APPENDIX 1 - Medication Formulary

Medication Formulary for Emergency Medical Technician

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.

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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).

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

Paediatric weight estimations acceptable to PHECC are:

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

Pregnancy caution:

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

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

Paramedic authorisation for IV infusion continuation

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

This version contains 13 medications.

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

Amendments to the Emergency Medical Technician 2014 Edition:

New Medications introduced:

- Chlorphenamine
- Methoxyflurane

Changes in orange text relate to the 2018 updates.

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

Epinephrine (1:1,000)		
Heading	**Add**	**Delete**
Presentation		(for EMT use)
Administration	(CPG: 2/3.4.15, 4/5/6.4.11, 4/5/6.7.13)	**CPG:** 4.4.15, 2/3.4.16, 4.7.31
Indications	Stridor, Symptomatic Bradycardia	
Usual Dosages	**Adult:** EMT 0.5 mg IM **Paediatric:** EMT < 6 months - 0.05 mg IM 6 months to 5 years - 0.125 mg IM 6 to 8 years - 0.25 mg IM > 8 years - 0.5 mg IM	

Glucagon:		
Heading	**Add**	**Delete**
Administration	(CPG: 4/5/6.4.19, 4/5/6.7.32)	**CPG:** 4.4.19, 4.7.32
Contra-Indications	< 1 year	
Usual Dosages	1 - 8 years - 0.5 mg (500 mcg) IM.	≤ 8 years - 0.5 mg (500 mcg) IM
Additional Information	Hypoglycaemic paediatrics patients who are not diagnosed as diabetic should not be administered Glucagon (this does not preclude the administration of Glucose gel or Dextrose to treat hypoglycaemia)	

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Glucose gel		
Heading	**Add**	**Delete**
Administration	(**CPG:** 4/5/6.4.19, 4/5/6.7.32)	**CPG:** 4.4.19, 4.7.32

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

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

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

Oxygen		
Heading	**Add**	**Delete**
Usual Dosages	Basic and Advanced Life Support – Neonate (< 4 weeks) Consider supplemental O_2 (≤ 30%)	

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Paracetamol		
Heading	**Add**	**Delete**
Presentation	Rectal suppository 1 g, 500 mg, 250 mg, 240 mg, 125 mg, 120 mg, 80 mg Glass vial, 1 g of Paracetamol in 100 mL solution for infusion	180 mg and 60 mg
Indications	**Adult**: Pyrexia / Temperature > 38.3°C / Minor or moderate pain for adult patients **Paediatric**: Pyrexia / Temperature > 38.5°C / Minor or moderate pain for paediatric patients	

Salbutamol		
Heading	**Add**	**Delete**
Administration	(**CPG:** 4/5/6.7.12)	**CPG:** 4.4.15, 2/3.4.16, 4.7.31, 3.7.12
Usual Dosages	0.1 mg metered aerosol spray (repeat aerosol x 11 prn) Repeat NEB at 5 minute intervals prn **EFR:** assist patient with Asthma/Anaphylaxis 0.1 mg metered aerosol spray (repeat aerosol x 11 prn) **Paediatric:** < 5 yrs - 0.1 mg metered aerosol spray (repeat aerosol x 5 prn) > 5 yrs - 0.1 mg metered aerosol spray (repeat aerosol x 11 prn) Repeat NEB at 5 minute intervals prn **EFR:** assist patient with Asthma/Anaphylaxis < 5 yrs - 0.1 mg metered aerosol spray (repeat aerosol x 5 prn) ≥ 5 yrs - 0.1 mg metered aerosol spray (repeat aerosol x 11 prn)	(0.1 mg metered aerosol spray x 5) **EFRs:** (0.1 mg metered aerosol spray x 2) **Paediatric:** < 5 yrs - (0.1 mg metered aerosol spray x 3) > 5 yrs - (0.1 mg metered aerosol spray x 5)

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

Clinical level: 

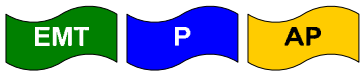
Medication	Aspirin
Class	Platelet aggregation inhibitor.
Descriptions	Anti-inflammatory agent and an inhibitor of platelet function. Useful agent in the treatment of various thromboembolic diseases such as acute myocardial infarction.
Presentation	300 mg dispersible tablet.
Administration	Orally (PO)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

Clinical level: EMT P AP

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

Clinical level: EFR EMT P AP

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

Clinical level: 

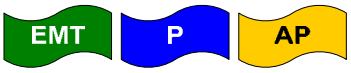
Medication	Glucagon
Class	Hormone and Antihypoglycaemic.
Descriptions	Glucagon is a protein secreted by the alpha cells of the Islets of Langerhans in the pancreas. It is used to increase the blood glucose level in cases of hypoglycaemia in which an IV cannot be immediately placed.
Presentation	1 mg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

Clinical level: 

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

Clinical level: EFR EMT P AP

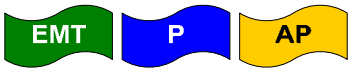
Medication	Glyceryl trinitrate (GTN)
Class	Nitrate.
Descriptions	Special preparation of Glyceryl trinitrate in an aerosol form that delivers precisely 0.4 mg of Glyceryl trinitrate per spray.
Presentation	***Aerosol spray:*** Metered dose of 0.4 mg (400 mcg).
Administration	***Sublingual:*** Hold the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

Clinical level: 

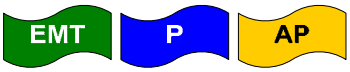
Medication	Ibuprofen
Class	Non-Steroidal Anti-Inflammatory Drugs (NSAIDs).
Descriptions	It is an anti-inflammatory analgesic.
Presentation	Suspension 100 mg in 5 mL and 200 mg in 5 mL. 200 mg, 400 mg tablets.
Administration	Orally (PO). (***CPG:*** 4/5/6.2.6, 4/5/6.7.5).
Indications	Mild to moderate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

Clinical Level: EMT P AP

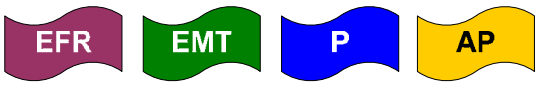
Medication	**Methoxyflurane**
Class	Volatile anaesthetic agent.
Descriptions	Clear, almost colourless, volatile liquid, with a characteristic fruity odour that becomes a vapour or gas when used with the single use inhaler.
Presentation	3 mL vial with a tear off tamper-evident seal.
Administration	Inhaled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

Clinical Level: 

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

Clinical Level: 

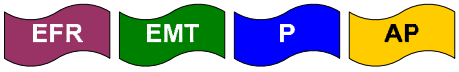
Medication	Nitrous Oxide 50% and Oxygen 50% (Entonox®)
Class	Analgesic.
Descriptions	Potent analgesic gas contains a mixture of both Nitrous Oxide and Oxygen.
Presentation	Cylinder, coloured blue with white and blue triangles on cylinder shoulders. ***Medical gas:*** 50% Nitrous Oxide & 50% Oxygen.
Administration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

Clinical Level: 

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

Clinical Level: EMT P AP

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

Clinical Level: 

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