APPENDIX 1 - Medication Formulary

Medication Formulary for Advanced Paramedics

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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ADVANCED PARAMEDIC

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

Approved Paediatric weight estimations approved 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.

Medication Formulary Age Designations

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

This version contains 45 medications

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

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New Medications introduced:

- Activated Charcoal
- Dexamethasone

Medications removed:

- Enoxaparin
- Hartmanns Solution
- Nifedipine
- Tenecteplase

Changes to Monographs

1. Class and Description headings have merged to one Classification heading in line with BNF drug descriptors
2. Long term side effects have been removed unless essential
3. Pharmacology/Action has been removed unless essential information

EPINEPHRINE (1:1000) CHANGES TO ADRENALINE (1:1000)			
Heading	Add		Delete
Medication	Adrenaline 1:1000.		Epinephrine 1:1000.
Indications	Stridor, Symptomatic Bradycardia and Cardiogenic Shock.		
Contra-indications	Hypersensitivity to excipients.		
Usual Dosages	< 6 months 6 months to < 6 years ≥ 6 years to < 12 years ≥ 12 years	10 mcg/kg IM 150 mcg (0.15 mL IM) 300 mcg (0.3 mL IM) 300 mcg (0.3 mL) (if child small or prepubital) or 500 mcg (0.5 mL IM)	All dosing which was previously recommended under the following age categories < 6 months, 6 months to 5 years, 6 to 8 years, > 8 years.

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EPINEPHRINE (1:10,000) CHANGES TO ADRENALINE (1:10,000)		
Heading	Add	Delete
Medication	Adrenaline 1:10000.	Epinephrine 1:10000.
Usual Dosages	10 mcg/kg.	0.01mg/kg.

ADENOSINE		
Heading	Add	Delete
Usual dosages	*Initial Adenosine unsuccessful:* If the first dose does not result in elimination of the supraventricular tachycardia within 1 to 2 minutes: Repeat doses at 12 mg. Max 2 x 12 mg.	
Additional Information	*Added to cautions:* Pericarditis/ QT interval prolongation.	

ASPIRIN		
Heading	Add	Delete
Classification	**Merge Class and Description to Classification:** Antithrombotic – Antiplatelet Drug which reduces clot formation.	Class. Description.
Description		Anti-inflammatory agent and an inhibitor of platelet function. Useful agent in the treatment of various thromboembolic diseases such as acute myocardial infarction.
Pharmacology/ Action		*Antithrombotic:* Inhibits the formation of thromboxane A2, which stimulates platelet aggregation and artery constriction. This reduces clot/ thrombus formation in an MI.
Long term side-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.

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ATROPINE		
Heading	Add	Delete
Presentation	*Pre-filled disposable syringe 1 mg/10 mL.* Pre-filled disposable syringe 0.5 mg/0.5 mL. Ampoule 600 mcg in 1 mL.	0.6mg in 1 mL.
Usual Dosages	*Symptomatic Bradycardia:* 0.5 mg (500 mcg) – 1 mg IV. (Repeat at 3-5 min intervals to Max 3 mg).	Symptomatic Bradycardia: 0.6 mg (600 mcg) IV. (Repeat at 3-5 min intervals to Max 3 mg).
Contra-indications	Hypersensitivity to atropine, closed angle glaucoma, achalasia of the oesophagus, paralytic ileus and toxic megacolon/ *NB: not relevant in life-threatening emergencies (e.g. bradyarrhythmia, poisoning.*	Known severe adverse reaction.

CEFTRIAXONE		
Heading	Add	Delete
Administration	Should be administered over 5 minutes.	Should be administered over 2-4 minutes.
Indications	*Open fractures.*	
Side effects	*Rash/ Anaemia/ Coagulation disorder.*	Diarrhoea/ rash/ headache/ dizziness/ nausea/ vomiting/ pruritis.

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CHLORPHENAMINE

Heading	Add	Delete
Classification	Sedating antihistamine – H2 receptor antagonists.	Class: Antihistamine. Description: H1 antagonist to counteract the effects of histamine release.
Usual dosages	For IV route, administer over 1 minute. May dilute with Sodium Chloride 0.9% for convenient administration volume of small doses.	Removal of all existing paediatric dosing.
Additional information		For IV route, administer over 1 minute. May dilute with Sodium Chloride 0.9% for convenient administration volume of small doses.
Side-effects	Reworded: Causes drowsiness, do not drive or operate machinery.	

Severity	Age	Dose and route of administration
Mild	6 to 11 years	2 mg PO (EMT/ P/ AP)
	≥ 12 years	4 mg PO (EMT/ P/ AP)
Moderate	1 month – 6 months	0.25 mg/kg IM (EMT/ P) or 0.25 mg/kg IV (AP)
	> 6 months - < 6 years	2.5 mg IM (EMT/ P) or 2.5 mg IV (AP)
	6 to < 12 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	1 month - 6 months	0.25 mg/kg IM (EMT/ P) or 0.25 mg/kg IV (AP)
	> 6 months - <6 years	2.5 mg IM (EMT/ P) or 2.5 mg IV (AP)
	6 to <12 years	5 mg IM (EMT/ P) or 5 mg IV (AP)
	≥ 12 years	10 mg IM (EMT/ P) or 10 mg IV (AP)

CYCLIZINE

Heading	Add	Delete
Administration		Oral (PO).

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DIAZEPAM RECTAL SOLUTION		
Heading	Add	Delete
Usual Dosages	Age Dose ≥ 1 month - < 2 years: 5 mg (PR). ≥ 2 years - < 12 years 5-10 mg (PR) ≥ 12 years: 10 mg (PR). Repeated after 5-10 minutes if required	< 3 years:2.5 mg (PR). 3 to 7 years: 5mg (PR). ≥ 8 years:10 mg (PR).

FENTANYL		
Heading	Add	Delete
Administration	New CPGs. 6.6.5: Procedural Sedation – Adult. 6.13.27: Procedural Sedation – Child.	
Indication	Procedural sedation Adult/ Child.	
Usual dosages	Adult pain 100 mcg IN. Adult pain 50 mcg IV. Paediatric pain 1.5 mcg/kg IN (max 100 mcg). *Adult Procedural Sedation* (AP only) 25-50 mcg IV (repeatable at > 5 min intervals). 50 mcg IN/IM (repeatable at > 5 min intervals). *Paediatric Procedural Sedation* (AP only) 0.75 mcg/kg IV (repeatable at > 5min interval). 1.5 mcg/kg IN (repeatable at > 5min interval).	0.1 mg. 0.05 mg. 0.0015 mg/kg.

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GLUCAGON		
Heading	Add	Delete
Usual dosages	Paediatric: ≥ 1 month and < 25 kg: 500 mcg IM. ≥ 1 month and ≥ 25 kg: 1 mg IM.	Paediatric: 1 - 8 years - 0.5 mg (500 mcg) IM. 8 years - 1 mg IM.
Side-effects	Common: Nausea Uncommon: Vomiting. Rare: may cause hypotension/ dizziness/ headache.	

GLUCOSE GEL		
Heading	Add	Delete
Classification	Class and Description merged.	Class. Description.
Administration	CPG 4/5/6.12.7: New-born Neonatal Care and Resuscitation.	

DEXTROSE 10% - CHANGES TO GLUCOSE 10%		
Heading	Add	Delete

GLYCERYL TRINITRATE (GTN)		
Heading	Add	Delete
Classification		Class. Description.
Presentation		(0.4 mg).
Usual Dosages	*Angina or MI:* 400 mcg sublingual. (Repeat at 3-5 min intervals, Max: 1200 mcg). *EFR:* assist administration - 400 mcg sublingual max. *Pulmonary oedema:* 800 mcg / 2 sprays (repeat x 1 PRN) (P & AP).	0.4 mg. 1.2 mg. 0.4 mg. 0.8 mg.
Pharmacology / Action		Remove complete section.

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GLYCOPYRRONIUM BROMIDE		
Heading	Add	Delete
Usual Dosages	Adult 200 mcg SC.	Adult 400mcg SC.

HALOPERIDOL		
Heading	Add	Delete
Administration	Agitation/ Delirium: 1 – 2 mg SC/PO. Nausea/ Vomiting: 0.5 – 1 mg SC.	

HYDROCORTISONE		
Heading	Add	Delete
Usual Dosages	*Adult:* Infusion over 20-30 minutes. *Paediatric:* *Anaphylactic reaction:* < 6 months: (AP) - 25 mg IV (infusion in 100 mL NaCl) or IM (P/AP). ≥6 months - < 6 years: (AP) - 50 mg IV (infusion in 100 mL NaCl) or IM (P/AP). ≥ 6 years - < 12 years: (AP) - 100 mg IV (infusion in 100 mL NaCl) or IM (P/AP).	Child age dosing guidelines for anaphylaxis.

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IBUPROFEN		
Heading	Add	Delete
Classification	Analgesics: Non-Steroidal Anti-Inflammatory Drugs (NSAIDs). Pain and Inflammation in musculoskeletal disorders.	Class: Non-Steroidal Anti-Inflammatory Drugs (NSAIDs). Description: It is an anti-inflammatory analgesic.
Contra-Indications	Body weight <5kg.	
Long term side-effects		Remove list of long-term side-effects.

IPRATROPIUM BROMIDE		
Heading	Add	Delete
Usual dosages	*Adult:* 500 mcg neb (Max 2mg/24 hours). *Paediatric:* < 12 years: 250 mcg neb (Max 1mg/24 hours). ≥ 12 years: 500 mcg neb (Max 2mg/24 hours).	0.5 mg neb. 0.25 mg neb.

KETAMINE		
Heading	Add	Delete
Usual dosages	*Adult & Paediatric:* 0.1 mg – 0.3 mg/kg IV. *ADULT Procedural Sedation* 0.5 – 1 mg/kg **IV** (Repeatable at > 10min intervals). Consider: 5mg/kg **IM** (if no IV access available). *CHILD Procedural Sedation* 0.5 – 1 mg/kg **IV** (Repeatable at > 10min intervals). 4 – 5 mg/kg IM (if no IV access available).	0.1 mg//kg IV.

LIDOCAINE		
Heading	Add	Delete
Presentation	Ampoule 1% Lidocaine 50 mg/ 5 mL.	5 mg/ 5 mL 1%.
Usual dosages	*NEW: Pain management Adult:* Lidocaine 1% 40 mg IO over 2 minutes. Wait 1 min. 2nd dose Lidocaine 1% 20 mg over 1 min. (supplementary dose of lidocaine 1% 20 mg x 1 PRN no sooner than ≥ 45 mins). *NEW: Pain management Child:* Lidocaine 1% 500 mcg/kg (max 40 mg) IO over 2 minutes. Wait one minute. 2nd dose 250 mcg/kg (max 20mg) IO over 1 minute. Total max 60 mg.	

MAGNESIUM SULPHATE INJECTION		
Heading	Add	Delete
Presentation	Ampoule 1 g in 2 mL.	
Additional Information	Compatible with glucose 5% or Sodium Chloride 0.9%. Must be diluted prior to IV administration. Max concentration must not exceed 20% (200mg/mL).	

METHOXYFLURANE		
Heading	Add	Delete
Classification	Anaesthetics. General: Volatile anaesthetic agent.	
Contra-Indications	Malignant Hyperthermia.	

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MIDAZOLAM SOLUTION		
Heading	Add	Delete
Administration	*Adult:* the IV injection of midazolam should be given at a slow rate of approximately 1mg per 30 seconds. *Paediatric:* the initial IV dose of midazolam should be administered over 2-3 minutes. *CPG*: 6.6.5, 6.13.27.	
Usual Dosages	*Adult Procedural sedation:* 1 – 2.5 mg IV repeatable at >5 minute intervals. 5 mg IM/IN repeatable at >15 min intervals.	
	Child Procedural Sedation: (With morphine): 25 mcg/kg IV Repeatable at > 5 min intervals. (With fentanyl/ketamine): 25 mcg/kg IV Repeatable at > 5 min intervals. (Dose for all options): 25 mcg/kg Repeatable at > 5 min intervals.	

MORPHINE SULPHATE		
Heading	Add	Delete
Administration	*CPG:* 6.6.5, 6.13.27.	
Usual Dosages	*Adult Procedural sedation:* 2 – 4 mg IV. Repeat dose > 5 minute interval. 5 mg IM. Repeat dose > 10 minute interval. *Child Procedural Sedation:* 100 mcg/kg IV – repeat at > 5min interval. 100 mcg/kg IM – repeat at > 10min interval.	
Additional information		Not recommended for headache.

NALOXONE		
Heading	Add	Delete
Usual Dosages	400 mcg 800 mcg	0.4 mg 0.8 mg

NITROUS OXIDE 50% AND OXYGEN 50%		
Heading	Add	Delete
Additional Information	Caution should be issued before using Entonox with patients who have known Chronic Obstructive Pulmonary Disease (COPD) or other conditions where compromised chemoreceptor sensitivity/function may be present. May cause respiratory depression and increases in $PaCO_2$. In cold temperatures warm cylinder and invert at least 3 times to ensure mix of gases. Prolonged or frequent use of ENTONOX may result in megaloblastic marrow changes, myeloneuropathy and sub-acute combined degeneration of the spinal cord.	In cold temperatures warm cylinder and invert to ensure mix of gases.

ONDANSETRON		
Heading	Add	Delete
Contraindication	Congenital long QT syndrome.	
Side effects	Rare: QT prolongation – monitor.	

OXYGEN		
Heading	Add	Delete
Clinical Level		
Classification	Merged Class and Description.	Class. Description.
Pharmacology/Action		Pharmacology/Action Oxygenation of tissue/organs.
Additional Information	Caution with emollients containing paraffin e.g. lip balms & moisturisers – may lead to skin burns.	

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PARACETAMOL		
Heading	Add	Delete
Presentation	500 mg of paracetamol in 50 mL solution for infusion.	0.1 mg.
Usual Dosages	15 mg/kg PO. PR (AP). > 1 month < 1 year - 80 mg PR.	20 mg/kg PO. > 1 month < 1 year - 90 mg PR.
Side effects		Long term side-effects.

SALBUTAMOL		
Heading	Add	Delete
Classification	Beta-2 Adrenoceptor agonist selective – short acting.	Class: Sympathetic agonist. Description: Sympathomimetic that is selective for Beta-2 Adrenergic receptors.
Presentation	100 mcg.	0.1 mg.
Usual Dosages	100 mcg metered aerosol spray.	0.1 mg metered aerosol spray.
Pharmacology / Action		Remove text/section Beta-2 agonist/ Bronchodilation/ relaxation of smooth muscle.

TRANEXAMIC ACID		
Heading	Add	Delete
Usual Dosages	*Paediatric:* 15 mg/kg (in 100mL NaCL) (Max 1g).	

Clinical Level: EMT P AP

MEDICATION	ACTIVATED CHARCOAL
Classification	Antidotes and Chelators – Intestinal adsorbents: reduction of absorption of poisons in the GI system / active elimination of poisons.
Presentation	Activated charcoal granules for suspension.
Administration	Oral suspension (PO). (*CPG:* 6.10.2).
Indications	Emergency treatment of acute oral poisoning or drug overdose.
Contra-Indications	Although activated charcoal is not contraindicated in poisoning by strong acids and alkalis and other corrosive substances, its value as a detoxicant for these substances is limited. Activated charcoal is poor in binding cyanide, iron salts and some solvents including methanol, ethanol and ethylene glycol.
Usual Dosages	*Adult:* 50g PO. Reconstitute with water as directed by manufacturer. The reconstituted product should be taken immediately. Repeat as necessary. *Paediatric:* Not Indicated.
Side effects	Bezoar/ Constipation/ diarrhoea/ GI disorders/ Black stools. Caution: aspiration may lead to airway obstruction.
Additional information	May be mixed with soft drinks or fruit juice for ease of administration & to mask the taste. Substances which may be absorbed by Activated Charcoal (but are not limited to) include: Aspirin & salicylates/ Barbiturates/ Benzodiazepines/ Chlormethiazole/ Chloroquine/ Chlorpromazine & related phenothiazines/ Clonidine/ Cocaine and other stimulants/ Digoxin and digitoxin/ Ibuprofen/ Mefenamic acid/ Mianserin/ Nicotine/ Paracetamol/ Paraquat/ Phenelzine and other MAOIs/ Phenytoin/ Propranolol and other Beta Blockers/ Quinine/ Theophylline/ Zidovudine.

Clinical Level: AP

MEDICATION	ADENOSINE
Classification	Cardiovascular system: Antiarrhythmic agent.
Presentation	6 mg in 2 mL solution. 3 mg per 1 mL (30 mg/10 mL) solution for infusion vials.
Administration	Intravenous (IV). (*CPG:* 5/6.3.4).
Indications	Paroxysmal supraventricular tachycardia (> 150) with signs of poor perfusion.
Contra-Indications	Asthma/Chronic obstructive lung disease/Wolff-Parkinson-White Syndrome Decompensated heart failure/Long QT syndrome/Second or third degree AV block/ Severe hypotension/ Sick sinus syndrome (unless pacemaker fitted).
Usual Dosages	*Adult:* 6 mg IV. *Initial Adenosine unsuccessful:* If the first dose does not result in elimination of the supraventricular tachycardia within 1 to 2 minutes: Repeat doses at 12 mg. Max 2 x 12 mg. *Paediatric:* Not Indicated.
Side effects	Angina (discontinue). Apprehension - arrhythmia (discontinue if asystole or severe bradycardia occur). AV block/ Dizziness/ Dyspnoea/ Flushing/ Headache/ Nausea/ Sinus pause.
Additional information	Initially 6 mg, administered into a large peripheral vein and given over 2 seconds, followed by rapid 10 mL Sodium Chloride 0.9% flush. Repeat doses of 12 mg are administered over 2 seconds. Monitor ECG. *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/ Pericarditis/ QT interval prolongation.

Clinical Level: AP

MEDICATION	ADRENALINE (1:10,000)
Classification	Sympathomimetics – Vasoconstrictor. Acts on both alpha & beta receptors and increases both heart rate and contractility. It can cause peripheral vasodilation (beta) or vasoconstriction (alpha).
Presentation	Pre-filled syringe. 1mg/10mL (1:10,000) as 0.1 mg/mL.
Administration	Intravenous (IV). Intraosseous (IO). (*CPG:* 4/5/6.12.7, 4/5/6.13.23, 4/5/6.13.24, 4/5/6.13.25, 4/5/6.14.2, 5/6.14.3 4/5/6.14.5.
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:** 10 mcg/kg of Adrenaline 1:10,000 IV/IO. (Repeat every 3-5 mins). **Bradycardia:** 10 mcg/kg of Adrenaline 1:10,000 IV/IO (Repeat every 3-5 mins).
Side effects	In non-cardiac arrest patients: Palpitations/ Tachyarrhythmias/ Hypertension.
Additional information	*N.B.* Double check concentrations on pack before use.

Clinical Level: EFR EMT P AP

MEDICATION	ADRENALINE (1:1,000)
Classification	Sympathetic agonist, Sympathomimetic – Vasoconstrictor. Acts on both alpha & beta receptors and increases both heart rate and contractility. It can cause peripheral vasodilation (beta) or vasoconstriction (alpha).
Presentation	Pre-filled syringe, ampoule or auto-injector. 1 mg/1 mL (1:1,000).
Administration	Intramuscular (IM), Intravenous (IV) and Nebulisation (Neb). (*CPG:* 2/3.10.1 2/3.13.21, 4/5/6.3.2, 4/5/6.10.1, 4/5/6.11.1, 4/5/6.13.9, 5/6.13.20. 4/5/6.13.21, 5/6.14.6)
Indications	Severe allergic reaction/ anaphylaxis, Stridor, Symptomatic Bradycardia and Cardiogenic shock.
Contra-Indications	Hypersensitivity to excipients.
Usual Dosages	*Adult: Anaphylaxis* 500mcg IM (0.5mL of 1: 1,000). *EFR* assist patient – 0.3 mg (Auto injector). (Repeat every 5 minutes PRN). *Adult: Symptomatic Bradycardia / Cardiogenic shock: 10mcg IV/IO repeat PRN.* (Dilute 1 mg Adrenaline in 100 mL NaCl and draw up in 1 mL syringe, administer the dose over 1 minute). (Off-license). *Anaphylaxis Paediatric:* < 6 months — 10 mcg/kg IM 6 months to < 6 years — 150 mcg (0.15 mL IM) ≥ 6 years to < 12 years — 300 mcg (0.3 mL IM) ≥ 12 years — 300 mcg (0.3 mL) (if child small or prepubital) or 500 mcg (0.5 mL IM) *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 (P/ AP): < 1 Year: 2.5 mg NEB. ≥ 1 year: 5 mg NEB (repeat after 30 minutes PRN) (AP). *Sepsis (AP):* Adrenaline 0.1 mcg/kg IV/IO.
Side effects	Palpitations / Tachyarrhythmias / Hypertension / Angina-like symptoms.
Additional information	*N.B.* Double check the concentration on pack before use.

Clinical Level: AP

MEDICATION	AMIODARONE
Classification	Cardiovascular system: Antiarrhythmic agent. Class III. - Prolongs refractory period in atria and ventricles thus effective for arrhythmias of various origins. - decreases SA automaticity and conduction through AV node.
Presentation	150 mg in 3 mL solution. Pre-filled syringe of 300 mg/10 mL (30 mg/mL).
Administration	Intravenous (IV). Intraosseous. (IO). (*CPG:* 6.3.5, 4/5/6.13.23, 4/5/6.14.2).
Indications	Ventricular Fibrillation (VF) and Pulseless Ventricular Tachycardia (pVT). Symptomatic Tachycardia (> 150).
Contra-Indications	Known hypersensitivity to Iodine.
Usual Dosages	*Adult:* VF/pVT: 5 mg/Kg IV/IO over 20min – 2hours. *Loading dose for cardiac arrest:* 300 mg and one supplemental dose of 150 mg if VF persists after a minimum 15minutes. *Symptomatic tachycardia:* 150 mg - IV infusion in 100 mL Glucose 5% (D5W) over 10 minutes. *Paediatric:* VF/pVT: 5 mg/Kg IV/IO. If refractory ***VF/pVT*** post Adrenaline and 3rd shock
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 Glucose 5% (D5W). May be flushed with NaCl 0.9%. For cardiac arrest, do not dilute prefilled syringe. Administer directly followed by a flush. For ease of use in paediatric calculations when using 150 mg in 3 mL, add 2 mL Glucose 5% (D5W) making the concentration 150 mg in 5 mL.

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MEDICATION	ASPIRIN
Classification	Antithrombotic – Antiplatelet Drug which reduces clot formation.
Presentation	300 mg dispersible tablet. 300 mg Enteric Coated (EC) tablet.
Administration	Orally (PO) - dispersed in water, or to be chewed if not dispersible form. (*CPG:* 5/6.3.1, 4.3.1, 1/2/3.3.1).
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.*
Side effects	Epigastric pain and discomfort/ Bronchospasm/ Gastrointestinal haemorrhage/ Increased bleeding times/ skin reactions in hypersensitive patients.
Additional information	Aspirin 300 mg is indicated for cardiac chest pain, regardless if patient is on an anti-coagulant or is already on Aspirin. If the patient has swallowed Aspirin EC (enteric coated) preparation without chewing, the patient should be regarded as not having taken any Aspirin; administer 300 mg PO.

Clinical Level: AP

MEDICATION	ATROPINE
Classification	Systemic Antimuscarinic - Anticholinergic (parasympatholytic). Competitively antagonizes acetylcholine at postganglionic nerve endings/Reverses effects of vagal overdrive/ Enhances A-V conduction/ Increases heart rate.
Presentation	Pre-filled disposable syringe 1 mg/10 mL. Pre-filled disposable syringe 0.5 mg/0.5 mL. Ampoule 600 mcg in 1 mL.
Administration	Intravenous (IV). Intraosseous (IO). (*CPG:* 5/6.2.6, 4/5/6.3.2, 5/6.9.1, 6.10.2).
Indications	*Adult:* Symptomatic bradycardia. Cholinergic poison (from Organophosphorus insecticides) with bradycardia and salivation.
Contra-Indications	Post-cardiac transplantation/ Hypersensitivity to atropine/ closed angle glaucoma/ Achalasia of the oesophagus, paralytic ileus and toxic megacolon/ **NB: not relevant in life-threatening emergencies (e.g. bradyarrhythmia, poisoning).**
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:* 0.5 mg (500 mcg) – 1 mg IV. (Repeat at 3-5 min intervals to Max 3 mg). *Paediatric:* Not indicated.
Side effects	Tachycardia/ Dry mouth/ Dilated pupils.
Additional information	Do not administer Atropine if temperature < 34oC.

Clinical Level: AP

MEDICATION	CEFTRIAXONE
Classification	Antibacterial Infections Cephalosporin.
Presentation	Ceftriaxone (as Ceftriaxone sodium) powder for solution for injection vials, 250 mg/ 1g/ 2 g for IV administration. Powder and solvent for solution for IM injection.
Administration	*IV/IO:* Reconstitute each 1 g vial in 10 mL of water for injection BP. Should be administered over 5 minutes. *Intravenous infusion:* Reconstitute 2 g of Ceftriaxone in 100 mL of one of the following calcium-free solutions: • Glucose 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:* 4/5/6.8.6, 4/5/6.11.1, 4/5/6.13.18, 4/5/6.13.20).
Indications	Severe sepsis/ open fractures
Contra-Indications	Age < 1 month. Known severe adverse reaction. Hx of severe hypersensitivity (e.g. anaphylactic reaction) to any beta-lactam antibacterial (Penicillin, Cephalosporin, Aztreonam, Meropenem, Ertapenem). Ceftriaxone solutions containing Lidocaine should never be administered IV.
Usual Dosages	*Adult: Severe sepsis/ open fracture* 2 g IV/IO/IM. *Paediatric:* 1 month – 11 years: 50 mg/Kg IV/IO/IM (max daily dose 2g) > 11 years or body weight > 50 Kg: 2 g IV/IO/IM *IV injection over 2-4 minutes or deep IM injection*
Side effects	Rash/ Anaemia/ Coagulation disorder.
Additional information	Ceftriaxone ***must not*** be mixed or administered simultaneously with any calcium-containing intravenous solutions. Preferred route > 1 g by IV infusion. Intramuscular route may be used only in exceptional circumstances. *The resulting solution should never be administered intravenously.*

APPENDIX 1 - Medication Formulary

Clinical Level: EMT P AP

MEDICATION	CHLORPHENAMINE
Classification	Sedating Antihistamine – H2 receptor antagonist.
Presentation	10 mg in 1 mL ampoule. 4 mg tablet.
Administration	Intravenous (IV), Intramuscular (IM) and Orally (PO). (*CPG:* 4/5/6.10.1, 4/5/6.13.21).
Indications	Anaphylaxis or allergic reaction.
Contra-Indications	Known severe adverse reaction/ Pre-coma states.
Usual Dosages	For IV route, administer over 1 minute IV: May dilute with Sodium Chloride 0.9% for convenient administration volume of small doses. *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:*

Severity	Age	Dose and route of administration
Mild	6 to 11 years	2 mg PO (EMT / P / AP)
	≥ 12 years	4 mg PO (EMT / P / AP)
Moderate	1 month - 6 months	0.25 mg/kg IM (EMT / P) or 0.25 mg/kg IV (AP)
	> 6 months - < 6 years	2.5 mg IM (EMT / P) or 2.5 mg IV (AP)
	6 to < 12 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	1 month - 6 months	0.25 mg/kg IM (EMT / P) or 0.25 mg/kg IV (AP)
	> 6 months - < 6 years	2.5 mg IM (EMT / P) or 2.5 mg IV (AP)
	6 to < 12 years	5 mg IM (EMT / P) or 5 mg IV (AP)
	≥ 12 years	10 mg IM (EMT / P) or 10 mg IV (AP

Side effects	Causes drowsiness, do 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.

Clinical Level: P AP

MEDICATION	CLOPIDOGREL
Classification	Antiplatelet: Platelet aggregation inhibitor.
Presentation	300 mg tablet. 75 mg tablet.
Administration	Orally (PO). (*CPG:* 5/6.3.1).
Indications	ST elevation myocardial infarction (STEMI) if the patient is not for PCI.
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.
Side effects	Abdominal pain/ Dyspepsia/ Diarrhoea/ Bleeding.
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.*

Clinical Level: P AP

MEDICATION	CYCLIZINE
Classification	Antiemetic & Anti-nausea. Antihistamine with antimuscarinic effect.
Presentation	Used in management of nausea & vomiting.
Administration	Intravenous (IV). Intraosseous (IO). Intramuscular (IM). Subcutaneous (SC). (*CPG:* 5/6.5.5, 4/5/6.12.1, 5/6.15.2).
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. (Repeat x 1 PRN - AP). *Paediatric:* Not indicated.
Side effects	Tachycardia/ Dry Mouth/ Sedation.
Additional information	IM route should only be utilised where IV or IO access is not available. IV formulation only: Blisters at the site of injection and pruritus, as well as sensation of heaviness, chills, agitation, flushing and hypotension have been reported. Rapid IV administration can lead to symptoms similar to overdose.

APPENDIX 1 - Medication Formulary

Clinical Level: P AP

MEDICATION	DEXAMETHASONE
Classification	Corticosteroid – systemic. Drug with high glucocorticoid activity and insignificant mineralocorticoid activity.
Presentation	2mg Tablet Dexamethasone. 2 mg/ 5 mL oral solution. 4mg/ 1 ml Solution for Injection Each mL contains 3.3 mg dexamethasone (as sodium phosphate) equivalent to 4 mg dexamethasone phosphate (or 4.37 mg dexamethasone sodium phosphate).
Administration	Orally (PO). Intramuscular (IM).
Indications	Severe croup. (*CPG:* 4/5/6.13.9).
Contra-Indications	Systemic infection unless specific anti-infective therapy is employed/ Hypersensitivity to any ingredient/ gastric and duodenal ulcer/ vaccination with live vaccines/ patients with rare hereditary problems of galactose intolerance, the Lapp lactase deficiency or glucose-galactose malabsorption should not take this medicine.
Usual Dosages	*Adult:* Not indicated. *Paediatric:* 300mcg (0.3mg)/ kg PO/IM (Maximum dose = 12 mg).
Side effects	Hiccups/ Hyperglycaemia/ MI rupture/ Protein catabolism.
Additional information	Dexamethasone 3.8mg/mL injection has replaced dexamethasone phosphate 4mg/mL injection – Double check product label & literature before administering dose. Medication Safety: All doses are stated in terms of dexamethasone. Dexamethasone 1mg = Dexamethasone phosphate 1.2mg. (As per CHI).

Clinical Level: AP

MEDICATION	DIAZEPAM INJECTION
Classification	Hypnotics, sedatives and anxiolytics: Benzodiazepine. CNS depressant that acts as an anticonvulsant and sedative.
Presentation	Ampoule 10 mg in 2 mL.
Administration	Intravenous (IV). Intraosseous (IO). (*CPG:* 5/6.6.3, 5/6.13.14).
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:* > 1 month: 0.1 mg/kg IV/IO. Maximum 4 doses of Benzodiazepine for adult and paediatric patients regardless of route.
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. Specific side effects with IV route (rare): Psychiatric disorder.
Additional information	Diazepam IV should be titrated to effect. Can cause injection site reactions/thrombophlebitis, ensure large vein is used. 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
Classification	Hypnotics, sedatives and anxiolytics: Benzodiazepine. CNS depressant that acts as an anticonvulsant and sedative.
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*: 5/6.6.3, 5/6.13.14).
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:* Age: ≥ 1 month - < 2 years: — Dose: 5 mg (PR). Age: ≥ 2 years - < 12 years: — Dose: 5 -10 mg (PR) Age: ≥ 12 years: — Dose: 10 mg (PR). Repeated after 5-10minutes if required Maximum 4 doses of Benzodiazepine for adult and paediatric patients regardless of route.
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.

Clinical Level: AP

MEDICATION	FENTANYL
Classification	Analgesics - Opioids.
Presentation	Ampoule 100 mcg in 2mL (0.1mg in 2mL).
Administration	Intranasal (IN). Intravenous (IV). (*CPG:* 4/5/6.6.2, 6.6.5, 4/5/6.13.13, 6.13.27).
Indications	Procedural sedation/ Acute severe pain.
Contra-Indications	< 1-year-old/ Known Fentanyl hypersensitivity/ ALoC/ Bilateral occluded nasal passage/ Nasal trauma/ Epistaxis/ Hypovolaemia.
Usual Dosages	*Adult:* *Pain* 100 mcg IN (Repeat by one at not < 10 minutes if severe pain persists). 50 mcg IV. *Procedural Sedation (AP only).* 25-50 mcg IV (repeatable at > 5min intervals). 50mcg IN/IM (repeatable at >5 min intervals). *Paediatric > 1 year (≥ 10 kgs):* *Pain* 1.5 mcg/kg IN. (max 100 mcg). *(Repeat by one at not < 10 minutes only if severe pain persists).* *Procedural Sedation (AP only).* 0.75 mcg/kg IV/IO (repeatable at > 5 min interval). 0.75 mcg/kg IN (repeatable at > 5 min interval).
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).

Clinical Level: AP

MEDICATION	FUROSEMIDE INJECTION
Classification	Diuretic: Loop diuretic.
Presentation	Ampoule 10 mg per mL. 2 mL, 5 mL and 25 mL per ampoule.
Administration	Intravenous (IV). (CPG: 5/6.2.6).
Indications	Pulmonary oedema.
Contra-Indications	Pregnancy/ Known Hypokalaemia. Known severe adverse reaction.
Usual Dosages	*Adult:* 40 mg slow IV (at a maximum rate of 4mg/min). (2.5mg/min in severe renal impairment). *Paediatric:* Not indicated.
Side effects	Headache / Dizziness / Hypotension / Arrhythmias / Transient deafness – usually associated with rapid IV administration / Diarrhoea / Nausea and Vomiting / Electrolyte imbalance.
Additional information	Furosemide should be protected from light.

Clinical Level: EMT P AP

MEDICATION	GLUCAGON
Classification	Hypoglycaemia: Glycogenolytic Hormones.
Presentation	1 mg vial powder and solution for reconstitution (1 mL).
Administration	Intramuscular (IM). (*CPG*: 4/5/6.5.3, 4/5/6.13.11).
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 month/ Phaechromocytoma/ Known Severe Adverse Reactions
Usual Dosages	*Adult:* 1 mg IM. *Paediatric:* ≥ 1 month and < 25kg: 500 mcg IM. ≥ 1 month and ≥ 25kg: 1 mg IM.
Side effects	Common: Nausea. Uncommon: Vomiting. Rare: may cause Hypotension/ Dizziness/ Headache.
Additional information	May be ineffective in patients with low stored glycogen e.g. prior use in previous 24 hours, alcohol dependent patients with liver disease. Store in refrigerator. Stable at room temperature for 18 months, use immediately once reconstituted. Protect from light. Hypoglycaemic paediatric patients who are not diagnosed as diabetic should not be administered Glucagon. (this does not preclude the administration of glucose gel or glucose solution to treat hypoglycaemia).

APPENDIX 1 - Medication Formulary

Clinical Level: P AP

MEDICATION	GLUCOSE 10% SOLUTION
Classification	Fluid and Electrolyte Imbalances: Carbohydrate.
Presentation	Soft pack for infusion 250 mL and 500 mL.
Administration	Intravenous (IV) Infusion/bolus. Intraosseous (IO). *Paramedic:* Maintain infusion once commenced. (*CPG*: 4/5/6.5.3, 4/5/6.13.11).
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).
Side effects	Necrosis of tissue around IV access.
Additional information	Cannula patency will reduce the effect of tissue necrosis. Advanced paramedics should use as large a vein as possible.

Clinical Level: P AP

MEDICATION	GLUCOSE 5% SOLUTION
Classification	Fluid and Electrolyte Imbalances: Carbohydrate.
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 Glucose 5% solution. *Paediatric:* Not indicated.
Side effects	Necrosis of tissue around IV access.

Clinical Level: EFR EMT P AP

MEDICATION	GLUCOSE GEL
Classification	Nutrients. Sugars: Antihypoglycaemic.
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*: 4/5/6.5.3, 4/5/6.12.7 4/5/6.13.11).
Indications	Hypoglycaemia. Blood glucose < 4 mmol/L.
Contra-Indications	Known severe adverse reaction.
Usual Dosages	*Adult:* 10 – 20 g buccal (Recheck blood glucose and repeat after 15 min if required). *Paediatric:* New-born neonate: 2 - 4 mL if blood glucose ≤ 2.6 mmol/L. ≤ 8 years: 5 – 10 g buccal (recheck blood glucose and repeat after 15 mins if required). > 8 years: 10 – 20 g buccal (recheck blood glucose and repeat after 15 mins if required).
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)
Classification	Nitrate. Potent coronary vasodilator/ reduces BP/ Dilation of systemic veins.
Presentation	*Aerosol spray:* Metered dose of 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 immediately after each dose. (*CPG*: 4/5/6.2.6, 4/5/6.3.1, 1/2/3.3.1).
Indications	Angina/ suspected myocardial infarction (MI). *EFR:* may assist with administration. *EMT:* Angina/ suspected myocardial infarction (MI) with systolic BP ≥110 mmHg. *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:* 400 mcg sublingual. (Repeat at 3-5 min intervals, Max: 1200 mcg). *EFR:* assist administration - 400 mcg sublingual max. *Pulmonary oedema:* 800 mcg/ 2 sprays (repeat x 1 PRN) (P & AP). *Paediatric:* Not indicated.
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
Classification	Systemic Antimuscarinics.
Presentation	Ampoule 200 mcg/mL.
Administration	Subcutaneous (SC). (*CPG*: 5/6.15.2).
Indications	Palliative care with excessive oropharyngeal secretions.
Contra-Indications	Known severe adverse reaction.
Usual Dosages	*Adult:* 200 mcg SC. *Paediatric:* Not applicable.
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
Classification	Antipsychotic.
Presentation	Ampule 5 mg/mL. Capsule 0.5 mg (PO).
Administration	Subcutaneous (SC). Oral (PO). (***CPG***: 5/6.15.2).
Indications	Palliative care with nausea and vomiting or agitation/ delirium.
Contra-Indications	Known severe adverse reaction.
Usual Dosages	*Adult:* Agitation/ Delirium: 1 – 2 mg SC/PO. Nausea/ Vomiting: 0.5 – 1 mg SC. *Paediatric* Not applicable.
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: P AP

MEDICATION	HYDROCORTISONE
Classification	Systemic Corticosteroid and anti-inflammatory.
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:* 4/5/6.2.4, 4/5/6.2.5, 5/6.5.1, 4/5/6.10.1, 4/5/6.13.8, 5/6.13.10, 4/5/6.13.21).
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: Infusion over 20-30 minutes* *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:* < 6 months — (AP) - 25 mg IV (infusion in 100 mL NaCl) or IM (P/AP). 6 months to < 6 years — (AP) - 50 mg IV (infusion in 100 mL NaCl) or IM (P/AP). ≥ 6 years to < 12 years — (AP) - 100 mg IV (infusion in 100 mL NaCl) or IM (P/AP). ≥ 12 years — (AP) - 200 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 - ≤ 5 years: 50 mg IV (AP) infusion in 100 mL NaCl or IM injection (P/AP). > 5 years: 100 mg IV (AP) infusion in 100 mL NaCl or IM injection (P/AP).
Pharmacology / Action	Potent anti-inflammatory properties and inhibits many substances that cause inflammation.

MEDICATION	HYDROCORTISONE
Side effects	CCF/ Hypertension/ Abdominal distension/ Vertigo/ Headache/ Nausea/ Malaise and hiccups.
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
Classification	Systemic Antimuscarinics. Reduction of secretions in palliative care.
Presentation	Ampoule 20 mg/mL.
Administration	Subcutaneous (SC). (*CPG*: 5/6.15.2).
Indications	Palliative care with excessive oropharyngeal secretions.
Contra-Indications	Known severe adverse reaction.
Usual Dosages	*Adult:* 10 – 20 mg SC. *Paediatric:* Not applicable.
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
Classification	Analgesics: Non-Steroidal Anti-Inflammatory Drugs (NSAIDs). Pain and Inflammation in musculoskeletal disorders.
Presentation	Suspension 100 mg in 5 mL and 200 mg in 5 mL. 200 mg, 400 mg tablets.
Administration	Orally (PO). (CPG: 4/5/6.6.2, 4/5/6.13.13).
Indications	Mild to moderate pain.
Contra-Indications	Not suitable for children under 3 months (or body weight <5kg)/ 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.
Side effects	Skin rashes/ Gastrointestinal intolerance and bleeding.
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 for synergic effect.

APPENDIX 1 - Medication Formulary

Clinical Level: P AP

MEDICATION	IPRATROPIUM BROMIDE
Classification	Inhaled Antimuscarinic: Airways disease, Obstructive.
Presentation	Nebuliser Solution 250 mcg in 1 mL. (0.25 mg/mL).
Administration	Nebulised (NEB) mixed with age specific dose of Salbutamol. (*CPG*: 4/5/6.2.4, 4/5/6.2.5, 4/5/6.13.8).
Indications	Acute moderate asthma or exacerbation of COPD not responding to initial Salbutamol dose.
Contra-Indications	Known severe adverse reaction.
Usual Dosages	*Adult:* 500 mcg NEB (Max 2mg/24 hours). *Paediatric:* < 12 years: 250 mcg NEB (Max 1mg/24 hours). ≥ 12 years: 500 mcg NEB (Max 2mg/24 hours).
Side effects	Transient dry mouth/ Blurred vision/ Tachycardia/ Headache.

APPENDIX 1 - Medication Formulary

Clinical Level: AP

MEDICATION	KETAMINE
Classification	Anaesthetics, General > NMDA receptor antagonists.
Presentation	Clear, colourless, aqueous solution. Vial 200 mg in 20 mL.
Administration	Intravenous (IV). Intraosseous (IO). (*CPG*: 4/5/6.6.2, 6.6.5, 4/5/6.13.13, 6.13.27).
Indications	*Adult and Paediatric:* Severe pain/ Procedural sedation.
Contra-Indications	Acute porphyrias/ Pre-eclampsia/ Eclampsia/ Hypertension/ Severe cardiac disease/ Stroke/ Known Severe Adverse Reactions. **Relative contra-indication:** Caution with head trauma.
Usual Dosages	*Adult:* Pain management 0.1 – 0.3 mg/kg IV (repeat if required PRN, not < 10 minutes). Procedural Sedation 0.5 – 1 mg /kg IV (repeatable at >10min intervals). 5mg/kg IM *Paediatric:* Pain management 0.1 – 0.3 mg/kg IV (repeat once only at not < 10 minutes PRN). Procedural Sedation 0.5 – 1 mg/kg IV/IO (repeatable at >10min intervals) 4 – 5 mg/kg IM
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). Ketamine is classified as CD3 but PHECC classify as CD2 - safe custody and appropriate record keeping rules apply.

Clinical Level: AP

MEDICATION	LIDOCAINE
Classification	Antiarrhythmic Class 1B. Ventricular Arrhythmias.
Presentation	Lidocaine injection Mini jet 1% w/v 100 mg per 10 mL. Ampoule 1% Lidocaine 50 mg/ 5 mL 1%.
Administration	Intravenous (IV). Intraosseous (IO). (*CPG:* 4/5/6.6.2, 4/5/6.13.13, 4/5/6.13.23).
Indications	1. When Amiodarone is unavailable it may be substituted with Lidocaine for VF/ pVT arrests - (Special authorisation required). 2. Solvent for Ceftriaxone IM. 3. Pain management.
Contra-Indications	No contraindications for cardiac arrest. KSAR when used as a dilutant for Ceftriaxone.
Usual Dosages	*Adult:* 1. 100 mg IV. 2. Solvent 3.5 mL for Ceftriaxone IM. 3. Lidocaine 1%, 40 mg IO over 2 minutes. Wait 1 min, 2nd dose Lidocaine 1% 20 mg over 1 min. (supplementary dose of lidocaine 1% 20mg x 1 PRN no sooner than ≥ 45 mins). *Paediatric:* 1. 1 - 1.5 mg/kg IV. 2. Solvent 3.5 mL for Ceftriaxone IM. 3. Lidocaine 1% 500 mcg/kg (max 40mg) IO over 2 minutes. Wait one minute, 2nd dose 250 mcg/kg (max 20mg) IO over 1 minute. Total max 60mg.
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
Classification	Hypnotics, Sedatives and Anxiolytics: Benzodiazepine.
Presentation	1 mg tablet.
Administration	Orally (PO). (*CPG*: 4/5/6.7.2).
Indications	Combative with hallucinations or paranoia and risk to self or others – Behavioural emergency. Procedural sedation.
Contra-Indications	History of sensitivity to Benzodiazepines/ Severe hepatic or pulmonary insufficiency/ Suspected significant alcohol and/or sedatives ingested/ KSAR.
Usual Dosages	*Adult:* 2 mg PO (repeat x 1PRN). *Paediatric:* Not indicated.
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
Classification	Hypomagnesaemia: Electrolyte and Minerals. Tocolytic agent.
Presentation	Ampoule 5g in 10 mL,1g in 2 mL.
Administration	Intravenous (IV). Intraosseous (IO). (*CPG:* 4/5/6.2.5, 4/5/6.3.6, 5/6.6.3 4/5/6.12.1, 4/5/6.12.6).
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	*Adult:* *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 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 30 minutes. *Paediatric:* Not indicated.
Side effects	Side-effects are rare. Bradycardia can occur during administration; this can be minimised by slowing the rate of infusion. Signs of overdose include: 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. Compatible with glucose 5% or Sodium Chloride 0.9%. Must be diluted prior to IV administration. Max concentration must not exceed 20% (200mg/mL). Monitoring requirements: BP, Respiratory rate, Urinary output and signs of overdose.

Clinical Level: EMT P AP

MEDICATION	METHOXYFLURANE
Classification	Anaesthetics. General: Volatile anaesthetic agent.
Presentation	3 mL vial with a tear off tamper-evident seal which is administered via carbon inhalation vapouriser.
Administration	Inhaled (INH) through an activated Carbon Chamber (self-administered). (*CPG:* 4/5/6.6.2, 4/5/6.13.13).
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/ Known Severe Adverse Reactions/ Malignant Hyperthermia.
Usual Dosages	*Adult:* 3 mL (INH) (repeat x 1 only PRN). *Paediatric:* 3 mL (INH) (repeat x 1 only PRN).
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. 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
Classification	Hypnotics, Sedatives and Anxiolytics: Benzodiazepine.
Presentation	*Ampoule:* 10 mg in 2 mL or 10 mg in 5 mL. *Pre-filled buccal administration oral 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.
Administration	Buccal/ IN/ IM/ IV/ IO. Intranasal (IN) (50% in each nostril). **Adults:** The IV injection of midazolam should be given at a slow rate of approximately 1mg per 30 seconds. **Children:** The initial IV dose of midazolam should be administered over 2-3 minutes. (*CPG:* 5/6.6.3, 6.6.5, 4/5/6.7.2, 5/6.13.14, 6.13.27, 5/6.15.2).
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 1PRN. *Behavioural Emergency:* AP - Seek medical advice regarding sedation. 5mg IN/IM - (repeat x 2 PRN) (AP). *Procedural Sedation:* 1 - 2.5mg IV. Repeatable at >5mins intervals. 5mg IM/IN repeatable at >15min intervals. *Paediatric:* *Seizure:* < 3 months: 0.3mg/kg (max 2.5mg) Buccal > 3 months – 1 year: 2.5mg Buccal 1 year to < 5 years: 5mg Buccal 5 years to < 10 years: 7.5mg Buccal 10 years to < 18 years: 10mg Buccal Or 0.2 mg/Kg IN (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 not < 5 minutes PRN. *Procedural Sedation:* **(with morphine): 25 mcg/kg IV/IO Repeatable at >5 min intervals.** **(with Fentanyl/Ketamine): 25 mcg/kg IV/IO repeatable at >5 min intervals.** **(Dose for All Options): 25 mcg/kg IN/IM**
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).

Clinical Level: AP

MEDICATION	MORPHINE SULPHATE
Classification	Analgesics Opiates.
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*: 4/5/6.6.2, 6.6.5, 4/5/6.13.13, 6.13.27, 5/6.15.2).
Indications	*Adult* Severe pain / Palliative care / Procedural sedation. *Paediatric:* Severe pain/ Procedural Sedation.
Contra-Indications	PO < 1-year-old/ Labour pains/ Acute respiratory depression/ Acute intoxication/ Systolic BP < 90 mmHg/ Known severe adverse reaction.
Usual Dosages	*Adult pain:* 4 mg IV - initial dose. Repeat Morphine 2 mg at not < 2 min intervals PRN (Max 16 mg). For musculoskeletal pain Max 20 mg. *Adult Procedural Sedation* 2 – 4 mg IV. Repeat dose >5 minute intervals. 5 mg IM. Repeat dose >10 minute intervals. *Adult Palliative Care:* 2.5 - 5 mg SC (repeat x 1 PRN) Alternatively 5 - 10 mg PO (repeat x 1 PRN).. *Paediatric pain:* 300 mcg/kg PO (Max 10 mg) (>1 year). 50 mcg/Kg IV bolus administered over at least 5 mins. Repeat at not < 2 min PRN to Max of 0.1 mg/Kg IV. *Paediatric Procedural sedation:* 100mcg/kg IV/IO – repeat at > 5 min interval. 100mcg/kg IM – repeat at > 10 min interval.
Side effects	Respiratory depression/ Drowsiness/ Nausea and vomiting/ Constipation.
Additional information	Use with extreme caution particularly with elderly/young. Caution with acute respiratory distress. Caution with reduced GCS. N.B. Controlled under Schedule 2 of the Misuse of Drugs Regulations 1988 (SI. no 328).

Clinical Level: EMT P AP

MEDICATION	NALOXONE
Classification	Opioid toxicity: Opioid receptor antagonist. The management and reversal of opiate overdose.
Presentation	Ampoules 400 mcg/mL (0.4 mg in 1 mL) / Minijet syringe.
Administration	IV / IO / IM / SC / IN. (*CPG*: 6.10.2, 4/5/6.12.7, 4/5/6.13.7 4/5/6.14.6).
Indications	Inadequate respiration and/or ALoC following known or suspected narcotic overdose.
Contra-Indications	Known severe adverse reaction.
Usual Dosages	*Adult:* 400 mcg IV/IO (AP) (repeat after 3 min PRN to a Max dose of 2 mg). 400 mcg IM/SC (P) (repeat after 3 min PRN to a Max dose of 2 mg). 800 mcg IN (EMT) (repeat x 1 after 3 min PRN). *Paediatric:* 10 mcg/kg IV/IO (AP). 10 mcg/kg IM/SC (P). 20 mcg/kg IN (EMT). (Repeat dose PRN to maintain opioid reversal to Max 0.1 mg/kg or 2 mg).
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.

APPENDIX 1 - Medication Formulary

Clinical Level: EMT P AP

MEDICATION	NITROUS OXIDE 50% AND OXYGEN 50% (ENTONOX®)
Classification	Analgesics – Volatile Liquid Anaesthetics - 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. Brand name: Entonox®.
Administration	Self-administered. Inhalation by demand valve with face-mask or mouthpiece. (*CPG:* 4/5/6.6.2, 4/5/6.12.3, 4/5/6.12.4, 4/5/6.13.13).
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 and Paediatric:* Self-administered until pain tolerable.
Side effects	Disinhibition/ Decreased level of consciousness/ Light headedness.
Additional information	Caution should be issued before using Entonox with patients who have known Chronic Obstructive Pulmonary Disease (COPD) or other conditions where compromised chemoreceptor sensitivity/function may be present. May cause respiratory depression and increases in $PaCO_2$. Do not use if patient unable to understand instructions. In cold temperatures warm cylinder and invert at least 3 times to ensure mix of gases. Advanced paramedics may use discretion with minor chest injuries. Has an addictive property. Caution when using Entonox® for greater than one hour for sickle cell crisis. Prolonged or frequent use of ENTONOX may result in megaloblastic marrow changes, myeloneuropathy and sub-acute combined degeneration of the spinal cord.

Clinical Level: P AP

MEDICATION	ONDANSETRON
Classification	Antiemetics and Antinauseants – Serotonin (5HT3 receptor antagonist).
Presentation	Ampoule 2 mL (4 mg in 2 mL).
Administration	IM/IV. (*CPG*: 5/6.5.5, 4/5/6.13.13).
Indications	Management, prevention and treatment of significant nausea and vomiting.
Contra-Indications	Known severe adverse reaction/ Congenital long QT syndrome.
Usual Dosages	*Adult:* 4 mg IM (P/AP) or slow IV (AP). *Paediatric:* 0.1 mg/kg 100 mcg/kg slow IV (AP) or IM (P/AP) to a Max of 4 mg.
Side effects	*General:* Flushing/ Headache/ Sensation of warmth/ Injection site reactions (rash, urticaria, itching). *Uncommon:* Arrhythmias/ Bradycardia/ Hiccups/ Hypotension/ Seizures. *Rare:* QT prolongation – monitor.
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.

APPENDIX 1 - Medication Formulary

ADVANCED PARAMEDIC

Clinical Level: CFR-A FAR EFR EMT P AP

MEDICATION	OXYGEN
Classification	Gas.
Presentation	*Medical gas:* D, E or F cylinders, coloured black with white shoulders. (Please note: By 2025, all cylinders will be completely white with OXYGEN in black). *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%.
Side effects	Prolonged use of O_2 with chronic COPD patients may lead to reduction in ventilation stimulus.
Additional information	Caution with emollients containing paraffin e.g. lip balms & moisurisers – may lead to skin burns. 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.

APPENDIX 1 - Medication Formulary

Clinical Level: P AP

MEDICATION	OXYTOCIN
Classification	Prostaglandins and Oxytotics.
Presentation	5 international units in 1 mL ampoule.
Administration	IM. (*CPG*: 4/5/6.12.2, 4/5/6.12.6).
Indications	Pre-hospital emergency childbirth. Control of post-partum haemorrhage.
Contra-Indications	Severe cardiac dysfunction/ Known Severe Adverse Reaction.
Usual Dosages	*Adult:* 10 international units IM. *Paediatric:* Not Indicated.
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 – 8oC, shelf life un-refrigerated 3 months.

APPENDIX 1 - Medication Formulary

Clinical Level: EMT P AP

MEDICATION	PARACETAMOL
Classification	Analgesic – Non-opioid.
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, 500mg of paracetamol in 50 mL solution for infusion.
Administration	Per Rectum (PR). Orally (PO). IV infusion. (*CPG*: 4/5/6.6.2, 4/5/6.11.1, 4/5/6.13.13, 4/5/6.13.19, 5/6.13.20, 5/6.15.2).
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 after 4-6 hours x 1 PRN). *Paediatric:* **PO** (EMT, P/AP): 15 mg/Kg PO **PR** (AP): > 1 month < 1 year - 80 mg PR; 1-3 years - 180 mg PR; 4-8 years - 360 mg **IV Infusion** (AP) (≥ 1 year Max 1g): < 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.
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 15 mg/Kg. Caution with IV Paracetamol in the absence of a buretrol.

Clinical Level: EFR EMT P AP

MEDICATION	SALBUTAMOL
Classification	Beta-2 Adrenoceptor agonist selective – short acting.
Presentation	Nebule 2.5 mg in 2.5 mL. Nebule 5 mg in 2.5 mL. Aerosol inhaler: Metered dose 100mcg per actuation (Puff).
Administration	Nebule Inhalation via aerosol inhaler. (*CPG*: 4/5/6.2.4, 2/3.2.5, 4/5/6.2.5, 4/5/6.8.9, 2/3.10.1, 4/5/6.10.1, 2/3.13.8, 4/5/6.13.8, 2/3.13.21, 4/5/6.13.21, 6.17.7).
Indications	Bronchospasm/ Exacerbation of COPD/ Respiratory distress following submersion incident.
Contra-Indications	Known severe adverse reaction.
Usual Dosages	*Adult:* 5 mg NEB or 100mcg metered aerosol spray (repeat aerosol x 11). Repeat NEB at 5 minute intervals PRN *EFR assist patient with Asthma/ Anaphylaxis.* - 100mcg metered aerosol spray (repeat aerosol x 11 PRN). *Paediatric:* < 5 yrs - 2.5 mg NEB or 100 mcg metered aerosol spray (repeat aerosol x 5). > 5 yrs - 5 mg NEB or 100 mcg metered aerosol spray (repeat aerosol x 11). (Repeat NEB at 5 minute intervals PRN). *EFR: assist patient with Asthma/ Anaphylaxis –* < 5 yrs - 100 mcg/ 1 actuation metered aerosol spray (repeat aerosol x 5 PRN). > 5 yrs - 100mcg/ 1 actuation metered aerosol spray (repeat aerosol x 11 PRN).
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
Classification	Fluid and Electrolyte Imbalance – Bicarbonate – alkalinisation.
Presentation	Glass vial 8.4% in 100 mL.
Administration	IV/IO. (*CPG*: 4/5/6.8.4, 6.10.2, 4/5/6.14.2, 5/6.14.3, 4/5/6.14.5).
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.
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)
Classification	Electrolytes & Minerals: Isotonic crystalloid solution.
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/ Submersion* - 20 mL/Kg IV/IO infusion. *Suspension Trauma* - 2L IV (Maintain systolic BP > 90 mmHg). *Hypothermia:* 250 mL IV/IO infusion (warmed to 40°C approx.) (Repeat to max 1L). *# Neck of femur/ Symptomatic bradycardia:* 250 mL IV infusion. *Decompression illness/ Sepsis with signs of hypoperfusion/ Tachyarrhythmia/ Vomiting in pregnancy:* 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 40°C 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:* 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: P AP

MEDICATION	TICAGRELOR
Classification	Antithrombotic Drugs – Antiplatelet.
Presentation	90 mg tablets.
Administration	PO. (*CPG*: 5/6.3.1).
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/ severe hepatic impairment.
Usual Dosages	*Adult:* Loading dose 180 mg PO. *Paediatric:* *Not indicated.*
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
Classification	Antihaemorrhagics. Anti-fibrinolytic.
Presentation	Ampoule 500 mg in 5 mL.
Administration	Intravenous injection (IV). Intraosseous (IO). (*CPG*: 5/6.8.7, 4/5/6.12.6, 5/6.13.17).
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:* *15 mg/kg (in 100 mL NaCL) (Max 1g).*
Side effects	Common: Diarrhoea/ Nausea/ Vomiting. Other undesirable effects include: Visual disturbance/ Impaired coloured vision/ Dizziness/ Headache.
Additional information	Caution with head injury.