

Drug Presentation

CPG D000

The drug section of these Guidelines has been specifically written to focus on the pharmacology relevant to selected medical emergencies. It is not intended that the pharmacology section of this booklet be seen as a standard text on pharmacology. Thus, the content has been restricted to Ambulance practice.

Presentation	In many instances, drugs may be available in presentations other than those listed. However, this booklet indicates only those presentations that are currently carried on Ambulance vehicles.
Pharmacology	A statement is included as to the nature of the drug followed by a list of specific actions related to the Ambulance use of that drug.
Metabolism	A single statement has been included to indicate the fate of the particular drug within the body.
Primary Emergency Indication	The indications to those emergency situations for which the drug is primarily used within Ambulance practice. The drug however, may have other indications within health care.
Contraindications	If there are absolute contraindications to the use of a particular drug, these are indicated in this section.
Precautions	Where there are relative contraindications or precautions in the administration of a drug, these are included in this section.
Route of Administration	Most drugs can be administered through a variety of routes. However, this section includes only those routes of administration considered appropriate for use in Ambulance practice. As a general principle, drugs should not be mixed in the same syringe or solution before administration.
Side Effects	Common side effects attributed to the use of the drug are included in this section.
Special Notes	In this section a variety of additional information, in particular the time that the drug takes to have its effect, has been included as background information.

Adrenaline

CPG D002

Presentation	1mg in 1ml amp (1:1,000) 1mg in 10ml amp (1:10,000)
Pharmacology	<p>A naturally occurring Alpha and Beta-adrenergic stimulant</p> <p><i>Actions:</i></p> <ul style="list-style-type: none"> - Increases pulse rate by increasing S.A. Node firing rate (Beta 1) - Increases conduction velocity through the A.V. Node (Beta 1) - Increases myocardial contractility (Beta 1) - Increases the irritability of the ventricles (Beta 1) - Causes bronchodilatation (Beta 2) - Causes peripheral vasoconstriction (Alpha)
Metabolism	By monoamine oxidase and other enzymes in blood, liver and around nerve endings and excreted by the kidneys
Primary Emergency Indications	<ol style="list-style-type: none"> 1. Persistent ventricular fibrillation or unconscious pulseless ventricular tachycardia 2. Asystole 3. Electro-mechanical dissociation/PEA 4. Inadequate perfusion (Cardiogenic) 5. Inadequate Perfusion (Non Cardiogenic – Non Hypovolaemic) 6. Anaphylactic reactions 7. Severe asthma 8. Unconscious asthma with no recordable blood pressure 9. Croup or suspected croup 10. Bradycardia with poor perfusion
Contraindication	Hypovolaemic shock without adequate fluid replacement

Adrenaline

CPG D002

Precautions	<ol style="list-style-type: none"> 1. Elderly Pts 2. Pts with cardiovascular disease 3. Pts on monoamine oxidase (MAO) inhibitors 4. Pts on Beta blockers as higher doses may be required
Route of Administration	<p>Intravenous Intramuscular Endotracheal Nebuliser Intravenous Infusion Intraosseous</p>
Side Effects	<p>Sinus tachycardia Supraventricular arrhythmias Ventricular arrhythmias Hypertension Pupillary dilatation May increase size of myocardial infarction Feeling of "anxiety/palpitations" in the conscious Pt</p>
Special Notes	<p>Intravenous Adrenaline should be reserved for life threatening situations.</p> <p><i>Intravenous effects:</i></p> <p>Onset: 30sec. Peak: 3 – 5min. Duration: 5 – 10min.</p> <p><i>Intramuscular effects:</i></p> <p>Onset: 30 – 90sec. Peak: 4 – 10min. Duration: 5 – 10min.</p>

Amiodarone

CPG D003

Presentation	150mg in 3ml ampoule
Pharmacology	A Class III anti-arrhythmic agent
Metabolism	By the liver
Primary Emergency Indications	<ol style="list-style-type: none"> 1. Ventricular Fibrillation/Pulseless Ventricular Tachycardia refractory to cardioversion 2. Sustained or recurrent Ventricular Tachycardia
Contraindications	<ol style="list-style-type: none"> 1. <i>Ventricular Fibrillation/Pulseless Ventricular Tachycardia refractory to cardioversion</i> <ul style="list-style-type: none"> - Nil of significance in above indication 2. <i>Ventricular Tachycardia</i> <ul style="list-style-type: none"> - Inadequate perfusion and deteriorating rapidly - Pregnancy 2. <i>Tricyclic antidepressant medication overdose</i>
Precautions	Following Fentanyl administration
Route of Administration	Intravenous
Side Effects	<ul style="list-style-type: none"> • Hypotension • Bradycardia
Special Notes	<p><i>Intravenous effects (bolus):</i></p> <p>Onset: 2min. Peak: 20min. Duration: 120min.</p> <p>Amiodarone is incompatible with saline. Glucose 5% must be used as dilutant when administered to the conscious Pt.</p> <p>An intravenous infusion of Amiodarone may be required during interhospital transfer. This will be prescribed by the referring physician and will normally be at a rate of 15mg/kg/day min.</p>

Presentation	0.6 mg in 1ml amp 1.2 mg in 1ml amp
Pharmacology	An anticholinergic agent <i>Actions:</i> <ul style="list-style-type: none">- inhibits the actions of acetylcholine on post-ganglionic cholinergic nerves at the neuro-effector site, e.g. as a vagal blocker and allows sympathetic effect to:<ul style="list-style-type: none">- increase pulse rate by increasing S.A. Node firing rate- increase the conduction velocity through the A.V. Node- antidote to reverse the effects of cholinesterase inhibitors, e.g. organophosphate insecticides, at the post-ganglionic neuro-effector sites of cholinergic nerves, i.e. reduces the excessive salivary, sweat, gastrointestinal, and bronchial secretions, and relaxes smooth muscles.
Metabolism	By the liver and excreted mainly by the kidneys
Primary Emergency Indication	<ol style="list-style-type: none">1. Bradycardia with poor perfusion2. Organophosphate poisoning with excessive cholinergic effects
Contraindication	Nil of significance in the above indications
Precautions	<ol style="list-style-type: none">1. Atrial flutter2. Atrial fibrillation3. Do not increase heart rate above 100/min. except in children under 6 years4. Glaucoma

Route of Administration	Intravenous Endotracheal
Side Effects	Tachycardia Palpitations Dry mouth Dilated pupils Visual blurring Retention of urine Confusion, restlessness (in large doses) Hot, dry skin (in large doses)
Special Notes	<i>Intravenous effects:</i> Onset: < 2min. Peak: < 5min. Duration: 2 – 6hr.

Ceftriaxone

CPG D005

Presentation	1g sterile powder in vial
Pharmacology	Cephalosporin Antibiotic
Metabolism	Excreted unchanged in urine (33% - 67%) and in bile
Primary Emergency Indication	<ol style="list-style-type: none"> 1. Suspected Meningococcal Septicaemia 2. Severe Sepsis (Consult only)
Contraindication	Allergy to Cephalosporin Antibiotics
Precautions	Allergy to Penicillin Antibiotics
Route of Administration	Intravenous route (preferred) Intramuscular route (if IV access unable to be obtained)
Side Effects	Nausea and Vomiting Skin Rash
Special Notes	<p>Usual Dose: Adult 1g, Child 50mg/kg</p> <p>Ceftriaxone IV must be made up to 10ml using sterile water and dose administered over 2min.</p> <p>Ceftriaxone IM must be made up to 4ml using 1% Lignocaine and dose administered in lateral upper thigh</p>

Compound Sodium Lactate

CPG D006

Presentation	500ml and 1000ml infusion soft pack
Pharmacology	<p>An isotonic crystalloid solution</p> <p><i>Composition:</i></p> <ul style="list-style-type: none"> - Electrolytes - in a similar concentration to that of extracellular fluid - Water <p><i>Action:</i></p> <p>Temporarily increases the volume of the intravascular compartment</p>
Metabolism	Excreted by the kidneys, Distributed throughout total body water, mainly in the extracellular fluid compartment
Primary Emergency Indication	<ol style="list-style-type: none"> 1. As a replacement fluid in volume-depleted Pts 2. To expand intravascular volume in the non-cardiac, non-hypovolaemic hypotensive Pt e.g. anaphylaxis, burns, sepsis 3. As a fluid challenge in unresponsive non-hypovolaemic hypotensive Pts, other than LVF e.g. Electro-mechanical dissociation, asthma 4. Vehicle for diluting and intravenous administration of drugs 5. Fluid to keep vein open for IV administration of drugs
Contraindication	Ceftriaxone
Precautions	Head injuries
Route of Administration	Intravenous infusion
Side Effects	Excessive administration will provoke fluid overload and may cause pulmonary oedema
Special Notes	<p><i>Intravascular half life:</i></p> <p>Approximately 30 – 60min.</p>

Dexamethasone

CPG D007

Presentation	8mg in 2ml Glass Vial
Pharmacology	A corticosteroid secreted by the adrenal cortex <i>Action:</i> Relieves inflammatory reactions and provides immunosuppression
Metabolism	By the liver and other tissues, and excreted predominantly by the kidneys
Primary Emergency Indication	<ol style="list-style-type: none"> 1. Bronchospasm associated with acute respiratory distress not responsive to nebulised Salbutamol 2. Anaphylaxis 3. Acute Exacerbation of COPD
Contraindication	Known hypersensitivity to Dexamethasone
Precautions	Solutions which are not clear or are contaminated should be discarded
Route of Administration	Intravenous and Intramuscular
Side Effects	Nil of significance in the above indication
Special Notes	<p>Does not contain an antimicrobial agent, therefore use solution immediately and discard any residue</p> <p><i>Intravenous effects:</i></p> <p>Onset: 30 – 60min. Peak: 2hr. Duration: 36 – 72hr.</p>

Dextrose 5%

CPG D008

Presentation	100ml infusion soft pack
Pharmacology	<p>An isotonic crystalloid solution</p> <p><i>Composition:</i></p> <ul style="list-style-type: none"> - Sugar – 5% dextrose - Water <p><i>Actions:</i></p> <ul style="list-style-type: none"> - Provides a small source of energy - Supplies body water
Metabolism	<p><i>Dextrose:</i></p> <ul style="list-style-type: none"> - Broken down in most tissues - Stored in liver and muscle as glycogen <p><i>Water:</i></p> <ul style="list-style-type: none"> - Excreted by the kidneys - Distributed throughout total body water, mainly in the extracellular fluid compartment
Primary Emergency Indication	Vehicle for dilution and administration of intravenous emergency drugs
Contraindication	Nil of significance in the above indication
Precautions	Nil of significance in the above indication
Route of Administration	Intravenous infusion
Side Effects	Nil of significance in the above indication
Special Notes	<p><i>Intravascular half life:</i></p> <p>Approximately 20 - 40min.</p>

Dextrose 10%

CPG D009

Presentation	50g in 500ml infusion soft pack
Pharmacology	A slightly hypertonic crystalloid solution <i>Composition:</i> - Sugar - 10% dextrose - Water <i>Actions:</i> - Provides a source of energy - Supplies body water
Metabolism	<i>Dextrose:</i> - Broken down in most tissues - Stored in liver and muscle as glycogen <i>Water:</i> - Excreted by the kidneys - Distributed throughout total body water, mainly in the extracellular fluid compartment
Primary Emergency Indication	Diabetic hypoglycaemia (Random Blood Glucose analysis < 4mmol/l) in Pts with an altered conscious state who are unable to self-administer oral glucose
Contraindication	Nil of significance in the above indication
Precautions	Nil of significance in the above indication
Route of Administration	Intravenous infusion
Side Effects	Nil of significance in the above indication
Special Notes	<i>Intravenous effects:</i> Onset: 3 minutes Peak: Duration: Depends on severity of hypoglycaemic episode

Fentanyl

CPG D010

Presentation	100mcg in 2ml amp, 900mcg in 3ml (IN use only)
Pharmacology	<p>A synthetic narcotic analgesic</p> <p><i>Actions:</i></p> <p>Central Nervous System effects:</p> <ul style="list-style-type: none"> - Depression – leading to analgesia - Respiratory depression – leading to apnoea - Dependence (addiction) <p><i>Cardiovascular effects:</i></p> <ul style="list-style-type: none"> - Decreases conduction velocity through the A.V. Node
Metabolism	By the liver and excreted by the kidneys
Primary Emergency Indications	<p>Sedation to facilitate intubation</p> <p>Sedation to maintain intubation</p> <p>Drug facilitated intubation</p> <p>Analgesia – IV/IN</p>
Contraindication	<p>Known hypersensitivity</p> <p>IV Amiodarone</p>
Precautions	<p>Elderly patients</p> <p>Impaired renal/hepatic function</p> <p>Respiratory depression, e.g. COPD</p> <p>Current asthma</p> <p>Pts on monoamine oxidase inhibitors</p> <p>Known addiction to narcotics</p> <p>Rhinitis, rhinorrhea or facial trauma (IN use)</p> <p>Oral Amiodarone</p>

Fentanyl

CPG D010

Route of Administration	Intravenous Intranasal
Side Effects	Respiratory depression Apnoea Rigidity of the diaphragm and intercostal muscles Bradycardia
Special Notes	<p>Fentanyl is a Schedule 8 drug under the Poisons Act and its use must be carefully controlled with accountability and responsibility.</p> <p>Respiratory depression can be reversed with Naloxone Hydrochloride. 100mcg Fentanyl is equivalent in analgesic activity to 10mg Morphine.</p> <p><i>Intravenous effects:</i> Onset: Immediate Peak: < 5min. Duration: 30 – 60min.</p> <p><i>Intranasal effects:</i> Peak: 2 mins</p>

Frusemide

CPG D011

Presentation	20mg in 2ml amp 40mg in 4ml amp
Pharmacology	A diuretic <i>Actions:</i> - Causes venous dilatation and reduces venous return - Promotes diuresis
Metabolism	Excreted by the kidneys
Primary Emergency Indication	Acute left ventricular failure
Contraindication	Nil of significance in the above indication
Precautions	Hypotension
Route of Administration	Intravenous
Side Effects	Hypotension
Special Notes	The effect of vasopressor drugs will often be reduced after treatment with Frusemide. <i>Intravenous effects:</i> Onset: 5min. Peak: 20 – 60min. Duration: 2 – 3hr. Also known as Furosemide

Glucagon

CPG D012

Presentation	1mg (IU) in 1ml Hypokit
Pharmacology	A hormone normally secreted by the pancreas <i>Actions:</i> Causes an increase in blood glucose concentration by converting stored liver glycogen to glucose
Metabolism	Mainly by the liver, also by the kidneys and in the plasma
Primary Emergency Indication	Diabetic hypoglycaemia (BGL < 4mmol/l) in Pts with an altered conscious state who are unable to self-administer oral glucose
Contraindication	Nil of significance in the above indication
Precautions	Nil of significance in the above indication
Route of Administration	Intramuscular
Side Effects	Nausea and vomiting (rare)
Special Notes	Not all Pts will respond to Glucagon, for example those with inadequate glycogen storage in the liver – alcoholics, malnourishment. <i>Intramuscular effects:</i> Onset: 3 – 5min. Peak: Duration: 12 – 25min.

Glyceryl Trinitrate (GTN)

CPG D013

Presentation	0.6mg tablets, Transdermal GTN Patch (0.4mg/hr)
Pharmacology	<p>Principally, a vascular smooth muscle relaxant</p> <p><i>Actions:</i></p> <ul style="list-style-type: none"> - Venous dilatation promotes venous pooling and reduces venous return to the heart (reduces preload) - Arterial dilatation reduces systemic vascular resistance and arterial pressure (reduces afterload) <p><i>The effects of the above are:</i></p> <ul style="list-style-type: none"> - reduced myocardial oxygen demand - reduced systolic, diastolic and mean arterial blood pressure, whilst usually maintaining coronary perfusion pressure - Mild collateral coronary arterial dilatation may improve blood supply to ischaemic areas of myocardium - Mild tachycardia secondary to slight fall in blood pressure - Preterm Labour: Uterine Quiescence in pregnancy
Metabolism	By the liver
Primary Emergency Indication	<ol style="list-style-type: none"> 1. Chest pain associated with Acute Coronary Syndrome 2. Acute Left Ventricular Failure 3. Hypertension associated with Acute Coronary Syndrome 4. Autonomic Dysreflexia 5. Preterm Labour: (consult)

Glyceryl Trinitrate (GTN)

CPG D013

Contraindication	<ol style="list-style-type: none"> 1. Known hypersensitivity 2. Systolic blood pressure < 110 tablet 3. Systolic blood pressure < 90 patch 4. Sildenafil Citrate "Viagra" or Vardenafil "Levitra" administration in the previous 24 hr. or Tadalafil "Cialis" administration in the previous 4 days (PED5 inhibitors) 5. Heart rate > 150 6. Bradycardia HR < 50 (excluding Autonomic Dysreflexia) 7. Ventricular Tachycardia 8. Inferior STEMI with systolic BP < 160 9. Right Ventricular Infarct
Precautions	<ol style="list-style-type: none"> 1. No previous administration 2. Elderly Pts 3. Recent acute myocardial infarction 4. Concurrent use with other tocolytics
Route of Administration	Buccal, sub-lingual, transdermal Infusion - interhospital transfer only
Side Effects	Tachycardia Hypotension Headache Skin flushing (uncommon) Bradycardia (occasionally)

Glyceryl Trinitrate (GTN)

CPG D013

Special Notes

Storage:

Glyceryl Trinitrate is susceptible to heat and moisture. Make sure that tablets are stored in their original light resistant, tightly sealed bottles. The foil pack of the patches should be intact.

Do not administer the Pts own medication, as its storage may not have been in optimum conditions or may be old. Tablets should be discarded and replaced after 1 month. Patches should be discarded prior to use by date.

Since both men and women can be prescribed Sildenafil Citrate "Viagra" or Vardenafil "Levitra" or Tadalafil "Cialis" all pts should be asked if and when they last have the drug to determine if Glyceryl Trinitrate is contraindicated.

Glyceryl Trinitrate by intravenous infusion may be required for an inter-hospital transfer as per the treating doctor's orders.

Dosage:

The IV dose is to be prescribed and signed by the referring hospital medical officer. Usually in the range of 5mcg/min to 200mcg/min and increased 3 -5mcg/min.

Buccal effects:

Onset: 30sec. – 2min.

Peak: 5 – 10min.

Duration: 15 – 30min.

Intravenous Effects

Onset: 30sec. – 1min.

Peak: 3 – 5min.

Duration: 15 – 30min.

Transdermal Effect

Onset: Up to 30min.

Peak: 2hr.

Ipratropium Bromide (Atrovent)

CPG D014

Presentation	250mcg in 1ml nebule or polyamp
Pharmacology	Anticholinergic bronchodilator <i>Actions:</i> allows bronchodilatation by inhibiting cholinergic bronchomotor tone (i.e. blocks vagal reflexes which mediate bronchoconstriction)
Metabolism	Excreted by the kidneys
Primary Emergency Indication	Severe respiratory distress associated with bronchospasm
Contraindication	Known hypersensitivity to Atropine or its derivatives
Precautions	<ol style="list-style-type: none"> 1. Glaucoma 2. Avoid contact with eyes
Route of Administration	Nebulised in combination with Salbutamol
Side Effects	<p>Headache Nausea Dry mouth Skin Rash Tachycardia (rare) Palpitations (rare) Acute angle closure glaucoma secondary to direct eye contact (rare)</p>

Ipratropium Bromide (Atrovent)

CPG D014**Special Notes**

There have been isolated reports of ocular complications (mydriasis, increased intraocular pressure, acute angle glaucoma, eye pain) as a result of direct eye contact of Ipratropium Bromide formulations

The nebuliser mask must therefore be fitted properly during inhalation and care taken to avoid Ipratropium Bromide solution entering the eyes

Ipratropium Bromide must be nebulised in conjunction with Salbutamol and is to be administered as a single dose only

Onset:	3 – 5min.
Peak	1.5 – 2hr.
Duration:	6hr.

Lignocaine

CPG D015

Presentation	50mg in 5ml amp (1%) - for intramuscular injection
Pharmacology	A local anaesthetic agent <i>Actions:</i> Prevents initiation and transmission of nerve impulses causing local anaesthesia (1% solution)
Metabolism	By the liver (90%) Excreted unchanged by the kidneys (10%)
Primary Emergency Indication	<i>Intramuscular administration (1% solution)</i> Diluent for Ceftriaxone for IM administration in suspected meningococcal disease
Contraindication	Known hypersensitivity
Precautions	When using Lignocaine 1% as diluent for IM Ceftriaxone it is important to rule out inadvertent IV administration due to potential CNS complications
Route of Administration	Intramuscular (1% solution with Ceftriaxone only)
Side Effects	Intramuscular administration (1% solution) Nil – unless inadvertent intravenous administration
Special Notes	<i>Intramuscular effects (1% solution)</i> Onset: Rapid Peak: Duration: 60 - 90min.

Lignocaine 1% Intraosseous Administration

CPG D015A

Presentation	50 mg in 5 ml amp (1%)
Pharmacology	A local anaesthetic agent <i>Actions</i> Prevents initiation and transmission of nerve impulses (local anaesthesia)
Metabolism	By the liver (90%) Excreted unchanged by the kidneys (10%)
Primary Emergency Indication	<i>Intraosseous administration</i> To reduce the pain of intraosseous drug and fluid administration in the responsive Pt.
Contraindication	Known hypersensitivity
Precautions	<i>Intraosseous administration (1% solution)</i> Hypotension and poor perfusion Chronic left ventricular failure Liver disease
Route of Administration	Intraosseous

Lignocaine 1% Intraosseous Administration

CPG D015A

Side Effects	<i>Intraosseous administration (1% solution)</i> <ul style="list-style-type: none">- Central Nervous System effects (common):<ul style="list-style-type: none">- drowsiness- disorientation- decreased hearing- blurred vision- change or slurring of speech- twitching and agitation- convulsions- Cardiovascular effects (uncommon):<ul style="list-style-type: none">- hypotension- bradycardia- sinus arrest- A.V. block- Respiratory effects (uncommon):<ul style="list-style-type: none">- difficulty in breathing- respiratory arrest
Special Notes	<i>Intraosseous effects</i> <p>Onset: 1 – 4 min. Peak: 5 – 10 min. Duration: 20 min.</p>

Metaraminol

CPG D016

Presentation	10mg in 1ml amp
Pharmacology	A synthetic adrenergic stimulant with primarily Alpha effects <i>Action:</i> Causes peripheral vasoconstriction (alpha) Increases myocardial contractility (beta1) Increases the irritability of the ventricles (beta1)
Metabolism	By monoamine oxidase and other enzymes in blood, liver and around nerve endings and excreted by the kidneys
Primary Emergency Indication	<ol style="list-style-type: none"> SVT associated with inadequate perfusion and a BP < 100 Inadequate to extremely poor perfusion secondary to the combination of Sildenafil Citrate "Viagra" or Tadalafil "Cialis" and Glyceryl Trinitrate administration
Contraindication	Nil in the above setting
Precautions	<ol style="list-style-type: none"> Causes tissue necrosis, avoid leakage of the drug into the tissues Do not raise blood pressure over 90 – 100 systolic
Route of Administration	Intravenous
Side Effects	Sinus tachycardia Ventricular arrhythmias Hypertension
Special Notes	<i>Intravenous effects:</i> Onset: 1 – 2min. Peak: 10min. Duration: 20min.

Methoxyflurane

CPG D017

Presentation	3ml glass bottle with plastic seal
Pharmacology	Inhalational analgesic agent at low concentrations
Metabolism	Excreted mainly by the lungs By the liver
Primary Emergency Indication	Pre-hospital pain relief
Contraindication	<ol style="list-style-type: none"> 1. Pre-existing renal disease/renal impairment 2. Concurrent use of tetracycline antibiotics 3. Exceeding total dose of 6ml in a 24 hr. period
Precautions	<ol style="list-style-type: none"> 1. The "Pentrox"TM inhaler must be hand-held by the Pt so that if unconsciousness occurs it will fall from the Pt's face. Occasionally the operator may need to assist but must continuously assess the level of consciousness 2. Pre-eclampsia
Route of Administration	Self-administration under supervision using the hand held "Pentrox" TM Inhaler with oxygen supplementation
Side Effects	<p>Drowsiness</p> <p>Decrease in blood pressure and bradycardia (rare)</p> <p>Exceeding the max. total dose of 6ml in a 24 hr. period may lead to renal toxicity</p>
Special Notes	The max. initial priming dose for Methoxyflurane is 3ml. This will provide approximately 25min. of analgesia and may be followed by one further 3ml dose once the initial dose is exhausted if required. Analgesia commences after 8-10 breaths and lasts for approximately 3-5min. once discontinued.

Metoclopramide

CPG D018

Presentation	10mg in 2ml ampoule
Pharmacology	Antiemetic which accelerates gastric emptying and peristalsis Mild 5HT ₃ -receptor antagonist
Metabolism	By the liver and excreted by the kidneys
Primary Emergency Indication	Nausea/vomiting associated with <ul style="list-style-type: none"> - Chest pain/discomfort of a cardiac nature - Opioid administration for pain - Cytotoxic or radiotherapy - Previously diagnosed migraine - Severe gastroenteritis - Treatment or prophylaxis in awake spinal immobilised Pts - Eye trauma
Contraindication	<ol style="list-style-type: none"> 1. Children 2. Suspected bowel obstruction or perforation 3. Gastrointestinal haemorrhage
Precautions	<ol style="list-style-type: none"> 1. Undiagnosed abdominal pain 2. Adolescents (< 20yrs) 3. Administer slowly over one minute to minimise risk of extrapyramidal reactions
Route of Administration	Intravenous Intramuscular

Metoclopramide

CPG D018

Side Effects	Drowsiness Lethargy Dry mouth Muscle tremor Extrapyramidal reactions (usually the dystonic type)
Special Notes	Not effective for established motion sickness Not effective for nausea prophylaxis in the setting of narcotic administration <i>Intravenous effects:</i> Onset: 1 – 3min. Duration: 10 – 30min. <i>Intramuscular effects:</i> Onset: 10 – 15min. Duration: 1 – 2 hr.

Midazolam

CPG D019

Presentation	5mg in 1ml amp 15mg in 3ml amp
Pharmacology	Short acting central nervous system depressant. <i>Actions:</i> - Anxiolytic – reducing anxiety - Sedative - Anti-convulsant
Metabolism	In the liver - excreted by the kidneys
Primary Emergency Indication	<ol style="list-style-type: none"> 1. Continuous/recurrent seizures 2. Sedation to maintain intubation 3. Sedation to enable intubation 4. Rapid sequence intubation 5. Sedation to enable synchronized cardioversion 6. Sedation in the agitated Pt 7. Sedation in psychostimulant overdose 8. Convulsions associated with Lignocaine toxicity
Contraindications	Known hypersensitivity to benzodiazepines
Precautions	<ol style="list-style-type: none"> 1. Reduced doses may be required for the elderly, Pts with chronic renal failure, congestive cardiac failure or shock 2. The CNS depressant effects of benzodiazepines are enhanced in the presence of narcotics and other tranquillisers including alcohol 3. Can cause severe respiratory depression in Pts with COPD 4. Pts with myasthenia gravis

Midazolam

CPG D019

Route of Administration	Intramuscular Intravenous
Side Effects	Depressed level of consciousness Respiratory depression Loss of airway control Hypotension
Special Notes	<p>Midazolam is not permitted for use to facilitate the transport of Pts who have been recommended for transport under the Mental Health Act. If sedation is required in these circumstances then the Act requires that this only be administered by a prescribed Medical Practitioner or Registered Nurse.</p> <p><i>Intramuscular effects:</i> Onset: 3 – 5min. Peak: 15min. Duration: 30min.</p> <p><i>Intravenous effects:</i> Onset: 1 – 3min. Peak: 10min. Duration: 20min.</p>

Morphine

CPG D020

Presentation	10mg in 1ml amp
Pharmacology	<p>A narcotic analgesic</p> <p><i>Actions:</i></p> <p><i>Central Nervous System effects:</i></p> <ul style="list-style-type: none"> - Depression - leading to analgesia - Respiratory depression - Depression of cough reflex - Stimulation - changes of mood, euphoria or dysphoria, vomiting, pin-point pupils - Dependence (addiction) <p><i>Cardiovascular effects:</i></p> <ul style="list-style-type: none"> - Vasodilatation - Decreases conduction velocity through the A.V. Node
Metabolism	By the liver and excreted by the kidneys
Primary Emergency Indication	<ol style="list-style-type: none"> 1. Pain Relief 2. Acute left ventricular failure with shortness of breath and full field crackles 3. Sedation to maintain intubation 4. Sedation to enable intubation 5. Rapid Sequence Intubation
Contraindications	<ol style="list-style-type: none"> 1. Known hypersensitivity 2. Late second stage of labour

Morphine

CPG D020

Precautions	<ol style="list-style-type: none"> 1. Elderly Pts 2. Hypotension 3. Respiratory depression 4. Current asthma 5. Respiratory tract burns 6. Known addiction to narcotics 7. Acute alcoholism 8. Pts on monoamine oxidase inhibitors 								
Route of Administration	Intravenous, Intramuscular, Intravenous infusion								
Side Effects	<p><i>Central Nervous System effects:</i></p> <ul style="list-style-type: none"> - Drowsiness - Respiratory depression - Euphoria - Nausea, vomiting - Pin-point pupils - Addiction <p><i>Cardiovascular effects:</i></p> <ul style="list-style-type: none"> - Hypotension - Bradycardia 								
Special Notes	<p>Morphine Sulphate is a Schedule 8 drug under the Poisons Act and its use must be carefully controlled with accountability and responsibility.</p> <p>Side effects of Morphine Sulphate can be reversed with Naloxone Hydrochloride.</p> <p>Occasional wheals are seen in the line of the vein being used for IV injection. This is not an allergy, only a histamine release.</p> <p><i>Intravenous effects:</i></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">Onset: 2 – 5min.</td> <td style="width: 50%;"><i>Intramuscular effects:</i></td> </tr> <tr> <td>Peak: 10min.</td> <td>Onset: 10 – 30min.</td> </tr> <tr> <td>Duration: 1 – 2hr.</td> <td>Peak: 30 – 60min.</td> </tr> <tr> <td></td> <td>Duration: 1 – 2hr.</td> </tr> </table>	Onset: 2 – 5min.	<i>Intramuscular effects:</i>	Peak: 10min.	Onset: 10 – 30min.	Duration: 1 – 2hr.	Peak: 30 – 60min.		Duration: 1 – 2hr.
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	Duration: 1 – 2hr.								

Naloxone

CPG D021

Presentation	0.4mg in 1ml amp 2mg in 5ml (prepared syringe)
Pharmacology	A narcotic antagonist <i>Action:</i> - Prevents or reverses the effects of narcotics
Metabolism	By the liver
Primary Emergency Indication	Altered Conscious State and respiratory depression secondary to administration of narcotics or related drugs
Contraindications	Nil of significance in the above indication
Precautions	<ol style="list-style-type: none"> 1. If Pt is known to be physically dependent on narcotics, be prepared to deal with a combative Pt after administration 2. Neonates
Route of Administration	Intramuscular Intravenous
Side Effects	Symptoms of narcotic withdrawal: Sweating, goose flesh, tremor Nausea and vomiting Agitation Dilatation of pupils, excessive lacrimation Convulsions

Naloxone

CPG D021

Special Notes

Since the duration of action of Naloxone Hydrochloride is often less than that of the narcotic used repeated doses may be required.

Naloxone Hydrochloride reverses the effects of narcotics with none of the actions produced by other narcotic antagonists when no narcotic is present in the body. (For example, it does not depress respiration or cause pupillary constriction).

In the absence of narcotics, Naloxone Hydrochloride has no perceivable effects.

Following a narcotic associated cardiac arrest Naloxone Hydrochloride should not be administered. Maintain assisted ventilation.

Following head injury Naloxone Hydrochloride should not be administered. Maintain assisted ventilation if required.

In neonates if the mother has had a narcotic analgesic within one hr. prior to delivery, the baby may have narcotic related respiratory depression for which diluted Naloxone Hydrochloride may be advised on consultation.

Intravenous effects:

Onset: 1 – 3min.

Peak:

Duration: 30 – 45min.

Intramuscular effects:

Onset: 1 – 3min.

Peak:

Duration: 30 – 45min.

Normal Saline

CPG D022

Presentation	10ml polyamp, 500ml + 1000ml infusion soft pack		
Pharmacology	<p>An isotonic crystalloid solution</p> <p><i>Composition:</i></p> <ul style="list-style-type: none"> - Electrolytes - sodium and chloride in a similar concentration to that of extracellular fluid - Water <p><i>Action:</i></p> <ul style="list-style-type: none"> - Transiently increases the volume of the intravascular compartment 		
Metabolism	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <p><i>Electrolytes:</i></p> <ul style="list-style-type: none"> - Excreted by the kidneys </td> <td style="width: 50%; vertical-align: top;"> <p><i>Water:</i></p> <ul style="list-style-type: none"> - Excreted by the kidneys - Distributed throughout total body water, mainly in the extracellular fluid compartment </td> </tr> </table>	<p><i>Electrolytes:</i></p> <ul style="list-style-type: none"> - Excreted by the kidneys 	<p><i>Water:</i></p> <ul style="list-style-type: none"> - Excreted by the kidneys - Distributed throughout total body water, mainly in the extracellular fluid compartment
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Primary Emergency Indication	<ol style="list-style-type: none"> 1. As a replacement fluid in volume-depleted Pts 2. To expand intravascular volume in the non-cardiac, non-hypovolaemic hypotensive Pt e.g. anaphylaxis, burns, sepsis 3. As a fluid challenge in unresponsive non-hypovolaemic hypotensive Pts, other than LVF e.g. asthma, PEA 4. Vehicle for diluting and intravenous administration of emergency drugs 5. Fluid to keep vein open for IV administration of emergency drugs 		
Contraindications	Nil of significance in the above indication		
Precautions	Nil of significance in the above indication		
Route of Administration	Intravenous		
Side Effects	Nil of significance in the above indication		
Special Notes	<i>Intravascular half life:</i> Approximately 30 – 60min.		

Pancuronium

CPG D023

Presentation	4mg in 2ml amp
Pharmacology	<p>A non-depolarising neuromuscular blocking agent.</p> <p><i>Actions:</i></p> <ul style="list-style-type: none"> - blocks transmission of impulses at the neuromuscular junction of striated muscles resulting in skeletal muscle paralysis. - due to weak vagolytic action, a slight rise in pulse rate and mean arterial pressure may be expected
Metabolism	By the kidneys and excreted mainly unchanged in the urine
Primary Emergency Indication	To maintain skeletal muscle paralysis and allow mechanical ventilation in intubated Pts following intubation facilitated by sedation, rapid sequence intubation, or during interhospital transport of ventilated Pts
Contraindications	<ol style="list-style-type: none"> 1. Pancuronium must not be given if continuous monitoring of Pt vital signs including pulse oximetry and end tidal CO₂ monitoring are not available 2. Status Epilepticus
Precautions	<ol style="list-style-type: none"> 1. Ensure patency of IV access 2. Sedatives must always be administered prior to Pancuronium Bromide 3. Endotracheal tube placement, adequacy of ventilation, oxygen saturation, end tidal CO₂, pulse and blood pressure must be continuously monitored 4. Pts with myasthenia gravis should be given much smaller doses and monitored carefully due to the potential of increased degree of neuromuscular block 5. Care should be exercised in Pts with renal impairment
Route of Administration	Intravenous

Pancuronium

CPG D023

Side Effects	Slight increase in heart rate Slight increase in mean arterial pressure Localised reaction at injection site (rare)
Special Notes	Allergic reactions such as urticaria, laryngeal oedema, bronchospasm and anaphylactic shock have been reported. Pancuronium Bromide infusions required during interhospital transfers are to be prescribed and signed by the referring hospital medical officer. The initial dose is usually 0.1mg/kg. <i>Intravenous</i> Onset: 2 – 3min. Peak: 8 – 10min. Duration: 35 – 45min.

Prochlorperazine

CPG D024

Presentation	12.5mg in 1ml amp
Pharmacology	An anti-emetic <i>Action:</i> - Acts on several central neuro-transmitter systems
Metabolism	Metabolised by the liver and excreted by the kidneys
Primary Emergency Indication	Treatment or prophylaxis of nausea/vomiting for - Motion sickness - Planned aeromedical evacuation - Known allergy or contraindication to Metoclopramide administration - Headache irrespective of nausea/vomiting - Vertigo
Contraindications	<ol style="list-style-type: none"> 1. Circulatory collapse 2. CNS depression 3. Previous hypersensitivity 4. Children
Precautions	<ol style="list-style-type: none"> 1. Hypotension 2. Epilepsy 3. Pts effected by alcohol or on anti-depressants
Route of Administration	Intramuscular

Prochlorperazine

CPG D024

Side Effects	Drowsiness Blurred vision Hypotension Sinus tachycardia Skin rash Extrapyramidal reactions, usually the dystonic type
Special Notes	<i>Intramuscular Effect</i> Onset: 20min. Peak: 40min. Duration: 6hr.

Presentation	5mg in 2.5ml nebule/polyamp 500mcg in 1ml amp 5mg in 5ml amp
Pharmacology	A synthetic Beta-adrenergic stimulant, with primarily Beta 2 effects <i>Action:</i> - Causes bronchodilatation
Metabolism	By the liver and excreted by the kidneys
Primary Emergency Indication	Respiratory distress with suspected bronchospasm: - asthma - pulmonary oedema - severe allergic reactions - COPD - smoke inhalation - Oleoresin Capsicum spray exposure
Contraindications	Nil of significance in the above indications
Precautions	1. Between doses, oxygen must be administered continuously 2. Large doses of IV Salbutamol have been reported to cause intracellular metabolic acidosis
Route of Administration	Nebulised Intravenous Intravenous Infusion Endotracheal Pressurised Metered Dose Inhaler (pMDI)

Salbutamol

CPG D025

Side Effects	Sinus tachycardia Muscle tremor (common)
Special Notes	<ul style="list-style-type: none"> - IV Salbutamol has no advantage over nebulised Salbutamol provided that adequate ventilation is occurring. - Salbutamol Nebules/Polyamps have a shelf life of one month after the wrapping is opened. The date of opening of the packaging should be recorded and the drug should be stored in an environment of < 30°C - Salbutamol by intravenous infusion may be required during interhospital transfers of some women in premature labour - The dose is to be prescribed and signed by the referring hospital medical officer <p><i>Nebulised effects:</i></p> <p>Onset: 5 – 15min. Peak: Duration: 15 – 50min.</p> <p><i>Intravenous effects:</i></p> <p>Onset: 1 – 2min. Peak: Duration: 30 – 60min.</p>

Sodium Bicarbonate 8.4%

CPG D026

Presentation	50ml prepared syringe (Sodium Bicarbonate 8.4%)
Pharmacology	<p>A hypertonic crystalloid solution</p> <p><i>Composition:</i></p> <ul style="list-style-type: none"> - Contains sodium and bicarbonate ions in a solution of high pH <p><i>Action:</i></p> <ul style="list-style-type: none"> - Raises pH
Metabolism	<p>Sodium: excreted by the kidneys</p> <p>Bicarbonate: excreted by the kidneys as bicarbonate ion, and by the lungs as carbon dioxide</p>
Primary Emergency Indication	<ol style="list-style-type: none"> 1. To reduce metabolic acidosis during cardiopulmonary resuscitation after 15min. of Ambulance personnel CPR 2. Symptomatic Tricyclic Antidepressant Overdose
Contraindications	Hypothermia < 30°C
Precautions	<ol style="list-style-type: none"> 1. Administration of Sodium Bicarbonate 8.4% must be accompanied by effective ventilation and External Cardiac Compression if required 2. Since Sodium Bicarbonate 8.4% causes tissue necrosis, care must be taken to avoid leakage of the drug into the tissues 3. Because of the high pH of this solution do not mix or flush any other drug or solution with Sodium Bicarbonate 8.4%
Route of Administration	Intravenous

Sodium Bicarbonate 8.4%

CPG D026

Side Effects	Sodium overload may provoke pulmonary oedema Excessive dosage of Sodium Bicarbonate 8.4%, especially without adequate ventilation and circulation may cause an intracellular acidosis.
Special Notes	<i>Intravenous effects:</i> Onset: 1 – 2min. Peak: Duration: Depends on cause and Pt's perfusion

Suxamethonium

CPG D027

Presentation	100mg in 2ml amp
Pharmacology	Depolarising neuromuscular blocking agent <i>Actions:</i> - Short acting muscular relaxant
Metabolism	Pseudo-cholinesterase in plasma
Primary Emergency Indication	Complete muscle relaxation to allow endotracheal intubation
Contraindications	<ol style="list-style-type: none"> 1. Known hypersensitivity 2. Upper airway obstruction 3. Severe respiratory distress 4. Penetrating eye injury 5. ECG signs of hyperkalaemia in conditions such as muscle necrosis and renal failure 6. Burns > 24 hrs post injury 7. Organophosphate poisoning 8. Ruptured Abdominal Aortic Aneurysm 9. Known history of Suxamethonium apnoea 10. Known history of malignant hyperthermia
Precautions	<ol style="list-style-type: none"> 1. Liver disease 2. Elderly Pts 3. Crush injuries 4. Pts who have not fasted 5. Airway trauma
Route of Administration	Intravenous

Suxamethonium

CPG D027

Side Effects	Muscular fasciculation Increase in intraocular pressure Increase in intragastric pressure Elevated serum potassium levels
Special Notes	Sedation is required prior to use Atropine (600mcg) should be administered prior to Suxamethonium administration in adult Pts with a HR < 60 Atropine 20mcg/kg should be administered prior to Suxamethonium administration in children A second dose of Suxamethonium usually causes profound bradycardia Refrigeration of Suxamethonium is required - requires weekly rotation or disposal when not refrigerated <i>Usual dosage:</i> Adults: 1.5mg/kg IV Children: 1 – 2mg/kg IV <i>Intravenous effects:</i> Onset: 20 – 40sec. Peak: 60sec. Duration: 4 – 6min.

Presentation	5mg in 2ml amp
Pharmacology	<p>A calcium ion antagonist and antiarrhythmic agent</p> <p><i>Actions:</i></p> <ol style="list-style-type: none"> 1. Increases the refractory period of the A.V. Node 2. Dilates coronary arteries 3. Decreases myocardial contractility 4. Reduces peripheral resistance 5. The effects of 3 and 4 may lead to a fall in blood pressure
Metabolism	By the liver and excreted by the kidneys
Primary Emergency Indication	Supraventricular tachycardia with adequate or borderline perfusion, but symptomatic, i.e. rate related chest pain and/or shortness of breath with crackles present, which has not responded to abdominal valsalva manoeuvre.
Contraindications	<ol style="list-style-type: none"> 1. Hypotension 2. Pts on Beta-blocking drugs
Precautions	<ol style="list-style-type: none"> 1. Partial A.V. block 2. Left ventricular failure 3. Concurrent chest pain of a cardiac nature
Route of Administration	Intravenous

Side Effects	Hypotension Left ventricular failure Bradycardia (uncommon) Ventricular fibrillation (uncommon) Asystole (uncommon)
Special Notes	<i>Intravenous effects:</i> Onset: 1 – 2min. Peak: 5 – 10min. Duration: 20 – 30min.

Water for Injection

CPG D029

Presentation	10ml in ampoule/polyamp
Pharmacology	Water for Injections is a clear, colourless, particle free, odourless and tasteless liquid. It is sterile, with a pH of 5.6 to 7.7 and contains no antimicrobial agents
Metabolism	Distributed throughout the body and excreted by the kidneys
Primary Emergency Indication	Used to dissolve Ceftriaxone in preparation for intravenous injection
Contraindications	Nil in the above indication
Precautions	Nil in the above indication
Route of Administration	Intravenous
Side Effects	Nil
Special Notes	Nil

Misoprostol

CPG D030

Presentation	200mcg tablet
Pharmacology	A synthetic prostaglandin
Metabolism	Converted to active metabolite Misoprostol Acid in the blood Metabolised in the tissues and excreted by the kidneys
Primary Emergency Indication	Primary Post Partum Haemorrhage
Contraindications	<ol style="list-style-type: none"> 1. Allergy to prostaglandins 2. Ensure multiple pregnancy excluded before drug administration
Precautions	<ol style="list-style-type: none"> 1. History of Asthma
Route of Administration	Oral
Side Effects	Hyper-pyrexia Shivering Abdominal pain and Diarrhoea
Special Notes	Side effects more likely with > 600mcg oral dose Onset: 8 –10 min Duration: 2 – 3 hr

Oxytocin (Syntocinon)

CPG D031

Presentation	10 units (iu) in 1 ml ampoule
Pharmacology	A synthetic oxytocic <i>Action</i> Stimulates smooth muscle of the uterus producing contractions
Metabolism	By the liver Excreted by the kidneys
Primary Emergency Indication	Primary post partum haemorrhage
Contraindications	<ol style="list-style-type: none"> 1. Previous Hypersensitivity 2. Severe toxæmia (pre-eclampsia) 3. Ensure multiple pregnancy excluded before drug administration 4. Cord prolapse
Precautions	<ol style="list-style-type: none"> 1. If given IV may cause transient hypotension 2. Concurrent use with Methoxyflurane may cause hypotension
Route of Administration	Intramuscular
Side Effects	<i>Uncommon via IMI route</i> Tachycardia/Bradycardia Nausea

Oxytocin (Syntocinon)

CPG D031**Special Notes**

Concomitant use with prostaglandins (Misoprostol) may potentiate uterotonic effect

Must be stored between 2 - 8°C

Intramuscular effects:

Onset 2 – 4 min

Duration: 30 – 60 min

