APPENDIX 1
MEDICATION FORMULARY

Amendments to the 2012 Edition

The paediatric age range has been increased to reflect the HSE National Clinical Programme for Paediatrics and Neonatology age profile:

A paediatric patient is defined as a patient up to the eve of his/her 16th birthday (≤ 15 years).

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

The paediatric weight estimation formulae have been modified.

New Medications introduced;

- Ibuprofen
- Naloxone

Epinephrine (1:1,000)		
HEADING	ADD	DELETE
Usual Dosages	Auto-injector	EpiPen® Jr

Ibuprofen		
HEADING	ADD	DELETE
Clinical Level	EMT	
Presentation	400 mg tablet	
Description	It is an anti-inflammatory analgesic	It is used to reduce mild to moderate pain
Additional information	Caution with significant burns or poor perfusion due to risk of kidney failure Caution if concurrent NSAIDs use	

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Naloxone

HEADING	ADD	DELETE
Clinical level	EMT	
Administration	Intranasal (IN). CPG: 6.4.23, 4/5.4.23, 4/5/6.7.5	CPG: 5/6.3.2, 5/6.7.5
Indications	Inadequate respiration and/or ALoC following known or suspected narcotic overdose	Respiratory rate < 10 secondary to known or suspected narcotic overdose
Usual Dosages	**Adult:** 0.8 mg (800 mcg) IN (EMT) **Paediatric:** 0.02 mg/Kg (20 mcg/Kg) IN (EMT)	(Paramedic repeats by one prn)

Nitrous Oxide 50% and Oxygen 50% (Entonox®)

HEADING	ADD	DELETE
Additional information	Caution when using Entonox for greater than one hour for Sickle Cell Crisis	

Oxygen

HEADING	ADD	DELETE
Contraindications		Paraquat poisoning
Indications	Sickle Cell Disease - 100%	
Additional Information	Caution with paraquat poisoning, administer oxygen if SpO_2 < 92%	

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Paracetamol		
HEADING	ADD	DELETE
Presentation	250 mg in 5 mL	
Indications	Pyrexia	Pyrexia following seizure for paediatric patients. Advanced Paramedics may administer Paracetamol, in the absence of a seizure for the current episode, provided the paediatric patient is pyrexial and has a previous history of febrile convulsions.
Contraindications	< 1 month old	
Usual Dosages	> 1 month < 1 year - 90 mg PR.	< 1 year - 60 mg PR

Salbutamol		
HEADING	ADD	DELETE
Administration		Advanced Paramedics may repeat Salbutamol x 3
Usual Dosages	**Adult:** .. (or 0.1 mg metered aerosol spray x 5) Repeat at 5 min prn (**EFRs**: 0.1 mg metered aerosol spray x 2) **Paediatric:** < 5 yrs...(or 0.1 mg metered aerosol spray x 3) ≥ 5 yrs...(or 0.1 mg metered aerosol spray x 5) Repeat at 5 min prn (**EFRs**: 0.1 mg metered aerosol spray x 2)	Adult: Repeat at 5 min prn (APs x 3 and Ps x 1) (EMTs & EFRs: 0.1 mg metered aerosol spray x 2) Paediatric: Repeat at 5 min prn (APs x 3 and Ps x 1) (EMTs & EFRs: 0.1 mg metered aerosol spray x 2)

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LIST OF MEDICATIONS

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CLINICAL LEVEL: 

Medication	Aspirin
Class	Platelet aggregation inhibitor
Descriptions	Anti-inflammatory agent and an inhibitor of platelet function. Useful agent in the treatment of various thromboembolic diseases such as acute myocardial infarction.
Presentation	300 mg dispersible tablet
Administration	Orally (PO) - dispersed in water, or to be chewed - if not dispersible form (CPG: 5/6.4.10, 4.4.10, 1/2/3.4.10)
Indications	Cardiac chest pain or suspected Myocardial Infarction
Contraindications	Active symptomatic gastrointestinal (GI) ulcer Bleeding disorder (e.g. haemophilia) Known severe adverse reaction Patients < 16 years old
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
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 anticoagulants or is already on aspirin. If the patient has swallowed an aspirin (enteric coated) preparation without chewing it, the patient should be regarded as not having taken any aspirin; administer 300 mg PO.

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CLINICAL LEVEL: EFR EMT P AP

Medication	Epinephrine (1:1,000)
Class	Sympathetic agonist
Description	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 (for EMT use) 1 mg/1 mL (1:1,000)
Administration	Intramuscular (IM) (CPG: 5/6.4.15, 4.4.15, 2/3.4.16, 5/6.7.31, 4.7.31, 2/3.7.31)
Indications	Severe anaphylaxis
Contraindications	None known
Usual Dosages	**Adult:** 0.5 mg (500 mcg) IM (0.5 mL of 1: 1,000) **EMT** & (EFR assist patient) 0.3 mg (Auto injector) Repeat every 5 minutes prn **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) **EMT** & (EFR assist patient): 6 months < 10 years: 0.15 mg (Auto injector) ≥ 10 years: 0.3 mg (Auto injector) Repeat every 5 minutes prn
Pharmacology/Action	Alpha and beta adrenergic stimulant Reversal of laryngeal oedema & 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

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CLINICAL LEVEL: EMT P AP

Medication	Glucagon
Class	Hormone and Antihypoglycaemic
Description	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, 4.4.19, 5/6.7.32, 4.7.32)
Indications	Hypoglycaemia in patients unable to take oral glucose or unable to gain IV access, with a blood glucose level < 4 mmol/L
Contraindications	Known severe adverse reaction Phaeochromocytoma
Usual Dosages	**Adult:** 1 mg IM **Paediatric:** ≤ 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 & 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

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CLINICAL LEVEL: EFR EMT P AP

Medication	Glucose gel
Class	Antihypoglycaemic
Description	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: 5/6.4.19, 4.4.19, 2/3.4.19, 5/6.7.32, 4.7.32)
Indications	Hypoglycaemia Blood glucose < 4 mmol/L **EFR** – Known diabetic with confusion or altered levels of consciousness
Contraindications	Known severe adverse reaction
Usual Dosages	**Adult:** 10 – 20 g buccal Repeat prn **Paediatric:** ≤ 8 years; 5 – 10 g buccal >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 five 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

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CLINICAL LEVEL: 

Medication	Glyceryl Trinitrate (GTN)
Class	Nitrate
Description	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 0.4 mg (400 mcg)
Administration	Sublingual (SL): 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, 4.4.10, 5/6.4.10)
Indications	Angina Suspected Myocardial Infarction (MI) EFRs may assist with administration Advanced Paramedic and Paramedic - Pulmonary oedema
Contraindications	SBP < 90 mmHg Viagra or other phosphodiesterase type 5 inhibitors (Sildenafil, Tadalafil and Vardenafil) used within previous 24 hours. 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 (EFRs 0.4 mg sublingual max, assist patient) **Pulmonary oedema;** 0.8 mg (800 mcg) sublingual Repeat x 1 **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	If the pump is new or has not been used for a week or more, the first spray should be released into the air.

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CLINICAL LEVEL: EMT P AP

Medication	Ibuprofen
Class	Non-Steroidal Anti-Inflammatory Drugs (NSAIDs)
Description	It is an anti-inflammatory analgesic
Presentation	Suspension 100 mg in 5 mL 200 mg tablet, 400 mg tablet
Administration	Orally (PO) (CPG: 4/5/6.2.6, 4/5/6.7.5)
Indications	Mild to moderate pain
Contraindications	Not suitable for children under 3 months Patient with history of asthma exacerbated by aspirin Pregnancy Peptic ulcer disease Known severe adverse reaction
Usual Dosages	**Adult:** 400 mg PO **Paediatric:** 10 mg/Kg PO
Pharmacology/Action	Suppresses prostaglandins, which cause pain via the inhibition of cyclooxygenase (COX). Prostaglandins are released by cell damage and inflammation.
Side effects	Skin rashes, gastrointestinal intolerance and bleeding
Long-term side effects	Occasionally gastrointestinal bleeding and ulceration occurs May also cause acute renal failure, interstitial nephritis and 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. Caution with significant burns or poor perfusion due to risk of kidney failure. Caution if concurrent NSAIDs use.

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CLINICAL LEVEL: EMT P AP

Medication	Naloxone
Class	Narcotic antagonist
Description	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	Intravenous (IV) Intramuscular (IM) Subcutaneous (SC) Intraosseous (IO) Intranasal (IN) (CPG: 6.4.22, 4/5.4.22, 5/6.5.2, 4/5/6.7.11)
Indications	Inadequate respiration and/or ALoC following known or suspected narcotic overdose
Contraindications	Known severe adverse reaction
Usual Dosages	**Adult:** 0.4 mg (400 mcg) IV/IO (AP) 0.4 mg (400 mcg) IM or SC (P) 0.8 mg (800 mcg) IN (EMT) Repeat after 3 min prn to a Max 2 mg **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 & 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.

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CLINICAL LEVEL: EMT P AP

Medication	Nitrous Oxide 50% and Oxygen 50% (Entonox®)
Class	Analgesic
Description	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, 4.5.1, 5/6.5.6, 4/5/6.7.5)
Indications	Pain relief
Contraindications	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 relieved **Paediatric:** Self-administered until pain relieved
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.

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CLINICAL LEVEL: EFR EMT P AP

Medication	Oxygen
Class	Gas
Description	Odourless, tasteless, colourless gas necessary for life
Presentation	D, E or F cylinders, coloured black with white shoulders CD cylinder; white cylinder Medical gas
Administration	Inhalation via: High concentration reservoir (non-rebreather) mask Simple face mask Venturi mask Tracheostomy mask Nasal cannulae 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
Contraindications	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 O2 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% 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 minute duration. Caution with paraquat poisoning, administer oxygen if SpO_2 < 92% Avoid naked flames, powerful oxidising agent.

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CLINICAL LEVEL: EMT P AP

Medication	Paracetamol
Class	Analgesic and antipyretic
Description	Paracetamol is used to reduce pain and body temperature
Presentation	Rectal suppository 180 mg, 90 mg and 60 mg Suspension 120 mg in 5 mL or 250 mg in 5 mL 500 mg tablet
Administration	Per Rectum (PR) Orally (PO) (CPG: 4/5/6.2.6, 4/5/6.4.24, 4/5/6.7.5, 4/5/6.7.35)
Indications	Pyrexia Minor or moderate pain (1 - 6 on pain scale) for adult and paediatric patients
Contraindications	Known severe adverse reaction Chronic liver disease < 1 month old
Usual Dosages	**Adult:** 1 g PO **Paediatric:** **PR** (AP) > 1 mth < 1 year - 90 mg PR; 1-3 years - 180 mg PR; 4-8 years - 360 mg PR **PO** (AP, P & EMT) 20 mg/Kg PO
Pharmacology/Action	Analgesic – central prostaglandin inhibitor Antipyretic – prevents the hypothalamus from synthesising prostaglandin E, inhibiting the body temperature from rising further
Side effects	None
Long-term side effects	Long-term use at high dosage or over dosage can cause liver damage and less frequently renal damage
Additional information	Note: Paracetamol is contained in Paracetamol Suspension and other over the counter drugs. Consult with parent/guardian in relation to medication prior to arrival on scene. For PR use be aware of modesty of patient, should be administered in presence of a 2nd person. If Paracetamol administered in previous 4 hours, adjust the dose downward by the amount given by other sources resulting in a maximum of 20 mg/Kg.

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CLINICAL LEVEL: EFR EMT P AP

Medication	Salbutamol
Class	Sympathetic agonist
Description	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	Nebuliser (NEB) Inhalation via aerosol inhaler (CPG: 4/5/6.3.3, 4/5/6.3.4, 3.3.4, 5/6.4.15, 4.4.15, 2/3.4.16, 4/5/6.6.10, 4/5/6.7.12, 3.7.12, 5/6.7.31, 4.7.31, 2/3.7.31)
Indications	Bronchospasm Exacerbation of COPD Respiratory distress following submersion incident
Contraindications	Known severe adverse reaction
Usual Dosages	**Adult:** 5 mg NEB (or 0.1 mg metered aerosol spray x 5) Repeat at 5 min prn (EFRs: 0.1 mg metered aerosol spray x 5, assist patient) **Paediatric:** < 5 yrs - 2.5 mg NEB (or 0.1 mg metered aerosol spray x 3) ≥ 5 yrs - 5 mg NEB (or 0.1 mg metered aerosol spray x 5) Repeat at 5 min prn (EFRs: 0.1 mg metered aerosol spray x 2, assist patient)
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 volumizer 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.