used in conjunction with a thrombolytic agent for the treatment of STEMI.
Presentation	Pre-filled Syringes (100 mg/mL).
Administration	Intravenous (IV). (***CPG:*** 5/6.4.10).
Indications	Acute ST-segment elevation myocardial infarction (STEMI) immediately following the administration of a thrombolytic agent.
Contra-Indications	Active major bleeding disorders and conditions with a high risk of uncontrolled haemorrhage, including recent haemorrhagic stroke or subdural haematoma; In jaundice / Active gastric or duodenal ulceration / Hiatal ulceration / Threatened abortion / Retinopathy. Hypersensitivity to Enoxaparin or other Low Molecular Weight Heparins. Known severe adverse reaction. Patient on oral anticoagulant as (Warfarin or new oral anticoagulant NOAC) thrombolytic contra-indicated.
Usual Dosages	***Adult:*** 30 mg IV bolus. *(> 75 years:* 0.75 mg/Kg SC). ***Paediatric:*** Not indicated.
Pharmacology / Action	It binds to the natural inhibitor of coagulation, antithrombin III and makes certain clotting factors inactive. This results in an increase in the clotting time.
Side effects	Pain, haematoma and mild local irritation may follow the subcutaneous injection (do not rub injection site).
Additional information	Do not store above 25°C. Do not refrigerate or freeze. ***Medical Practitioners****:* Due to the significant increased risk of intra-cerebral bleed for patients aged > *75 years* ***Do Not*** administer IV Enoxaparin. ***Enoxaparin 0.75 mg/Kg SC:*** (Max 75 mg SC) is the recommended dose and route.

Clinical level: AP

Medication	Epinephrine (1:10,000)
Class	Sympathetic agonist.
Descriptions	Naturally occurring catecholamine. It is a potent alpha and beta adrenergic stimulant; however, its effect on beta receptors is more profound.
Presentation	Pre-filled syringe. 1 mg/10 mL (1:10,000) as 0.1 mg/mL.
Administration	Intravenous (IV). Intraosseous (IO). (***CPG:*** 4/5/6.4.3, 5/6.4.4, 4/5/6.4.6, 5/6.5.2, 4/5/6.7.22, 4/5/6.7.23, 4/5/6.7.24).
Indications	Cardiac arrest / Paediatric bradycardia unresponsive to other measures.
Contra-Indications	Known severe adverse reaction.
Usual Dosages	***Adult:*** ***Cardiac arrest:*** 1 mg (1:10,000) IV/IO. (Repeat every 3-5 mins). ***Paediatric:*** ***Cardiac arrest:*** 0.01 mg/Kg (10 mcg/Kg) (0.1 mL/Kg of 1:10,000) IV/IO. (Repeat every 3-5 mins). ***Bradycardia:*** 0.01 mg/Kg (10 mcg/Kg) (0.1 mL/Kg of 1:10,000) IV/IO (Repeat every 3-5 mins).
Pharmacology / Action	***Alpha and beta adrenergic stimulant:*** Increases heart rate – Chronotropic effect. Increases myocardial contractions – Inotropic effect. Increases BP. Increases electrical activity in the myocardium. Increases cerebral and coronary blood flow. Dilation of bronchioles.
Side effects	***In non-cardiac arrest patients:*** Palpitations / Tachyarrhythmias / Hypertension.
Additional Information	***N.B.*** Double check concentrations on pack before use.

APPENDIX 1 - Medication Formulary

Clinical level: 

Medication	Epinephrine (1:1,000)
Class	Sympathetic agonist.
Descriptions	Naturally occurring catecholamine. It is a potent alpha and beta adrenergic stimulant; however, its effect on beta receptors is more profound.
Presentation	Pre-filled syringe, ampoule or Auto injector. 1 mg/1 mL (1:1,000).
Administration	Intramuscular (IM), Intravenous (IV) and Nebulisation (Neb) (***CPG:*** 2/3.4.15, 2/3.7.31, 5/6.4.7 4/5/6.4.11, 4/5/6.4.15, 4/5/6.7.13, 4/5/6.7.31).
Indications	Severe anaphylaxis, Stridor, Symptomatic Bradycardia and Cardiogenic shock.
Contra-Indications	None known.
Usual Dosages	***Adult:*** 0.5 mg **(**500 mcg) IM (0.5 mL of 1: 1,000). ***EFR*** assist patient – 0.3 mg (Auto injector) (Repeat every 5 minutes' prn). ***Adult: Symptomatic Bradycardia/ Cardiogenic shock:*** 0.01 mg IV/IO repeat prn. (Dilute 1 mg Epinephrine in 100 mL NaCl and draw up in 1 mL syringe, administer the dose over 1 minute). ***Anaphylaxis Paediatric:*** *< 6 months:* - 0.05 mg (50 mcg) IM (0.05 mL of 1:1,000) *6 months to 5 years:* - 0.125 mg (125 mcg) IM (0.13 mL of 1:1,000) *6 to 8 years:* - 0.25 mg (250 mcg) IM (0.25 mL of 1:1,000) *> 8 years:* - 0.5 mg (500 mcg) IM (0.5 mL of 1:1,000) ***EFR*** assist patient – *6 Months < 10 years:* 0.15 mg (Auto injector) (repeat every 5 minutes prn). *≥ 10 years:* 0.3 mg (Auto injector) (repeat every 5 minutes prn). ***Stridor (AP):*** ***< 1 Year:*** 2.5 mg NEB ***≥ 1 year:*** 5 mg NEB (repeat after 30 minutes' prn) (AP).
Pharmacology / Action	***Alpha and beta adrenergic stimulant:*** Reversal of laryngeal oedema and bronchospasm in anaphylaxis. Antagonises the effects of histamine.
Side effects	Palpitations / Tachyarrhythmias / Hypertension / Angina-like symptoms.
Additional information	***N.B.*** Double check the concentration on pack before use.

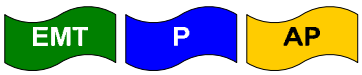
Clinical level: AP

Medication	Fentanyl
Class	Narcotic analgesic.
Descriptions	Synthetic narcotic analgesic with a rapid onset and short duration of action. It has a half-life of 6.5 minutes when IN route is used.
Presentation	Ampoule 100 micrograms in 2 mL (0.1 mg in 2 mL).
Administration	Intranasal (IN). Intravenous (IV). (***CPG:*** 4/5/6.2.6, 4/5/6.7.5).
Indications	Acute severe pain.
Contra-Indications	< 1-year-old / Known Fentanyl hypersensitivity / ALoC / Bilateral occluded nasal passage / Nasal trauma / Epistaxis / Hypovolaemia.
Usual Dosages	***Adult:*** 0.1 mg (100 mcg) IN (Repeat by one at not < 10 minutes if severe pain persists). 0.05 mg (50 mcg) IV ***Paediatric:*** 0.0015 mg/Kg (1.5 mcg/Kg) IN. (Repeat by one at not < 10 minutes if severe pain persists).
Pharmacology / Action	Fentanyl provides some of the effects typical of other opioids through its agonism of the opioid receptors. Its strong potency in relation to that of Morphine is largely due to its high lipophilicity. Because of this, it can more easily penetrate the CNS. Fentanyl binds to μ-opioid G-protein-coupled receptors, which inhibit pain neurotransmitter release by decreasing intracellular Ca^{2+} levels.
Side effects	Sedation / Nausea / Vomiting / Respiratory depression.
Additional information	***Caution if patient has transdermal Fentanyl patch:*** Include an additional 0.1 mL, to allow for dead space in the mucosal atomisation device (MAD), in the calculated volume required. Administer 50% volume in each nostril if more than 1 mL. Following Fentanyl IN, the next dose may be either Fentanyl or Morphine IV, but not both. (Adults) In the absence of acquiring IV access, a second dose of IN Fentanyl may be administered. Controlled under Schedule 2 of the Misuse of Drugs Regulations 1988 (S.I. No. 328 of 1988).

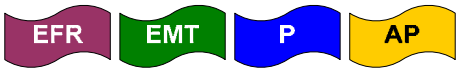
APPENDIX 1 - Medication Formulary

Clinical level: AP

Medication	Furosemide injection
Class	Diuretic.
Descriptions	A loop diuretic.
Presentation	Ampoule 10 mg per mL. 2 mL, 5 mL and 25 mL per ampoule.
Administration	Intravenous (IV). (***CPG:*** 5/6.3.5).
Indications	Pulmonary oedema.
Contra-Indications	Pregnancy / Known Hypokalaemia Known severe adverse reaction.
Usual Dosages	***Adult:*** 40 mg slow IV. ***Paediatric:*** Not indicated.
Pharmacology / Action	Acts on the ascending loop of Henle by inhibiting the reabsorption of chloride and sodium ions into the interstitial fluid. This results in a relative hypertonic state. Water is therefore retained in the loop and eliminated via the bladder. It also causes venodilation which reduces venous return to the heart.
Side effects **Long term side effects**	Headache / Dizziness / Hypotension / Arrhythmias / Transient deafness / Diarrhoea / Nausea and Vomiting. Hyperuricaemia / Gout / Hypokalaemia / Hyperglycaemia.
Additional information	Furosemide should be protected from light. SPC recommends administration at 4 mg/min IV.

Clinical level: 

Medication	Glucagon
Class	Hormone and Antihypoglycaemic.
Descriptions	Glucagon is a protein secreted by the alpha cells of the Islets of Langerhans in the pancreas. It is used to increase the blood glucose level in cases of hypoglycaemia in which an IV cannot be immediately placed.
Presentation	1 mg vial powder and solution for reconstitution (1 mL).
Administration	Intramuscular (IM) (***CPG:*** 5/6.4.19, 4/5/6.7.32)
Indications	Hypoglycaemia in patients unable to take oral glucose or unable to gain IV access, with a blood glucose level < 4 mmol/L.
Contra-Indications	< 1 year / Phaeochromocytoma / KSAR
Usual Dosages	***Adult:*** 1 mg IM. ***Paediatric:*** *1 - 8 years* - 0.5 mg (500 mcg) IM. *> 8 years* - 1 mg IM.
Pharmacology / Action	***Glycogenolysis:*** Increases plasma glucose by mobilising glycogen stored in the liver.
Side effects	Rare, may cause Hypotension / Dizziness / Headache / Nausea and Vomiting.
Additional information	May be ineffective in patients with low stored glycogen e.g. prior use in previous 24 hours, alcoholic patients with liver disease. Store in refrigerator. Protect from light. Hypoglycaemic paediatrics patients who are not diagnosed as diabetic should not be administered Glucagon. (this does not preclude the administration of Glucose Gel or Dextrose to treat hypoglycaemia)

Clinical level: 

Medication	Glucose gel
Class	Antihypoglycaemic.
Descriptions	Synthetic glucose paste.
Presentation	Glucose gel in a tube or sachet.
Administration	Buccal administration: Administer gel to the inside of the patient's cheek and gently massage the outside of the cheek. (***CPG:*** 2/3.4.19, 4/5/6.4.19, 4/5/6.7.32).
Indications	Hypoglycaemia. Blood glucose < 4 mmol/L. ***EFR*** - Known diabetic with confusion or altered levels of consciousness.
Contra-Indications	Known severe adverse reaction.
Usual Dosages	***Adult:*** 10 – 20 g buccal (repeat prn). ***Paediatric:*** ≤ *8 years:* 5 – 10 g buccal (repeat prn). > *8 years:* 10 – 20 g buccal (repeat prn).
Pharmacology / Action	Increases blood glucose levels.
Side effects	May cause vomiting in patients under the age of 5 years if administered too quickly.
Additional information	Glucose gel will maintain glucose levels once raised but should be used secondary to Dextrose to reverse hypoglycaemia. ***Proceed with caution:*** Patients with airway compromise. Altered level of consciousness.

Clinical level: EFR EMT P AP

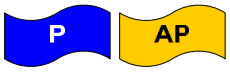
Medication	Glyceryl trinitrate (GTN)
Class	Nitrate.
Descriptions	Special preparation of Glyceryl trinitrate in an aerosol form that delivers precisely 0.4 mg of Glyceryl trinitrate per spray.
Presentation	***Aerosol spray:*** Metered dose of 0.4 mg (400 mcg).
Administration	***Sublingual:*** Hold the pump spray vertically with the valve head uppermost. Place as close to the mouth as possible and spray under the tongue. The mouth should be closed after each dose. (***CPG:*** 5/6.3.5, 5/6.4.10, 4.4.10, 1/2/3.4.10).
Indications	Angina / suspected myocardial infarction (MI). ***EMT:*** Angina / suspected myocardial infarction (MI) with systolic BP ≥ 110 mmHg. ***EFR:*** may assist with administration. ***Advanced Paramedics and Paramedics*** - Pulmonary oedema.
Contra-Indications	SBP < 90 mmHg / Viagra or other phosphodiesterase type 5 inhibitors (Sildenafil, Tadalafil and Vardenafil) used within previous 24 hours / Severe mitral stenosis / Known severe adverse reaction.
Usual Dosages	***Adult:*** ***Angina or MI:*** 0.4 mg (400 mcg) sublingual. (Repeat at 3-5 min intervals, Max: 1.2 mg). ***EFR:*** assist administration - 0.4 mg sublingual max. ***Pulmonary oedema:*** 0.8 mg (800 mcg) sublingual (repeat x 1 prn) (P & AP). ***Paediatric:*** Not indicated.
Pharmacology / Action	***Vasodilator:*** Releases nitric oxide which acts as a vasodilator. Dilates coronary arteries particularly if in spasm increasing blood flow to myocardium. Dilates systemic veins reducing venous return to the heart (pre-load) and thus reduces the heart's workload. Reduces BP.
Side effects	Headache / Transient Hypotension / Flushing / Dizziness.
Additional information	Caution with inferior wall MI with right ventricular involvement as this may lead to profound hypotension. If the pump is new or it has not been used for a week or more the first spray should be released into the air.

Clinical level: AP

Medication	Glycopyrronium Bromide
Class	Antimuscarinics.
Descriptions	Glycopyrronium Bromide is a quaternary ammonium antimuscarinic with peripheral effects similar to those of Atropine.
Presentation	Ampule 200 mcg/mL.
Administration	Subcutaneous (SC). (***CPG:*** 5/6.8.7).
Indications	Palliative care with excessive oropharyngeal secretions.
Contra-Indications	Known severe adverse reaction.
Usual Dosages	***Adult:*** 0.4 mg (400 mcg) SC. ***Paediatric:*** Not applicable.
Pharmacology / Action	It inhibits the action of acetylcholine on structures innervated by postganglionic cholinergic nerves and on smooth muscles that respond to acetylcholine but lack cholinergic innervation.
Side effects	Transient bradycardia / Pupil dilation / Photophobia / Flushing.
Additional information	For patients receiving palliative care administer their doctor's prescribed dose if known.

Clinical level: AP

Medication	Haloperidol
Class	Antipsychotic.
Descriptions	A class of antipsychotic medication used especially in the treatment of schizophrenia.
Presentation	Ampule 5 mg/mL. Capsule 0.5 mg (PO).
Administration	Subcutaneous (SC). Oral (PO). (***CPG:*** 5/6.8.7).
Indications	Palliative care with nausea and vomiting or agitation/delirium.
Contra-Indications	Known severe adverse reaction.
Usual Dosages	***Adult:*** 1 – 2 mg SC/PO. ***Paediatric:*** Not applicable.
Pharmacology / Action	Haloperidol is metabolised by several routes, including glucuroniation and cytochrome P450 enzyme system (particularly CYP 3A4 or CYP 2D6). As a direct consequence of the central dopamine blocking effect, Haloperidol has an incisive activity on delusion and hallucinations and an activity on the basal ganglia.
Side effects	Insomnia / Agitation / Hyperkinesia / Headache.
Additional information	For agitation/delirium, consider Midazolam in addition only if severe agitation. For patients receiving palliative care administer their doctor's prescribed dose if known.

Clinical level: 

Medication	Hartmann's Solution
Class	Isotonic crystalloid solution.
Descriptions	Hartmann's Solution is an isotonic crystalloid solution containing Sodium Chloride 0.6%, Sodium Lactate 0.25%, Potassium Chloride 0.04%, Calcium Chloride 0.027%.
Presentation	Soft pack for infusion 500 mL & 1000 mL.
Administration	Intravenous (IV) infusion. Intraosseous (IO) infusion. ***Paramedic:*** Maintain infusion once commenced.
Indications	When NaCl is unavailable it may be substituted with Hartmann's Solution IV/IO, except for crush injuries, burns, renal failure and hyperglycaemia.
Contra-Indications	Known severe adverse reaction. Do not use with Ceftriaxone.
Usual Dosages	***Adult:*** See NaCl. ***Paediatric:*** See NaCl.
Pharmacology / Action	Increases extracellular volume.
Side effects	If administered in large amounts may cause oedema.
Additional information	Observe caution with patients with history of heart failure. ***Also called:*** Sodium Lactate Intravenous Solution or Compound Ringer Lactate Solution for injection. Warm fluids prior to administration if possible.

Clinical level: P AP

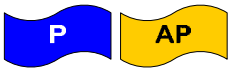
Medication	Hydrocortisone
Class	Corticosteroid and anti-inflammatory.
Descriptions	Hydrocortisone is a potent corticosteroid with anti-inflammatory properties.
Presentation	Powder and solvent for solution for injection or infusion. Vial containing off-white powder and vial containing water for injections. Prepare the solution aseptically by adding not more than 2 mL of sterile water for injections to the contents of one 100 mg vial, shake and withdraw for use.
Administration	Intravenous (IV infusion). Intramuscular (IM). The preferred route for initial emergency use is intravenous. (***CPG:*** 4/5/6.3.3, 4/5/6.3.4, 5/6.4.13, 4/5/6.4.15, 4/5/6.7.12, 5/6.7.30, 4/5/6.7.31).
Indications	Severe or recurrent anaphylactic reactions. Asthma refractory to Salbutamol and Ipratropium Bromide. Exacerbation of COPD (AP). Adrenal insufficiency (P).
Contra-Indications	No major contraindications in acute management of anaphylaxis.
Usual Dosages	***Adult:*** ***Anaphylactic reaction:*** (AP) 200 mg IV (infusion in 100 mL NaCl) or IM injection (P/AP). ***Exacerbation of COPD:*** 200 mg IV (infusion in 100 mL NaCl) or IM (AP). ***Asthma:*** 100 mg slow IV (infusion in 100 mL NaCl) (AP). ***Adrenal insufficiency:*** (AP) 100 mg IV (infusion in 100 mL NaCl) or IM (P/AP). ***Paediatric:*** ***Anaphylactic reaction:*** *< 1 year:* (AP) - 25 mg IV (infusion in 100 mL NaCl) or IM (P/AP). *1 to 5 years:* (AP) - 50 mg IV (infusion in 100 mL NaCl) or IM (P/AP). *> 5 years:* (AP) - 100 mg IV (infusion in 100 mL NaCl) or IM (P/AP). ***Asthma:*** (AP) *< 1 year:* 25 mg IV / *1 to 5 years:* 50 mg IV / *> 5 years:* 100 mg IV - (infusion in 100 mL NaCl). ***Adrenal insufficiency:*** *6 months to ≤ 5 years:* (AP) 50 mg IV (infusion in 100 mL NaCl) or IM injection (P/AP). *> 5 years:* (AP) 100 mg IV (infusion in 100 mL NaCl) or IM injection (P/AP).
Pharmacology / Action	Potent anti-inflammatory properties and inhibits many substances that cause inflammation.
Side effects **Long term side effects**	CCF / Hypertension / Abdominal distension / Vertigo / Headache / Nausea / Malaise and hiccups. Adrenal cortical atrophy develops during prolonged therapy and may persist for months after stopping treatment.
Additional information	Intramuscular injection should avoid the deltoid area because of the possibility of tissue atrophy. Dose should not be less than 25 mg. IV is the preferred route for adrenal crisis. If the patient, in an adrenal crisis, is still unwell following Hydrocortisone administration prior to arrival of the practitioner the standard dose of Hydrocortisone should be administered.

Clinical level: AP

Medication	Hyoscine Butylbromide
Class	Antimuscarinics.
Descriptions	Hyoscine Butylbromide is an antispasmodic agent.
Presentation	Ampule 20 mg/mL.
Administration	Subcutaneous (SC). (***CPG:*** 5/6.8.7).
Indications	Palliative care with excessive oropharyngeal secretions.
Contra-Indications	Known severe adverse reaction.
Usual Dosages	***Adult:*** 10 – 20 mg SC. ***Paediatric:*** Not applicable.
Pharmacology / Action	It is believed to act predominantly on the intramural parasympathetic ganglia of the abdominal and pelvic cavity organs.
Side effects	Transient bradycardia / Pupil dilation / Photophobia / Flushing.
Additional information	For patients receiving palliative care administer their doctor's prescribed dose if known.

Clinical level: EMT P AP

Medication	Ibuprofen
Class	Non-Steroidal Anti-Inflammatory Drugs (NSAIDs).
Descriptions	It is an anti-inflammatory analgesic.
Presentation	Suspension 100 mg in 5 mL and 200 mg in 5 mL. 200 mg, 400 mg tablets.
Administration	Orally (PO). (***CPG:*** 4/5/6.2.6, 4/5/6.7.5).
Indications	Mild to moderate pain.
Contra-Indications	Not suitable for children under 3 months / Patient with history of asthma exacerbated by Aspirin / Pregnancy / Peptic ulcer disease / Known renal failure / Known severe liver failure / Known severe heart failure / Concurrent NSAID use (e.g. Diclofenac, Naproxen) / Known severe adverse reaction.
Usual Dosages	***Adult:*** 400 mg PO (Mild pain). 600 mg PO (Moderate pain). ***Paediatric:*** 10 mg/Kg PO to a maximum of 400 mg.
Pharmacology / Action	Suppresses prostaglandins, which cause pain via the inhibition of cyclooxygenase (COX). Prostaglandins are released by cell damage and inflammation.
Side effects **Long term side effects**	Skin rashes / Gastrointestinal intolerance and bleeding. Occasional gastrointestinal bleeding and ulceration can occur. May also cause acute renal failure / Interstitial nephritis / NSAID-associated nephropathy.
Additional information	If Ibuprofen administered in previous 6 hours, adjust the dose downward by the amount given by other sources resulting in a maximum of 10 mg/Kg or 400 mg for paediatrics. Caution with significant burns or poor perfusion due to risk of kidney failure. Caution if on oral anticoagulant (e.g. Warfarin, Rivaroxaban, Apixaban, Edoxaban) due to increased bleeding risk. Ibuprofen may be combined with Paracetamol fir synergic effect.

Clinical level: 

Medication	Ipratropium Bromide
Class	Anticholinergic.
Descriptions	It is a parasympatholytic bronchodilator that is chemically related to Atropine.
Presentation	Nebuliser Solution 0.25 mg (250 mcg) in 1 mL.
Administration	Nebulised (NEB) mixed with age specific dose of Salbutamol. (***CPG:*** 4/5/6.3.3, 4/5/6.3.4, 4/5/6.7.12).
Indications	Acute moderate asthma or exacerbation of COPD not responding to initial Salbutamol dose.
Contra-Indications	Known severe adverse reaction.
Usual Dosages	***Adult:*** 0.5 mg (500 mcg) NEB. ***Paediatric:*** *< 12 years:* 0.25 mg (250 mcg) NEB. *≥ 12 years:* 0.5 mg (500 mcg) NEB.
Pharmacology / Action	It blocks muscarinic receptors associated with parasympathetic stimulation of the bronchial air passageways. This results in bronchial dilation and reduced bronchial secretions.
Side effects	Transient dry mouth / Blurred vision / Tachycardia / Headache.

APPENDIX 1 - Medication Formulary

Clinical level: AP

Medication	Ketamine
Class	Ketamine is a dissociative anaesthetic agent with analgesic properties.
Descriptions	Ketamine acts as an *N*-methyl-D-aspartate (NMDA) receptor noncompetitive antagonist. Combined with Morphine, Ketamine demonstrates beneficial effects in trauma patients with severe acute pain.
Presentation	White crystalline powder or clear liquid. Vial 200 mg in 20 mL.
Administration	Intravenous (IV). (***CPG:*** 4/5/6.2.6, 4/5/6.7.5).
Indications	***Adult:*** Severe pain. ***Paediatric:*** Severe pain.
Contra-Indications	Acute porphyrias / Pre-eclampsia / Eclampsia / Head trauma / Hypertension / Severe cardiac disease / Stroke / KSAR.
Usual Dosages	***Adult:*** 0.1 mg/Kg IV (repeat once only at not < 10 minutes prn). ***Paediatric:*** 0.1 mg/Kg IV (repeat once only at not < 10 minutes prn).
Pharmacology / Action	Induces sedation, immobility amnesia, and marked analgesia.
Side effects	Diplopia / Hallucinations / Hypertension / Nausea and Vomiting / Tachycardia / Transient psychotic effects. ***Uncommon:*** Arrhythmias / Bradycardia / Hypotension / Laryngospasm / Respiratory depression.
Additional information	Incidents of hallucinations, nightmares, and other psychotic effects can be reduced by a Benzodiazepine such as Diazepam or Midazolam. Reduces Morphine requirements. Has low frequency of serious side effects in doses used for analgesia. Allows patients to maintain their pharyngeal reflexes and maintain their own airway. Controlled under Schedule 3 to the Misuse of Drugs Regulations 1988 (S.I. No. 328 of 1988).

Clinical level: AP

Medication	Lidocaine
Class	Antiarrhythmic.
Descriptions	Ventricular antiarrhythmic agent.
Presentation	Lidocaine injection Mini jet 1% w/v 100 mg per 10 mL. 5 mg/ 5 mL 1%
Administration	Intravenous (IV). Intraosseous (IO). (***CPG:*** 5/6.4.3, 4/5/6.7.22).
Indications	When Amiodarone is unavailable it may be substituted with Lidocaine for VF/pVT arrests - *(Special authorisation required).* Solvent for Ceftriaxone IM
Contra-Indications	No contraindications for cardiac arrest.
Usual Dosages	***Adult:*** 100 mg IV. Solvent 3.5 mL for Ceftriaxone IM ***Paediatric:*** 1-1.5 mg/Kg IV. Solvent 3.5 mL for Ceftriaxone IM
Pharmacology / Action	Reduces automaticity by decreasing the rate of diastolic depolarisation. Stabilises the neuronal membrane and prevents the initiation and transmission of nerve impulses, action is rapid and blockade may last up to 2 hours.
Side effects	Drowsiness / Dizziness / Twitching / Paraesthesia / Convulsions / Bradycardia / Respiratory depression.
Additional information	Lidocaine may not be administered if Amiodarone has been administered.

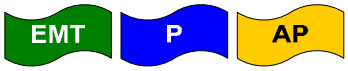
Clinical level: AP

Medication	Lorazepam
Class	Benzodiazepine.
Descriptions	It is an anxiolytic used as a sedative.
Presentation	1 mg tablet.
Administration	Orally (PO). (***CPG:*** 4/5/6.4.30).
Indications	Combative with hallucinations or paranoia and risk to self or others.
Contra-Indications	History of sensitivity to Benzodiazepines / Severe hepatic or pulmonary insufficiency / Suspected significant alcohol and/or sedatives ingested / KSAR.
Usual Dosages	***Adults:*** 2 mg PO (repeat x 1prn). ***Paediatric:*** Not indicated.
Pharmacology / Action	Acts on CNS receptors to potentiate the inhibitory action of GABA.
Side effects	Drowsiness / Confusion / Headache / Dizziness / Blurred vision / Nausea and Vomiting. ***On rare occasions:*** Hypotension / Hypertension.
Additional information	Must seek medical advice prior to administration.

Clinical level: AP

Medication	Magnesium Sulphate injection
Class	Electrolyte and Tocolytic agent.
Descriptions	It is a salt that is an essential element in numerous biochemical reactions that occur within the body.
Presentation	Ampoule 5 g in 10 mL.
Administration	Intravenous (IV). Intraosseous (IO). (***CPG:*** 4/5/6.3.4, 5/6.4.12, 5/6.4.23).
Indications	Life-threatening Asthma / Torsades de pointes / Persistent bronchospasm / Seizure associated with eclampsia.
Contra-Indications	None in cardiac arrest. Known severe adverse reaction.
Usual Dosages	***Adults:*** ***Life-threatening Asthma:*** 2 g IV (infusion in 100 mL NaCl) given over 20 minutes. ***Tachycardia – Irregular:*** *Torsades de pointes with a pulse:* 2 g IV (infusion in 100mL NaCl) given over 10 - 15 minutes. ***Persistent bronchospasm:*** 2 g IV (infusion in 100 mL NaCl) given over 20 minutes. ***Seizure associated with pre-eclampsia:*** 4 g IV (infusion in 100 mL NaCl) given over 15 minutes. ***Paediatric:*** Not indicated.
Pharmacology / Action	It acts as a physiological calcium channel blocker and blocks neuromuscular transmission**.**
Side effects	Bradycardia can occur during administration; this can be minimised by slowing the rate of infusion. Arrhythmias / Coma / Confusion / Drowsiness / Flushing of skin / Hypotension / Decreased deep tendon reflexes / Muscle weakness / Nausea / Respiratory depression / Thirst / Vomiting.
Additional Information	5 g in 10 mL is equivalent to 20 mmol/mg.

APPENDIX 1 - Medication Formulary

Clinical Level: 

Medication	**Methoxyflurane**
Class	Volatile anaesthetic agent.
Descriptions	Clear, almost colourless, volatile liquid, with a characteristic fruity odour that becomes a vapour or gas when used with the single use inhaler.
Presentation	3 mL vial with a tear off tamper-evident seal.
Administration	Inhaled (INH) through an activated Carbon Chamber (self-administered). (***CPG:*** 4/5/6.2.6, 4/5/6.7.5).
Indications	***Adult:*** Moderate to severe pain. ***Paediatric:*** Moderate to severe pain.
Contra-Indications	< 5 years old Altered LOC due to head injury, drugs or alcohol / Cardiovascular instability / Respiratory depression / Renal Failure or Impairment / KSAR.
Usual Dosages	***Adult:*** 3 mL (INH) (repeat x 1 only prn). ***Paediatric:*** 3 mL (INH) (repeat x 1 only prn).
Pharmacology / Action	Methoxyflurane vapour provides analgesia when inhaled at low concentrations. Methoxyflurane perturbs membrane fluidity and alters the activity of many ion channels and receptors required for cell-cell signalling across gap junctions and which underlie the action potential.
Side effects	Amnesia / Anxiety / Depression / Dizziness / Dysarthria / Dysgeusia / Euphoria / Headache / Sensory neuropathy / Somnolence / Hypotension / Coughing / Dry mouth / Nausea / Feeling drunk / Sweating. ***Uncommon:*** Tingling or numbness to hands and feet / Tiredness / Mouth discomfort.
Additional information	Patients with pain due to acute coronary syndrome (ACS) or migraine may not be suitable for Methoxyflurane. Methoxyflurane crosses the placenta. Consider the risk of central nervous system (CNS) and respiratory depression in an already compromised foetus. Contains butylated hydroxytoluene (E321) as a stabiliser. Methoxyflurane has a mildly pungent odour. If used in a confined space request the patient to inhale and exhale through the inhaler tube while ensuring that the activated Carbon Chamber is attached.

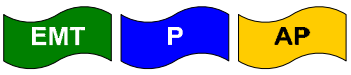
Clinical level: P AP

Medication	Midazolam Solution
Class	Benzodiazepine.
Descriptions	It is a potent sedative agent. Clinical experience has shown Midazolam to be 3 to 4 times more potent per mg as Diazepam.
Presentation	***Ampoule:*** 10 mg in 2 mL or 10 mg in 5 mL. ***Pre-filled syringe:*** 2.5 mg in 0.5 mL / 5 mg in 1 mL / 7.5 mg in 1.5 mL / 10 mg in 1 mL / 10 mg in 2 mL. ***Buccal liquid:*** 50 mg in 5 mL.
Administration	Buccal / IN / IM / IV / IO. Intranasal (IN) (50% in each nostril). (***CPG:*** 5/6.4.23, 4/5/6.4.30, 5/6.7.33, 5/6.8.7).
Indications	Seizures / Combative with hallucinations or paranoia and risk to self or others / Sedation (following medical advice).
Contra-Indications	Shock / Respiratory depression / KSAR / Depressed vital signs or alcohol-related altered level of consciousness.
Usual Dosages	***Adult:*** ***Seizure:*** 10 mg buccal, 5 mg IN or 5 mg IM (P/AP) 2.5 mg IV/IO (AP) ***Palliative Care:*** 2.5 mg SC (AP) *Alternatively* 2.5 - 5 mg buccal (P/AP) repeat x 1 prn. ***Behavioural Emergency:*** AP - Seek medical advice regarding sedation. 5 mg IN/IM - (repeat x 2 prn) (AP). ***Paediatric****:* ***Seizure****:* < 3 months: - 1.25 mg buccal 3 months to < *1 year:* - 2.5 mg buccal *1 year to < 5 years:* - 5 mg buccal *5 years to < 10 years:* - 7.5 mg buccal ≥ *10 years:* - 10 mg buccal Or 0.2 mg/Kg intranasal (P & AP) or 0.1 mg/Kg IV/IO (AP) Maximum 4 doses of Benzodiazepine for adult and paediatric seizing patients regardless of route. Repeat at no < 5 minutes prn. ***Behavioural Emergency:*** AP - Seek medical advice regarding sedation. 0.1 mg/Kg IN - (repeat x 2 prn) (AP).
Pharmacology / Action	It affects the activity of a chemical that transmits impulses across nerve synapses called Gmma-AminoButyric Acid (GABA). GABA is an inhibitory neurotransmitter. Midazolam works by increasing the effects of GABA at these receptors.
Side effects	Respiratory depression / Headache / Hypotension / Drowsiness.
Additional information	Midazolam IV should be titrated to effect. Ensure Oxygen and resuscitation equipment are available prior to administration. Practitioners should take into account the dose administered by carers prior to arrival of practitioner. Contraindications, other than KSAR, refer to non-seizing patients. If patient recommences seizing regard it as a new event, administer additional dose then consider medical advice (AP).

APPENDIX 1 - Medication Formulary

Clinical level: AP

Medication	Morphine Sulphate
Class	Narcotic analgesic.
Descriptions	CNS depressant and a potent analgesic with haemodynamic properties that make it extremely useful in emergency medicine.
Presentation	Ampoule 10 mg in 1 mL (dilute in 9 mL of NaCl). Oral Suspension 10 mg in 5 mL.
Administration	IV / IO / PO / IM. (***CPG:*** 4/5/6.2.6, 4/5/6.7.5, 5/6.8.7).
Indications	***Adult:*** Severe pain. ***Paediatric:*** Severe pain.
Contra-Indications	PO < 1-year-old / Labour pains / Acute respiratory depression / Acute intoxication / Systolic BP < 90 mmHg / Known severe adverse reaction.
Usual Dosages	***Adult:*** 4 mg IV - initial dose. Repeat Morphine 2 mg at not < 2 min intervals prn (Max 16 mg). For musculoskeletal pain Max 20 mg. Up to 10 mg IM (if no cardiac chest pain and no IV access). ***Palliative Care:*** 2.5 - 5 mg SC (repeat x 1 prn) *Alternatively* 5 - 10 mg PO (repeat x 1 prn). ***Paediatric:*** 0.3 mg/Kg (300 mcg/Kg) PO (Max 10 mg). 0.05 mg/Kg (50 mcg/Kg) IV/IO. Repeat at not < 2 min prn to Max of 0.1 mg/Kg IV/IO.
Pharmacology / Action	***Opiate Analgesic:*** Acts on Central Nervous System to reduce pain and anxiety. Vasodilatation resulting in reduced pre-load to myocardium.
Side effects **Long term side effects**	Respiratory depression / Drowsiness / Nausea and vomiting / Constipation. Long term use may lead to dependence.
Additional information	Use with extreme caution particularly with elderly/young. Caution with acute respiratory distress. Caution with reduced GCS. Not recommended for headache. ***N.B.*** Controlled under Schedule 2 of the Misuse of Drugs Regulations 1988 (SI. no 328).

Clinical Level: 

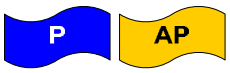
Medication	Naloxone
Class	Narcotic antagonist.
Descriptions	Effective in management and reversal of overdoses caused by narcotics or synthetic narcotic agents.
Presentation	Ampoules 0.4 mg in 1 mL (400 mcg /1 mL) or pre-loaded syringe.
Administration	IV / IO / IM / SC / IN. (***CPG**:* 5/6.4.7, 4/5.4.22, 6.4.22, 5/6.5.2, 4/5/6.7.11).
Indications	Inadequate respiration and/or ALoC following known or suspected narcotic overdose.
Contra-Indications	Known severe adverse reaction.
Usual Dosages	***Adult:*** 0.4 mg (400 mcg) IV/IO (AP) (repeat after 3 min prn to a Max dose of 2 mg). 0.4 mg (400 mcg) IM/SC (P) (repeat after 3 min prn to a Max dose of 2 mg). 0.8 mg (800 mcg) IN (EMT) (repeat x 1 after 3 min prn). ***Paediatric:*** 0.01 mg/Kg (10 mcg/Kg) IV/IO (AP). 0.01 mg/Kg (10 mcg/Kg) IM/SC (P). 0.02 mg/Kg (20 mcg/Kg) IN (EMT). (Repeat dose prn to maintain opioid reversal to Max 0.1 mg/Kg or 2 mg).
Pharmacology / Action	***Narcotic antagonist:*** Reverse the respiratory depression and analgesic effect of narcotics.
Side effects	Acute reversal of narcotic effect ranging from nausea and vomiting to agitation and seizures.
Additional information	Use with caution in pregnancy. Administer with caution to patients who have taken large dose of narcotics or are physically dependent. Rapid reversal will precipitate acute withdrawal syndrome. Prepare to deal with aggressive patients.

Clinical level: AP

Medication	Nifedipine
Class	Tocolytic agent and calcium channel blocker.
Descriptions	Dihydropyridine calcium channel blocker.
Presentation	10 mg tablet (standard preparation).
Administration	PO (***CPG:*** 4/5/6.5.5)
Indications	Prolapsed cord.
Contra-Indications	Hypotension. Known severe adverse reaction.
Usual Dosages	***Adults:*** 20 mg PO. ***Paediatric:*** Not indicated.
Pharmacology / Action	Inhibits muscle contraction by interfering with the movement of calcium ions through the slow channels of active cell membrane.
Side effects	Asthenia / Hypotension / Headache / Dizziness / Palpitation / Vasodilatation / Lethargy / Nausea and Vomiting
Additional information	Close monitoring of maternal pulse & BP is required and continuous foetal monitoring should be carried out if possible.

Clinical Level: EMT P AP

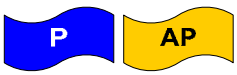
Medication	Nitrous Oxide 50% and Oxygen 50% (Entonox®)
Class	Analgesic.
Descriptions	Potent analgesic gas contains a mixture of both Nitrous Oxide and Oxygen.
Presentation	Cylinder, coloured blue with white and blue triangles on cylinder shoulders. ***Medical gas:*** 50% Nitrous Oxide & 50% Oxygen.
Administration	Self-administered. Inhalation by demand valve with face-mask or mouthpiece. (***CPG:*** 4/5/6.2.6, 5/6.5.1, 5/6.5.6, 4/5/6.7.5).
Indications	Moderate to severe pain.
Contra-Indications	Altered level of consciousness / Chest Injury / Pneumothorax / Shock / Recent scuba dive / Decompression sickness / Intestinal obstruction / Inhalation Injury / Carbon monoxide (CO) poisoning / Known severe adverse reaction.
Usual Dosages	***Adult:*** Self-administered until pain tolerable. ***Paediatric:*** Self-administered until pain tolerable.
Pharmacology / Action	***Analgesic agent gas:*** CNS depressant. Pain relief.
Side effects	Disinhibition / Decreased level of consciousness / Light headedness.
Additional information	Do not use if patient unable to understand instructions. In cold temperatures warm cylinder and invert to ensure mix of gases. Advanced paramedics may use discretion with minor chest injuries. ***Brand name:*** Entonox®. Has an addictive property. Caution when using Entonox® for greater than one hour for sickle cell crisis.

Clinical level: 

Medication	Ondansetron
Class	Antiemetic.
Descriptions	Used in management of nausea and vomiting. Potent, highly selective 5 HT3 receptor-antagonist.
Presentation	Ampoule 2 mL (4 mg in 2 mL).
Administration	IM/IV. (***CPG:*** 5/6.4.26, 4/5/6.7.5).
Indications	Management, prevention and treatment of significant nausea and vomiting.
Contra-Indications	Known severe adverse reaction.
Usual Dosages	***Adult:*** 4 mg IM (P/AP) or slow IV (AP). ***Paediatric:*** *0.1 mg*/kg 0.1 mg/Kg (100 mcg / Kg) slow IV or IM to a Max of 4 mg (AP).
Pharmacology / Action	Precise mode of action in the control of nausea and vomiting is not known.
Side effects	***General:*** Flushing / Headache / Sensation of warmth/ Injection site reactions (rash, urticaria, itching). ***Uncommon:*** Arrhythmias / Bradycardia / Hiccups / Hypotension / Seizures.
Additional information	Caution in patients with a known history or family history of cardiac conduction intervals (QT prolongation) or if patient has history of arrhythmias or electrolyte imbalance.

Clinical Level: EFR EMT P AP

Medication	Oxygen
Class	Gas.
Descriptions	Odourless / Tasteless / Colourless gas necessary for life.
Presentation	***Medical gas:*** D, E or F cylinders, coloured black with white shoulders. ***CD cylinder:*** White cylinder.
Administration	***Inhalation via:*** High concentration reservoir (non-rebreather) mask / Simple face mask / Venturi mask / Tracheostomy mask / Nasal cannulae / CPAP device / Bag Valve Mask. **(*CPG:* Oxygen is used extensively throughout the CPGs).**
Indications	Absent / Inadequate ventilation following an acute medical or traumatic event. SpO_2 < 94% adults and < 96% paediatrics. SpO_2 < 92% for patients with acute exacerbation of COPD. SpO_2 < 90% for patients with acute onset of Pulmonary Oedema.
Contra-Indications	Bleomycin lung injury.
Usual Dosages	***Adult:*** Cardiac and respiratory arrest or sickle cell crisis; 100%. Life threats identified during primary survey; 100% until a reliable SpO_2 measurement obtained then titrate O_2 to achieve SpO_2 of 94% - 98%. For patients with acute exacerbation of COPD, administer O_2 titrate to achieve SpO_2 92% or as specified on COPD Oxygen Alert Card. All other acute medical and trauma titrate O_2 to achieve SpO_2 94% - 98%. ***Paediatric:*** Cardiac and respiratory arrest or sickle cell crisis; 100%. Life threats identified during primary survey; 100% until a reliable SpO_2 measurement obtained then titrate O_2 to achieve SpO_2 of 96% - 98%. Neonatal resuscitation (< 4 weeks) consider supplemental O_2 (≤ 30%). All other acute medical and trauma titrate O_2 to achieve SpO_2 of 96% - 98%.
Pharmacology / Action	Oxygenation of tissue/organs.
Side effects	Prolonged use of O_2 with chronic COPD patients may lead to reduction in ventilation stimulus.
Additional information	A written record must be made of what oxygen therapy is given to every patient. Documentation recording oximetry measurements should state whether the patient is breathing air or a specified dose of supplemental Oxygen. Consider humidifier if oxygen therapy for paediatric patients is > 30 minutes duration. Caution with paraquat poisoning, administer Oxygen if SpO_2 < 92%. Avoid naked flames, powerful oxidising agent.

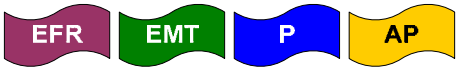
Clinical Level: 

Medication	**Oxytocin**
Class	Synthetic hormone.
Descriptions	Synthetic Oxytocin 5 international units per mL.
Presentation	5 international units in 1 mL ampoule.
Administration	IM. (***CPG*: 4/5/6.5.4).**
Indications	Control of post-partum haemorrhage.
Contra-Indications	Severe cardiac dysfunction / KSAR.
Usual Dosages	***Adult:*** 5 international units IM. ***Paediatric:*** 5 international units IM.
Pharmacology / Action	Causes rhythmic contraction of uterine smooth muscle, thereby constricting uterine blood vessels. It acts rapidly with a latency period of 2 to 4 minutes following IM injection. The oxytocic response lasts for 30 to 60 minutes.
Side effects	Cardiac arrhythmias / Headache / Nausea and vomiting / Hypotension / Abdominal pain / Dizziness.
Additional information	Ensure that a second foetus is not in the uterus prior to administration. Avoid rapid intravenous injection (may transiently reduce blood pressure). Store at 2 – 8°C, shelf life un-refrigerated; 3 months.

APPENDIX 1 - Medication Formulary

Clinical Level: EMT P AP

Medication	Paracetamol
Class	Analgesic and antipyretic.
Descriptions	Paracetamol is used to reduce pain and body temperature.
Presentation	Rectal suppository 1 g, 500 mg, 250 mg, 180 mg, 125 mg, 80 mg. Suspension 120 mg in 5 mL or 250 mg in 5 mL. 500 mg tablet. Plastic vial, 1 g of Paracetamol in 100 mL solution for infusion.
Administration	Per Rectum (PR). Orally (PO). IV infusion. (***CPG:*** 4/5/6.2.6, 4/5/6.4.24, 4/5/6.7.5, 5/6.7.34, 4/5/6.7.35, 5/6.8.7).
Indications	***Adult:*** Pyrexia / Temperature > 38.3°C / Mild or moderate pain. ***Paediatric:*** Pyrexia / Temperature > 38.5°C / Mild or moderate pain.
Contra-Indications	< 1 month old / Known severe adverse reaction / Chronic liver disease.
Usual Dosages	***Adult:*** 1 g PO (EMT, P/AP). 1 g IV infusion (AP), if estimated weight < 50 kg, 15 mg/kg (administered slowly over 15 minutes). ***Palliative Care:*** 1g PO (Repeat x 1 prn). ***Paediatric:*** **PO** (EMT, P/AP): 20 mg/Kg PO **PR** (AP): *>1 month < 1 year* - 90 mg PR; *1-3 years* - 180 mg PR; *4-8 years* - 360 mg PR **IV Infusion** (AP): *< 1 year* – 7.5 mg/kg IV slowly; *≥ 1 year* – 15 mg/kg IV slowly
Pharmacology / Action	Analgesic – central prostaglandin inhibitor. Antipyretic – prevents the hypothalamus from synthesising prostaglandin E, inhibiting the body temperature from rising further.
Side effects **Long term side effects**	If Paracetamol IV is administered too fast it may result in hypotension. Long term use at high dosage or over dosage can cause liver damage and less frequently renal damage.
Additional information	Paracetamol is contained in Paracetamol suspension and other over the counter drugs. Consult with parent / guardian in relation to medication administration prior to arrival on scene. For PR use be aware of the modesty of the patient, should be administered in the presence of a 2nd person. If Paracetamol administered in the previous 4 hours, adjust the dose downward by the amount given by other sources resulting in a maximum of 20 mg/Kg. Caution with IV Paracetamol in the absence of a buretrol.

Clinical Level: 

Medication	Salbutamol
Class	Sympathetic agonist.
Descriptions	Sympathomimetic that is selective for beta-2 adrenergic receptors.
Presentation	Nebule 2.5 mg in 2.5 mL. Nebule 5 mg in 2.5 mL. *Aerosol inhaler:* Metered dose 0.1 mg (100 mcg).
Administration	NEB. Inhalation via aerosol inhaler. (***CPG:*** 4/5/6.3.3, 3.3.4, 4/5/6.3.4, 2/3.4.15, 4/5/6.4.15, 4/5/6.6.10, 4/5/6.7.12, 2/3.7.31, 4/5/6.7.31).
Indications	Bronchospasm / Exacerbation of COPD / Respiratory distress following submersion incident.
Contra-Indications	Known severe adverse reaction.
Usual Dosages	***Adult:*** 5 mg NEB or 0.1 mg metered aerosol spray (repeat aerosol x 11) Repeat NEB at 5 minute intervals prn ***EFR*** assist patient with Asthma/ Anaphylaxis. - 0.1 mg metered aerosol spray (repeat aerosol x 11 prn) ***Paediatric:*** < *5 yrs* - 2.5 mg NEB or 0.1 mg metered aerosol spray (repeat aerosol x 5). ≥ *5 yrs* - 5 mg NEB or 0.1 mg metered aerosol spray (repeat aerosol x 11). (Repeat NEB at 5 minute intervals prn). ***EFR:*** assist patient with Asthma/ Anaphylaxis – < *5 yrs* - 0.1 mg metered aerosol spray (repeat aerosol x 5 prn). ≥ *5 yrs* - 0.1 mg metered aerosol spray (repeat aerosol x 11 prn).
Pharmacology / Action	Beta-2 agonist / Bronchodilation / Relaxation of smooth muscle.
Side effects	Tachycardia / Tremors / Tachyarrhythmias / High doses may cause Hypokalaemia.
Additional information	It is more efficient to use a volumiser in conjunction with an aerosol inhaler when administering Salbutamol. If an oxygen driven nebuliser is used to administer Salbutamol for a patient with acute exacerbation of COPD it should be limited to 6 minutes maximum.

Clinical level: AP

Medication	Sodium Bicarbonate injection BP
Class	Alkalinizing agent.
Descriptions	A salt that is an alkalinizing agent and electrolyte supplement.
Presentation	Glass vial 8.4% in 100 mL.
Administration	IV/IO. (***CPG:*** 4/5/6.4.3, 5/6.4.4, 4/5/6.4.6, 6.4.22, 4/5/6.6.4).
Indications	Wide complex QRS arrhythmias and / or seizures following Tricyclic antidepressant (TCA) overdose. Cardiac arrest following Tricyclic overdose. Cardiac arrest following harness induced suspension trauma.
Contra-Indications	Known severe adverse reaction.
Usual Dosages	***Adult:*** 1 mEq/Kg (1 mL/Kg 8.4% solution). Max 50 mEq (50 mL 8.4%). ***Paediatric:*** Not indicated.
Pharmacology / Action	TCA excretion from the body is enhanced by making the urine more alkaline (raising the pH).
Side effects	Nil when used for emergencies.
Additional Information	Sodium Bicarbonate 8.4% is a 1 mmol/mL solution.

Clinical Level: P AP

Medication	Sodium Chloride 0.9% (NaCl)
Class	Isotonic crystalloid solution.
Descriptions	Solution of Sodium and Chloride, also known as normal saline (NaCl).
Presentation	Soft pack for infusion 100 mL, 500 mL and 1,000 mL. Ampoules 10 mL / pre-filled syringe 10 mL.
Administration	IV infusion / IV flush / IO. ***Paramedic****:* maintain infusion once commenced. (***CPG:* Sodium Chloride 0.9% is used extensively throughout the CPGs**).
Indications	IV/IO fluid for pre-hospital emergency care.
Contra-Indications	Known severe adverse reaction.
Usual Dosages	***Adult:*** Keep vein open (KVO) or medication flush for cardiac arrest prn. ***Asystole / PEA*** - Consider fluid challenge 1 L IV/IO (repeat prn). ***Crush injury*** - 20 mL/Kg IV/IO infusion. ***Suspension Trauma*** - 2 L IV (Maintain systolic BP > 90 mmHg). ***Hypothermia****:* 250 mL IV/IO infusion (warmed to 40ºC approx.) (Repeat to max 1 L). ***# Neck of femur / Sepsis / Symptomatic bradycardia / Tachycardia*** -Torsades de pointes: 250 mL IV infusion. ***Decompression illness / Sepsis with poor perfusion:*** 500 mL IV/IO infusion. ***Shock from blood loss:*** 500 mL IV/IO infusion. Repeat in aliquots of 250 mL IV/IO to maintain SBP of 90-100 mmHg. For associated **Head injury** with GCS ≤ 8 maintain SBP of 120 mmHg. ***Burns:*** > 25% TBSA and / or 1 hour from time of injury to ED, 1000 mL IV/IO infusion. > 10% TBSA consider 500 mL IV/IO infusion. ***Adrenal insufficiency / Glycaemic Emergency / Heat Related Emergency / Sickle Cell Crisis:*** 1,000 mL IV/IO infusion. ***Anaphylaxis and Postpartum Haemorrhage:*** 1,000 mL IV/IO infusion (repeat x 1 prn). ***Post-resuscitation care:*** 250 mL IV/IO infusion, if persistent hypotension to maintain SBP > 100 mmHg or MAP > 70 mmHg. ***Paediatric:*** ***Glycaemic Emergency / Neonatal Resuscitation / Sickle Cell Crisis:*** 10 mL/Kg IV/IO infusion. ***Hypothermia:*** 10 mL/Kg IV/IO infusion (warmed to 40ºC approx.) (repeat x 1 prn). ***Haemorrhagic shock:*** 10 mL/Kg IV/IO repeat prn if signs of inadequate perfusion. ***Anaphylaxis:*** 20 mL/Kg IV/IO infusion (repeat x 1 prn). ***Adrenal insufficiency / Crush injury / Septic shock / Suspension Trauma / Symptomatic Bradycardia / Suspension Trauma:*** 20 mL/Kg IV/IO infusion. ***Asystole / PEA*** – Consider fluid challenge 20 mL/Kg IV/IO. ***Post-resuscitation care:*** 20 mL/Kg IV/IO infusion if persistent poor perfusion or < 5th percentile SBP. ***Burns:*** *> 10% TBSA and / or > 1 hour from time of injury to ED:* • ***5 – 10 years:*** 250 mL IV/IO / • ***> 10 years:*** 500 mL IV/IO.
Pharmacology / Action	Isotonic crystalloid solution / Fluid replacement.
Side effects	Excessive volume replacement may lead to heart failure.
Additional information	Sodium Chloride 0.9% (NaCl) is the IV/IO fluid of choice for pre-hospital emergency care. For KVO use 500 mL pack only. Medication flush used in adult and paediatric cardiac arrest.

Clinical level: MP

Medication	Tenecteplase Powder for injection
Class	Thrombolytic agent.
Descriptions	A recombinant fibrin-specific plasminogen activator.
Presentation	Powder and solvent for solution. 1 vial contains 10,000 units (50 mg) tenecteplase. 1 pre-filled syringe contains 10 mL water for injections. The reconstituted solution contains 1,000 units (5 mg) tenecteplase per mL.
Administration	IV. (***CPG:*** 5/6.4.10).
Indications	Confirmed STEMI and patient conscious, coherent and understands therapy / Patient consent obtained / Patient not suitable for PPCI from a time or clinical perspective.
Contra-Indications	Haemorrhagic stroke or stroke of unknown origin at any time / Ischaemic stroke in previous 6 months / Central nervous system damage or neoplasms / Recent major trauma - surgery - head injury (within 3 weeks) / Gastro-intestinal bleeding within the last month / Active peptic ulcer / Known bleeding disorder / Oral anticoagulant therapy / Aortic dissection / Transient ischaemic attack in preceding 6 months / Pregnancy and within one week post-partum / Non-compressible punctures / Traumatic resuscitation / Refractory hypertension (Sys BP > 180 mmHg) / Advanced liver disease / Infective endocarditis.
Usual Dosages	***Adult:*** Kg / Units / mg / mL < 60 / 6,000 / 30 / 6 ≥ 60 < 70 / 7,000 / 35 / 7 ≥ 70 < 80 / 8,000 / 40 / 8 ≥ 80 < 90 / 9,000 / 45 / 9 ≥ 90 / 10,000 / 50 / 10 ***Paediatric:*** Not indicated.
Pharmacology / Action	Tenecteplase is a recombinant fibrin-specific plasminogen activator that is derived from native t-PA by modifications at three sites of the protein structure. It binds to the fibrin component of the thrombus (blood clot) and selectively converts thrombus-bound plasminogen to plasmin, which degrades the fibrin matrix of the thrombus.
Side effects	Haemorrhage predominantly superficial at the injection site. Ecchymoses are observed commonly but usually do not require any specific action. Stroke (including intracranial bleeding) and other serious bleeding episodes.
Additional information	Enoxaparin should be used as antithrombotic adjunctive therapy.

Clinical level: P AP

Medication	Ticagrelor
Class	Platelet aggregation inhibitor.
Descriptions	An inhibitor of platelet function.
Presentation	90 mg tablets.
Administration	PO. (***CPG:*** 5/6.4.10).
Indications	Identification of ST elevation myocardial infarction (STEMI) if transporting to PPCI centre.
Contra-Indications	Hypersensitivity to the active substance (Ticagrelor) or to any of the excipients / Active pathological bleeding / History of intracranial haemorrhage / Moderate to severe hepatic impairment.
Usual Dosages	***Adult:*** Loading dose 180 mg PO. ***Paediatric:*** Not indicated.
Pharmacology / Action	Ticagrelor is a selective adenosine diphosphate (ADP) receptor antagonist acting on the P2Y12 ADP-receptor that can prevent ADP-mediated platelet activation and aggregation. Ticagrelor is orally active, and reversibly interacts with the platelet P2Y12 ADP-receptor. Ticagrelor does not interact with the ADP binding site itself, but interacts with platelet P2Y12 ADP-receptor to prevent signal transduction.
Side effects	***Common:*** Dyspnoea / Epistaxis / Gastrointestinal haemorrhage / Subcutaneous or dermal bleeding / Bruising and Procedural site haemorrhage. ***Other undesirable effects include:*** Intracranial bleeding / Elevations of serum creatinine and uric acid levels. Consult SmPC for a full list of undesirable effects.
Additional information	***Special authorisation:*** Advanced paramedics and paramedics are authorised to administer Ticagrelor 180 mg PO following identification of STEMI and medical practitioner instruction. If a patient has been loaded with an anti-platelet medication (other than Aspirin), prior to the arrival of the practitioner, the patient should not have Ticagrelor administered.

Clinical level: AP

Medication	Tranexamic Acid
Class	Anti-fibrinolytic.
Descriptions	An anti-fibrinolytic which reduces the breakdown of blood clots.
Presentation	Ampoule 500 mg in 5 mL.
Administration	Intravenous injection (IV). Intraosseous (IO). (***CPG:*** 5/6.6.8, 4/5/6.5.4).
Indications	Suspected significant internal or external haemorrhage associated with trauma Postpartum Haemorrhage.
Contra-Indications	Hypersensitivity to the active substance or to any of the excipients / Acute venous or arterial thrombosis / History of convulsions / Known severe renal impairment.
Usual Dosages	***Adult:*** 1 g IV/IO (infusion in 100 mL NaCl). ***Paediatric:*** Not indicated.
Pharmacology / Action	Tranexamic acid exerts an anti-haemorrhagic activity by inhibiting the activation of plasminogen to plasmin, by binding to specific sites of plasaminogen and plasmin, a molecule responsible for the degradation of fibrin, a protein that forms the framework of blood clots.
Side effects	***Common:*** Diarrhoea / Nausea / Vomiting. ***Other undesirable effects include:*** Visual disturbance / Impaired coloured vision / Dizziness / Headache.
Additional information	Caution with head injury.