APPENDIX 1 - Medication Formulary

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

Approved Paediatric weight estimations 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 26 medications.

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

Amendments to the Paramedic 2017 Edition:

New Medications introduced:

- Activated Charcoal
- Dexamethasone

Medications removed:

- Hartmanns Solution

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 (0.3mL) (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.

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

ASPIRIN		
Heading	Add	Delete
Classification	**Merge Class and Description to Classification:** Antithrombotic – Antiplatelet Drug which reduces clot formation.	Class. Description.

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ASPIRIN

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.

CHLORPHENAMINE

Heading	Add	Delete
Classification	Sedating antihistamine – H1 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.

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)

CHLORPHENAMINE		
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.	

CYCLIZINE		
Heading	Add	Delete
Administration		Oral (PO).

GLUCAGON		
Heading	Add	Delete
Usual dosages	Paediatric: ≥1 month and < 25kg: 500 mcg IM. ≥1 month and ≥ 25kg: 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.	

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.

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). ≥ 12 years: (AP) - 200 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 <5 kg.	
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 1 mg/24 hours). ≥ 12 years: 500 mcg neb (Max 2 mg/24 hours).	0.5 mg neb. 0.25 mg neb.

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

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 IV Repeatable at > 5 min intervals.	

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.	

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.

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: 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 (0.5 mL 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: CFR FAR EFR EMT P AP

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: EMT P AP

MEDICATION	CHLORPHENAMINE
Classification	Sedating Antihistamine – H1 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:*
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.

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

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.

Clinical Level: P AP

MEDICATION	DEXAMETHASONE
Classification	Corticosteroid – systemic. Drug with high glucocorticoid activity and insignificant mineralocorticoid activity.
Presentation	2mg Tablet Dexamethasone 2mg/ 5 mL oral solution 4mg/ 1mL 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 3.8 mg/mL injection has replaced dexamethasone phosphate 4 mg/mL injection – Double check product label & literature before administering dose. Medication Safety: All doses are stated in terms of dexamethasone. Dexamethasone 1 mg = Dexamethasone phosphate 1.2 mg. (As per CHI).

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).

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: 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: 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.

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.

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.

APPENDIX 1 - Medication Formulary

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 1 PRN. *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

MEDICATION	MIDAZOLAM SOLUTION
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: 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.

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. *ED cylinder: White cylinder.* *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.

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 O2 to achieve SpO_2 of 96% - 98%. Neonatal resuscitation (< 4 weeks) consider supplemental O_2 (≤ 30%). All other acute medical and trauma titrate O2 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.

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 – 8°C, shelf life un-refrigerated 3 months.

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 > 38.3oC/ 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: 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 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:* 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.

APPENDIX 1 - Medication Formulary

MEDICATION	SODIUM CHLORIDE 0.9% (NACL)
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.