Resuscitation Handbook

Purpose

This handbook provides staff with an easy reference guide to current resuscitation and other decision support emergency algorithms for use by staff in medical emergencies. It also provides drug doses and administration advice for drugs used in medical emergencies.

Intended Audience

For use by healthcare professionals at Sheffield Children’s Hospital NHS Foundation Trust
1. Introduction

This handbook provides staff with an easy reference guide to current resuscitation and other decision support emergency algorithms for use by staff in medical emergencies. It also provides drug doses and administration advice for drugs used in medical emergencies.

2. Intended Audience

For use by healthcare professionals at Sheffield Children’s Hospital NHS Foundation Trust

3. Guideline Content

This handbook provides staff with an easy reference guide to current resuscitation and other decision support emergency algorithms for use by staff in medical emergencies. It also provides drug doses and administration advice for drugs used in medical emergencies.

It includes:

- Paediatric Basic Life Support
- Choking
- Tracheostomy life support
- ‘Can't ventilate’ guidelines
- Asystole
- Pulseless Electrical Activity
- Ventricular Fibrillation
- Defibrillation
- Bradycardia
- Supraventricular Tachycardia
- Status Epilepticus
- Anaphylaxis
- Ventricular Tachycardia
- Massive blood loss
- Calculations
- Neonatal Resuscitation Drugs
- Paediatric Resuscitation Drugs
- Adolescent Resuscitation Drugs
- Adult Basic Life Support
- Adult Advanced Life Support
- Adult Resuscitation Drugs

This guideline should be used in conjunction with the Trust Initial Drug Doses for Medical Emergencies which provides drug doses and administration advice for drugs used in medical emergencies which are kept in the Trust Paediatric Emergency Drug Boxes.
4. References


Resuscitation Council (UK) Emergency Treatment of Anaphylactic reactions – guidelines for healthcare providers 2008


This handbook is intended for use as a guide by all clinical staff involved in resuscitation on SC(NHS)FT MAIN HOSPITAL SITE & NGH OPD2 premises and by the EMBRACE TEAM.

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Paediatric Basic Life Support

1. Unresponsive
2. Shout for help
3. Open airway
4. Not breathing normally
5. 5 Rescue breaths
6. No signs of life
7. 15 Chest compressions
8. 2 Rescue breaths
9. 15 Chest compressions
10. Call resuscitation team
    (1 min CPR first, if alone)
Basic Life Support
Choking Algorithm

Assess severity

Ineffective cough

Conscious
5 back blows
5 thrusts (chest for infant)
(abdominal for child > 1 year)

Encourage cough
Continue to check for deterioration to ineffective cough or until obstruction relieved

Effective cough

Unconscious
Open airway
5 breaths
Start CPR
Tracheostomy life support

Apnoeic patient (not breathing)

Shout for help (2222 in hospital or 999)

Suction and/or tube change.
All patients carry with them a spare tube of the same size and one smaller.
If suction given then once only to check tube patency.

Working clear tracheostomy

5 Rescue Breaths
- Attach ambu bag of appropriate size to tracheostomy tube
- (or via mouth to tracheostomy)
- Administer high flow oxygen if available via the ambu bag

Commence CPR if child does not show signs of life after the ‘rescue breaths’.

1 minute BLS

Ensure Help is on the way – call 2222 or 999

Fail to insert or clear tracheostomy tube *

5 Rescue Breaths
- Perform mouth to mouth, mouth to mouth and nose or Bag valve mask resuscitation.
  - Block off the stoma site if air is escaping through it but otherwise leave the stoma site alone (i.e. do not insert anything into it).

* If unable to insert tube then try a smaller tube. Don’t make repeated attempts to insert either size tube.
  In non-breathing patient the priority is to ventilate the patient, so call 2222 or 999 and provide life support via mouth/nose or endotracheal tube.
**SCH - Can't ventilate guidelines**

For unresponsive, apnoeic patients with no anaesthetist

1. **Call 2222**

2. **Attempt bag-mask ventilation, 100% O2**
   - **Fail to ventilate**
     - Ensure:
       - 100% O2
       - 2 person technique
       - head tilt, chin lift
       - jaw thrust
       - oropharyngeal +/- nasopharyngeal airway
     - Manage gastric distension with OG tube
     - **Fail to ventilate**
     - **Insert LMA – no more than 2 attempts**
     - **Fail to ventilate**
       - SpO2 <90% with 100% O2
       - **Call 2222 and request consultant anaesthetist and PCCU consultant. Consider intubation if competent – no more than 2 attempts**
     - **Succeed**
   - **Succeed**
     - **Continue to bag mask ventilate with 100% O2 & await anaesthetist**

3. **Succeed**
   - **Ventilate with 100% O2 via LMA & await anaesthetist**
   - **Ventilate with 100% O2 via endotracheal tube & ensure anaesthetist/PCCU team attendance**

4. **Fail**
   - SpO2 <90% with 100% O2
   - **Consider emergency needle cricothyroidotomy if patient deteriorating**
Asystole and PEA

Start BLS, confirm rhythm

VENTILATE with high concentration O₂

Continue CPR

High Flow Oxygen IV/IO access
If able intubate

ADRENALINE IV/IO immediately
(See Drug Formulary for doses)

2 min CPR

Assess Rhythm every 2 minutes

2 min CPR

Repeat ADRENALINE every 4 minutes

CONSIDER (and treat appropriately)

Hypoxia, Hypovolaemia, Hypothermia, Hyper/Hypokalaemia/metabolic

Tension Pneumothorax, Cardiac Tamponade, Toxic substances, Thromboembolic phenomena

Consider alkalising agents
Ventricular Fibrillation & Pulseless VT

Start BLS, confirm rhythm

DC shock 4 J/kg

INTUBATE, High flow O₂, IV/IO access

DC shock 4 J/kg

INTUBATE, High flow O₂, IV/IO access

DC shock 4 J/kg

then IV/IO Adrenaline and Amiodarone

(See Drug Formulary for doses)

2 min CPR, check monitor

2 min CPR, check monitor

2 min CPR, check monitor

2 min CPR, check monitor

CONSIDER (and treat appropriately)

Hypoxia,
Hypovolaemia,
Hypothermia,
Hyper/Hypokalaemia/metabolic

Tension Pneumothorax, Cardiac Tamponade,
Toxic substances, Thromboembolic phenomena

Consider alkalising agents
Defibrillation

- Use **Single** shocks with 2 min CPR in between each shock.
- Use energy level of 4J/kg throughout – up to a weight of 50 kg.
- Above 50 kg – use Adult guidelines.

**Adult guidelines**

**Zoll R series defibrillator** - adult shocks are given at 120J, 150J, 200J. Maximum dose 200J.

**Lifepak 20/20e** - 1\(^{st}\) adult shock is 150-200 J followed by 2\(^{nd}\) and subsequent shocks 150-360 J.

- **Internal** paddles are kept in ED resus.
- **External** pacing is provided using the Hands-free pads available with all defibrillators.
Bradycardia

Shock present?

YES

If heart rate less than 60 start CPR

Seek opinion

NO

Treat Hypoxia and Shock

No Vagal overactivity

Adrenaline
(See Drug Formulary for doses)

CONSIDER
Adrenaline infusion
Pacing

Vagal overactivity

Atropine
(See Drug Formulary for doses)
SVT

Shock present

NO

Vagal manoeuvres

Adenosine*

2 min

Adenosine*

2 min

Adenosine*

CONSIDER
Higher doses of Adenosine*
Seek paediatric cardiology advice.
Synchronous DC shock or Amiodarone*
other antiarrhythmics

YES

Attempt vagal manoeuvres (if no delays)

Establishing vascular access quicker than obtaining defibrillator?

NO

Synchronous DC shock 1 J/kg

Synchronous DC shock 2 J/kg

Consider Amiodarone*

* (Adenosine - See Drug Formulary for contraindications and doses)
VT

Pulse present

NO

VF protocol

Seek Paediatric cardiology advice. Amiodarone infusion (See Drug Formulary for doses)

CONSIDER
Synchronous DC shock
Seek advice

YES

Shock present

NO

* Synchronous DC shock
2 J/kg

* Synchronous DC shock
4 J/kg

Amiodarone

YES

* If Synchronous shocks are ineffective consider Asynchronous shocks as it may not be possible for the defibrillator to deliver a synchronised shock in VT due to a lack of recognisable QRST complexes

Torsade de pointes – treatment is emergency defibrillation (synchronised) followed by magnesium sulphate and possibly Lidocaine.
Status Epilepticus

To ease administration, doses are rounded according to age:
- 3 – 12 months: 2.5mg
- 1 – 5 years: 5mg
- 5 – 10 years: 7.5mg
- 10 – 18 years: 10mg

*Rectal diazepam should be used in infants under 3 months (1.25 – 2.5mg)

Note this algorithm starts from the beginning of the seizure so prehospital treatment must be taken into consideration and hospital treatment might need to start at step 2 or 3.
Massive Blood Loss

SCH MASSIVE BLOOD LOSS PROTOCOL

Suspected blood loss and clinical signs of shock

CALL FOR HELP
ED - Trauma Team via 2222 Wards - Cardiac Arrest Team via 2222 Theatres - Theatre Intercom 'ALL CALL' on 011 STATE 'MASSIVE BLOOD LOSS' and location

Team leader activates Massive Blood Loss protocol

1 person phones urgently - Blood Bank, on-call haematologist, senior clinician in charge State 'Massive Blood Loss'

RESUSCITATE ABC, observations, assess hypovolaemia, 2 large IV cannulae or IO access, send samples - cross match, FBC, clotting screen, U&E and/or ABG Sample bottles - 1 large pink, 1 small pink, 1 purple, 1 orange

STOP BLEEDING - surgeons, direct pressure, pack, tourniquet, pelvic binder, manage fractures etc

PREVENT HYPOThERMIA - keep covered, air warming blanket, warm fluids/products
**GIVE IV/O TRAEXAMIC ACID**
15mg/kg over 10 minutes (max 1 gram) then 2mg/kg/hr infusion for 8 hrs minimum or until bleeding controlled

**EMERGENCY O neg RED CELLS** - 2 units are held in Blood Bank fridge

**Theatres/wards**
10 ml/kg WARM crystalloid +/- further 10 ml/kg if required and O neg Blood not yet available
First products RBCs 20ml/kg & Octaplas 20ml/kg

**Therapy aims**
Hb 80-100g/L  
Platelets >75 x 10^9/L  
APTT ratio <1.5  
Fibrinogen >1g/L  
PH >7.35 (ABG) > 7.25 (cap)  
Temp >35C

**ED / Major Trauma**
DO NOT GIVE CRYSTALLOIDS
First products RBCs 10ml/kg & Octaplas 10ml/kg

**Therapy aims**
Systolic BP 90 or age equivalent
Palpable radial pulse
Aim for higher SBP if predominantly head injury

**ONGOING LOSSES?**

2nd bolus of products
RBCs 10ml/kg & Octaplas 10ml/kg & platelets 10ml/kg
Cryoprecipitate 5-10ml/kg (as directed by Cons Haematologist)

**AT POINT OF STAND DOWN** - Inform Blood Bank, return unused components

**PHONE NUMBERS** - Blood Bank 17478 in hours (bleep via Switchboard at other times), Haematology 17221, General Porters bleep 528 / 529, Cons Haematologist via Switchboard, Theatre Porters 075 / 042  
ED resus room 17066 / 53068, PCCU 17362

**CONSIDER**
DIC risk also increases with acidosis and shock  
Low calcium / magnesium - 0.14ml/kg 14.7% calcium (max 7ml)  
Volume overload
Recheck blood and clotting parameters post-transfusion to guide further treatment  
Consider cell salvage  
Complete all documentation
## Anaphylaxis

### Anaphylactic reaction?

**Airway, Breathing, Circulation, Disability, Exposure**

**Diagnosis** - look for:
- Acute onset of illness
- Life-threatening Airway and/or Breathing and/or Circulation problems
- And usually skin changes

- Call for help
- Lie patient flat
- Raise patient’s legs

**Adrenaline**

**When skills and equipment available:**
- Establish airway
- High flow oxygen
- IV fluid challenge
- Chlorphenamine
- Hydrocortisone

**Monitor:**
- Pulse oximetry
- ECG
- Blood pressure

### 1 Life-threatening problems:
- **Airway:** swelling, hoarseness, stridor
- **Breathing:** rapid breathing, wheeze, fatigue, cyanosis, SpO₂ < 92%, confusion
- **Circulation:** pale, clammy, low blood pressure, faintness, drowsy/coma

### 2 Adrenaline (give IM unless experienced with IV adrenaline)

<table>
<thead>
<tr>
<th>Dose</th>
<th>Adult</th>
<th>500 micrograms IM (0.5 mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child more than 12 years</td>
<td>500 micrograms IM (0.5 mL)</td>
<td></td>
</tr>
<tr>
<td>Child 6-12 years</td>
<td>300 micrograms IM (0.3 mL)</td>
<td></td>
</tr>
<tr>
<td>Child less than 6 years</td>
<td>150 micrograms IM (0.15 mL)</td>
<td></td>
</tr>
</tbody>
</table>

Adrenaline IV to be given only by experienced specialists
Titrated: Adults 50 micrograms; Children 1 microgram/kg

### 3 IV fluid challenge:
- Adult - 500 – 1000 mL
- Child - crystalloid 20 mL/kg

Stop IV colloid if this might be the cause of anaphylaxis

### 4 Chlorphenamine (IM or slow IV)

<table>
<thead>
<tr>
<th>Dose</th>
<th>Adult or child more than 12 years</th>
<th>10 mg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Child 6 - 12 years</td>
<td>5 mg</td>
</tr>
<tr>
<td></td>
<td>Child 6 months to 6 years</td>
<td>2.5 mg</td>
</tr>
<tr>
<td></td>
<td>Child less than 6 months</td>
<td>250 micrograms/kg</td>
</tr>
</tbody>
</table>

### 5 Hydrocortisone (IM or slow IV)

<table>
<thead>
<tr>
<th>Dose</th>
<th>Adult or child more than 12 years</th>
<th>200 mg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Child 6 - 12 years</td>
<td>100 mg</td>
</tr>
<tr>
<td></td>
<td>Child 6 months to 6 years</td>
<td>50 mg</td>
</tr>
<tr>
<td></td>
<td>Child less than 6 months</td>
<td>25 mg</td>
</tr>
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See also: [Anaphylactic reactions – Initial treatment](#)

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## Calculations

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<th><strong>Weight (kg)</strong></th>
<th><strong>Under 1 year</strong></th>
<th><strong>Over 1 year</strong></th>
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<tr>
<td></td>
<td>( (0.5 \times \text{age in months}) + 4 )</td>
<td>( \text{(Age in years +4)} \times 2 )</td>
</tr>
</tbody>
</table>

### ET T

<table>
<thead>
<tr>
<th><strong>Diameter (mm)</strong></th>
<th><strong>Oral</strong></th>
<th><strong>Nasal</strong></th>
</tr>
</thead>
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<tr>
<td>( \frac{\text{AGE} + 4}{4} )</td>
<td>( \frac{\text{AGE} + 12}{2} )</td>
<td>( \frac{\text{AGE} + 15}{2} )</td>
</tr>
</tbody>
</table>

- **Pre-Term**: 2.5mm
- **Neonate**: 3.0 - 3.5mm

### B.P.

**Systolic**

\( 85 + (\text{age in years} \times 2) \)

### Fluids

- **General use**: 20 ml/kg
- **Trauma, DKA or cardiac**: 10 ml/kg reassess and repeat as necessary
Drug Formulary
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<th>DRUG</th>
<th>INDICATIONS</th>
<th>DOSAGE</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adenosine (monitor ECG)</td>
<td>SVT</td>
<td>150 microgram/kg IV IO. If necessary repeat every 1-2 minutes increasing dose by 50 - 100 microgram/kg until tachycardia terminates or max. single dose of 300 micrograms/kg given</td>
<td>Rapid intravenous injection - give over 2 seconds into central or large peripheral vein followed by rapid Sodium Chloride 0.9% flush</td>
</tr>
<tr>
<td>Adenosine contraindications: Asthma; decompensated heart failure; long QT syndrome; second- or third-degree AV block and sick sinus syndrome (unless pacemaker fitted); severe hypotension</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Children with heart transplant very sensitive to effects of Adenosine and should not receive higher initial doses. In children receiving Dipyridamole reduce dose to a quarter usual dose of Adenosine.</td>
<td></td>
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<td></td>
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<tr>
<td>Adenosine</td>
<td>Asystole</td>
<td>1st Dose: 10 microgram/kg (0.1ml/kg) 1:10,000 IV IO</td>
<td></td>
</tr>
<tr>
<td></td>
<td>VF</td>
<td>Subsequent doses: 10-30 microgram/kg (0.1-0.3ml/kg) 1:10,000 IV IO (Maximum dose 1mg)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PEA</td>
<td>All IV/IO Adrenaline doses must be flushed with 5mls of 0.9% Sodium Chloride after each dose</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bradycardia</td>
<td>Endotracheal route is accepted but has unproven effectiveness in resuscitation at birth.</td>
<td></td>
</tr>
<tr>
<td>Adrenaline</td>
<td>Anaphylaxis</td>
<td>0.15 ml 1:1000 IM (150 microgram)</td>
<td>Repeat at 5 min intervals according to clinical response</td>
</tr>
<tr>
<td></td>
<td>Croup or post-extubation stridor</td>
<td>400 microgram/kg 0.4 ml/kg 1:1,000 Nebulised (Maximum dose 5mg)</td>
<td>If necessary dilute to nebulise with 0.9% Sodium Chloride</td>
</tr>
<tr>
<td>IM Adrenaline in Anaphylaxis – caution with β blockers - Severe anaphylaxis in patients taking beta-blockers may not respond to adrenaline—consider bronchodilator therapy. Furthermore, adrenaline can cause severe hypertension and bradycardia in those taking non-cardioselective beta-blockers.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amiodarone (Use only on advice) (monitor ECG)</td>
<td>Shock Resistant VF Pulsed VT SVT</td>
<td>5mg/kg IV IO Bolus over at least 3 min</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5mg/kg IV IO Infusion over 30 minutes Then 5 mg/kg over 30 min every 12 – 24 hours</td>
<td>Dilute in 5% Glucose to a concentration not less than 600 micrograms/ml</td>
</tr>
<tr>
<td>Amiodarone – recommended for administration by central line if possible.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Atropine</td>
<td>Intraoperative Bradycardia</td>
<td>10 – 20 microgram/kg IV IO (20microgram/kg ETT) (Minimum dose 100 microgram)</td>
<td>Bolus over 1 min</td>
</tr>
<tr>
<td>Calcium Gluconate 10%</td>
<td>Acute hypocalcaemia and hyperkalaemia</td>
<td>0.5 ml/kg IV IO</td>
<td>Slow IV injection over 5 – 10 min</td>
</tr>
<tr>
<td>Chlorphenamine</td>
<td>Anaphylaxis</td>
<td>250 microgram/kg IV IO</td>
<td></td>
</tr>
<tr>
<td>Diazepam (IV)</td>
<td>Convulsions</td>
<td>0.3mg/kg IV IO</td>
<td>Over 3 – 5 min. If Lorazepam not available</td>
</tr>
<tr>
<td>Diazepam (PR)</td>
<td>Convulsions</td>
<td>1.25 - 2.5mg PR</td>
<td></td>
</tr>
<tr>
<td>DRUG</td>
<td>INDICATIONS</td>
<td>DOSAGE</td>
<td>NOTES</td>
</tr>
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<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>Glucose 10%</td>
<td>Hypoglycaemia</td>
<td>2ml/kg IV IO</td>
<td>Repeat if necessary or start infusion</td>
</tr>
<tr>
<td>Hydrocortisone</td>
<td>Anaphylaxis</td>
<td>25mg IV IO</td>
<td></td>
</tr>
<tr>
<td>Lorzepam</td>
<td>Convulsions</td>
<td>0.1mg/kg IV IO</td>
<td>Limited experience in neonates. Must give over 30 – 60 seconds and flush with 5ml 0.9% Sodium Chloride. Repeated once after 10 min if necessary. May cause apnoea. Flumazenil is an antidote.</td>
</tr>
<tr>
<td>Mannitol</td>
<td>Raised ICP</td>
<td>0.25 – 0.5 g/kg (1.25 – 2.5 ml/kg of 20% solution)</td>
<td>Infusion over 30 min via 5 micron filter. Single dose.</td>
</tr>
<tr>
<td>Naloxone</td>
<td>Reversal of opiate in resuscitation situation</td>
<td>Initially 100 micrograms/kg, if no response, repeat at intervals of 1 min to a total max. 2mg</td>
<td>See line below.</td>
</tr>
<tr>
<td>Paraldehyde</td>
<td>Convulsions</td>
<td>0.8ml/kg PR of prepared diluted solution (Maximum dose 20mls)</td>
<td>(Paraldehyde + olive oil mixed 1:1)</td>
</tr>
<tr>
<td>Phenobarbital</td>
<td>Convulsions</td>
<td>20mg/kg IV IO loading dose (Maximum dose 1 g)</td>
<td>Dilute with water for injection to 20mg/ml. Infuse over 20 min.</td>
</tr>
<tr>
<td>Phenytin (monitor ECG and BP)</td>
<td>Convulsions</td>
<td>20mg/kg IV IO loading dose Infuse over 20 - 30 minutes.</td>
<td>Central lines and PICC lines – use NEAT (no need to filter) Peripheral lines - dilute to 10mg/ml only with Sodium Chloride 0.9% and administer through 0.22 – 0.5 micron filter Always administer with a large 0.9% Sodium Chloride flush</td>
</tr>
<tr>
<td>Sodium Bicarbonate</td>
<td>Acidotic states hyperkalaemia</td>
<td>1mmol/kg (1ml/kg of 8.4%) IV IO</td>
<td></td>
</tr>
<tr>
<td>Sodium Chloride 2.7% or 3%</td>
<td>Raised ICP</td>
<td>3-5ml/kg IV or IO</td>
<td>Infuse over 15 min Single dose</td>
</tr>
<tr>
<td>Thiopental</td>
<td>Anaesthetic induction</td>
<td>2- 4 mg/kg IV IO</td>
<td></td>
</tr>
<tr>
<td>Tranexamic Acid</td>
<td>Massive Blood Loss</td>
<td>15 mg/kg over 10 minutes (Maximum dose 1gram)</td>
<td>Then 2 mg/kg/hr infusion for 8 hours minimum or until bleeding controlled.</td>
</tr>
</tbody>
</table>

In patients on long term opiates in whom complete reversal of analgesia, or precipitation of acute withdrawal may be dangerous, a lower dose of 4 micrograms/kg should be used initially (max 200 micrograms).

Naloxone is very rarely indicated in patients receiving End of Life care (e.g. accidental 10 fold overdose with respiratory depression), but if required, the low dose regimen should be used.
### Adenosine

**Monitoring ECG:**

**Indications:** SVT

**Dosage:**
- 1 month to 1 year: 150 microgram/kg IV IO.
- 1 – 12 year: 100 microgram/kg IV IO.
- If necessary repeat every 1-2 minutes increasing dose by 50 - 100 microgram/kg until tachycardia terminates or max. single dose of 500 microgram/kg given (Max. dose 12 mg)

**Notes:** Rapid intravenous injection - give over 2 seconds into central or large peripheral vein followed by rapid Sodium Chloride 0.9% flush

**Contraindications:**
- Asthma
- Decompensated heart failure
- Long QT syndrome
- Second- or third-degree AV block and sick sinus syndrome (unless pacemaker fitted)
- Severe hypotension

*Children with heart transplant very sensitive to effects of Adenosine and should not receive higher initial doses. In children receiving Dipyridamole reduce dose to a quarter usual dose of Adenosine.*

### Adrenaline

**Indications:**
- Asystole
- VF
- PEA
- Bradycardia

**Dosage:**
- 10 microgram/kg (0.1ml/kg) 1:10,000 IV IO
- Outside the neonatal period doses over 10 microgram/kg may be disadvantageous except in the rare circumstances of cardiac arrest following β blocker overdoses (Max. dose 1mg)

**Notes:**
- The use of adrenaline given by ET bolus has not convincingly been shown to be effective. The IV/IO approach is preferred where possible.

### Adrenaline

**Indications:**
- Anaphylaxis

**Dosage:**
- < 6 yrs: 0.15 ml 1:1000 IM (150 micrograms)
- 6-12 yrs: 0.3 ml 1:1000 IM (300 micrograms)

**Notes:**
- Repeat at 5 min intervals according to clinical response

**Im Adrenaline in Anaphylaxis – caution with β blockers:** Severe anaphylaxis in patients taking beta-blockers may not respond to adrenaline—consider bronchodilator therapy. Furthermore, adrenaline can cause severe hypertension and bradycardia in those taking non-cardioselective beta-blockers.
<table>
<thead>
<tr>
<th>DRUG</th>
<th>INDICATIONS</th>
<th>DOSAGE</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amiodarone</td>
<td>Shock Resistant VF</td>
<td>5 mg/kg IV IO (Maximum 300mg)</td>
<td>Dilute in 5% Glucose to a concentration of 15 mg/ml</td>
</tr>
<tr>
<td></td>
<td>Pulseless VT</td>
<td>Bolus over at least 3 min</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pulsed VT</td>
<td>5 – 10 mg/kg IV IO Infusion over 20 - 120 minutes (Max 1.2g in 24 hours) Then by continuous infusion 300 micrograms/kg/hr increased according to response to 1.5 mg/kg/hr. Do not exceed 1.2 g in 24 hours</td>
<td>Dilute in 5% Glucose to a concentration not less than 600 micrograms/ml</td>
</tr>
<tr>
<td>Amiodarone – recommended for administration by central line if possible.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Atropine</td>
<td>Intraoperative Bradycardia</td>
<td>10 - 20 microgram/kg IV IO (Min 100 microgram; Max 600 microgram per dose)</td>
<td>Slow IV injection over 5 – 10 min</td>
</tr>
<tr>
<td>Calcium Gluconate 10%</td>
<td>Acute hypocalcaemia and hyperkalaemia</td>
<td>0.5 ml/kg IV IO Maximum dose 20 ml</td>
<td>Slow IV injection over 5 – 10 min</td>
</tr>
<tr>
<td>Chlorphenamine</td>
<td>Anaphylaxis</td>
<td>250 microgram/kg IV IO (1 – 6 months)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.5 mg IV IO (6 months - 6 yr)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 mg IV IO (6 - 12 yr)</td>
<td></td>
</tr>
<tr>
<td>Diazepam (IV)</td>
<td>Convulsions</td>
<td>0.3 mg/kg IV IO</td>
<td>Over 3 – 5 min. If Lorazepam not available</td>
</tr>
<tr>
<td>Diazepam (PR)</td>
<td>Convulsions</td>
<td>1.25 – 2.5 mg (&lt; 3 months)</td>
<td></td>
</tr>
<tr>
<td>Glucose 10%</td>
<td>Hypoglycaemia</td>
<td>2 ml/kg IV IO</td>
<td>Repeat if necessary or start infusion</td>
</tr>
<tr>
<td>Hydrocortisone</td>
<td>Anaphylaxis</td>
<td>25 mg IV IO (1 – 6 months)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>50 mg IV IO (6 months - 6 yr)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>100 mg IV IO (6 - 12 yr)</td>
<td></td>
</tr>
<tr>
<td>Lorazepam</td>
<td>Convulsions</td>
<td>0.1 mg/kg IV IO (Max Dose 4mg)</td>
<td>Give over 30 – 60 seconds and flush with 5ml 0.9% Sodium Chloride. Repeated once after 10 min if necessary. May cause apnoea. Flumazenil is an antidote.</td>
</tr>
<tr>
<td>Magnesium Sulphate 10%</td>
<td>Torsade de pointes</td>
<td>25 – 50 mg/kg (max 2g)</td>
<td>IV infusion over 10 – 15 minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10% injection = 100 mg/ml</td>
<td></td>
</tr>
</tbody>
</table>
### Drug (1 month - 12 years) Drug Doses

<table>
<thead>
<tr>
<th>DRUG</th>
<th>INDICATIONS</th>
<th>DOSAGE</th>
<th>NOTES</th>
</tr>
</thead>
</table>
| Mannitol                  | Raised ICP                      | 0.25 – 0.5 g/kg (1.25 – 2.5 ml/kg of 20% solution) | Infusion over 30 min via 5 micron filter  
Single dose |
| Midazolam (buccal)        | Convulsions                     | Buccal doses;  
3 – 12 months 2.5mg (yellow)  
1 – 5 years 5mg (blue)  
5 – 10 years 7.5mg (purple)  
10 – 18 years 10mg (orange) | BUCCOLAM® pre-filled oral syringes are colour coded according to dose (nb. part syringes cannot be given)  
Repeat dose once after 10 minutes if necessary. |
| Naloxone                  | Reversal of opiate in resuscitation situation | Initially 100 micrograms/kg, if no response, repeat at intervals of 1 minute to a total max. 2 mg | See line below. |
| Paraldehyde               | Convulsions                     | 0.8ml/kg PR of prepared diluted solution  
(Maximum dose 20mls) | (Paraldehyde + olive oil mixed 1:1) |
| Phenobarbital             | Convulsions                     | 20mg/kg IV IO loading dose  
(Maximum dose 1 g) | Dilute with water for injection to 20mg/ml.  
Infuse over 20 min. |
| Phenytoin (monitor ECG and BP) | Convulsions                     | 20mg/kg IV IO loading dose  
Infuse over 20 – 30 minutes. | Central lines and PICC lines – use NEAT (no need to filter)  
Peripheral lines - dilute to 10mg/ml only with Sodium Chloride 0.9% and administer through 0.22 – 0.5 micron filter.  
Always administer with a large 0.9% Sodium Chloride flush. |
| Sodium Bicarbonate        | Acidotic states  
Hyperkalaemia                  | 1mmol/kg (1ml/kg of 8.4%) IV IO |                                                                      |
| Sodium Chloride 2.7% or 3% | Raised ICP                      | 3-5ml/kg IV or IO | Infuse over 15 min  
Single dose |
| Thiopental                | Anaesthetic induction           | 4 – 7 mg/kg IV IO |                                                                      |
| Tranexamic Acid           | Massive Blood Loss              | 15 mg/kg over 10 minutes  
(Maximum dose 1 gram) | Then 2 mg/kg/hr infusion for 8 hours minimum or until bleeding controlled. |
<table>
<thead>
<tr>
<th>DRUG</th>
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<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adenosine</td>
<td>SVT</td>
<td>3 mg IV IO Followed by 6mg after 1-2 minutes if necessary, and then by 12mg after a further 1-2 minutes if necessary.</td>
<td>Rapid intravenous injection - give over 2 seconds into central or large peripheral vein followed by rapid Sodium Chloride 0.9% flush</td>
</tr>
<tr>
<td>Adenosine</td>
<td></td>
<td></td>
<td>Adenosine contraindications: Asthma; decompensated heart failure; long QT syndrome; second- or third-degree AV block and sick sinus syndrome (unless pacemaker fitted); severe hypotension Children with heart transplant very sensitive to effects of Adenosine and should not receive higher initial doses. In children receiving Dipyridamole reduce dose to a quarter usual dose of Adenosine.</td>
</tr>
<tr>
<td>Adrenaline</td>
<td>Asystole</td>
<td>10 microgram/kg (0.1ml/kg) 1:10,000 IV IO up to a maximum of 1 mg (10 ml) 1:10,000 IV IO Outside the neonatal period doses over 10 microgram/kg may be disadvantageous except in the rare circumstances of cardiac arrest following β blocker overdoses</td>
<td>All IV/IO Adrenaline doses must be flushed with 20mls of 0.9% Sodium Chloride after each dose</td>
</tr>
<tr>
<td>Adrenaline</td>
<td>VF</td>
<td>100 microgram/kg (0.1 ml/kg) 1:1000 ETT</td>
<td>The use of adrenaline given by ET bolus has not convincingly been shown to be effective. The IV/IO approach is preferred where possible.</td>
</tr>
<tr>
<td>Adrenaline</td>
<td>PEA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adrenaline</td>
<td>Bradycardia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amiodarone</td>
<td>Shock Resistant VF</td>
<td>5mg/kg IV IO (Maximum 300mg) Bolus over at least 3 min</td>
<td>Dilute in 5% Glucose to a concentration of 15mg/ml</td>
</tr>
<tr>
<td>Amiodarone</td>
<td>Pulseless VT</td>
<td>5 – 10 mg/kg IV IO Infusion over 20 - 120 minutes (Max 1.2g in 24 hours) Then by continuous infusion 300 micrograms/kr/hr increased according to response to 1.5 mg/kg/hr. Do not exceed 1.2 g in 24 hours</td>
<td>Dilute in 5% Glucose to a concentration not less than 600 micrograms/ml</td>
</tr>
<tr>
<td>Amiodarone</td>
<td>Pulsed VT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amiodarone</td>
<td>SVT</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

IM Adrenaline in Anaphylaxis – caution with β blockers - Severe anaphylaxis in patients taking beta-blockers may not respond to adrenaline—consider bronchodilator therapy. Furthermore, adrenaline can cause severe hypertension and bradycardia in those taking non-cardioselective β-blockers.

Adrenaline – recommended for administration by central line if possible.
### Adolescent (>12 years) Drug Doses

<table>
<thead>
<tr>
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<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atropine</td>
<td>Intraoperative Bradycardia</td>
<td>300 – 600 microgram IV IO</td>
<td>Larger doses in emergencies</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Repeat in 5 min</td>
<td></td>
</tr>
<tr>
<td>Calcium Gluconate 10%</td>
<td>Acute hypocalcaemia and hyperkalaemia</td>
<td>0.5 ml/kg IV IO</td>
<td>Slow IV injection over 5 – 10 min</td>
</tr>
<tr>
<td>Chlorphenamine</td>
<td>Anaphylaxis</td>
<td>10 mg IV IO</td>
<td></td>
</tr>
<tr>
<td>Diazepam (IV)</td>
<td>Convulsions</td>
<td>10 mg IV IO</td>
<td>Over 3 – 5 min. If Lorazepam not available</td>
</tr>
<tr>
<td>Glucose 10%</td>
<td>Hypoglycaemia</td>
<td>2ml/kg IV IO</td>
<td>Repeat if necessary or start infusion</td>
</tr>
<tr>
<td>Hydrocortisone</td>
<td>Anaphylaxis</td>
<td>200 mg IV IO</td>
<td></td>
</tr>
<tr>
<td>Lorazepam</td>
<td>Convulsions</td>
<td>4 mg IV IO</td>
<td>Give over 30 – 60 seconds and flush with 5ml 0.9% Sodium Chloride. Repeated once after 10 min if necessary. May cause apnoea. Flumazenil is an antidote.</td>
</tr>
<tr>
<td>Magnesium Sulphate 10%</td>
<td>Torsade de pointes</td>
<td>25 – 50mg/kg (max 2g)</td>
<td>IV infusion over 10 – 15 minutes</td>
</tr>
<tr>
<td>Mannitol</td>
<td>Raised ICP</td>
<td>0.25 – 0.5 g/kg (1.25 – 2.5 ml/kg of 20% solution)</td>
<td>Infusion over 30 min via 5 micron filter Single dose</td>
</tr>
<tr>
<td>Midazolam (buccal)</td>
<td>Convulsions</td>
<td>Buccal dose;</td>
<td>BUCCOLAM® pre-filled oral syringes are colour coded according to dose (nb. part syringes cannot be given) Repeat dose once after 10 minutes if necessary.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 – 18 years</td>
<td>10mg (orange)</td>
</tr>
<tr>
<td>Naloxone</td>
<td>Reversal of opiate in resuscitation situation</td>
<td>Initially 400 micrograms, then 800 micrograms for up to 2 doses at 1 minute intervals if no response to preceding dose, then increased to 2 mg for 1 dose if still no response, then review diagnosis; further doses may be required if respiratory function deteriorates, 4 mg dose may be required in seriously poisoned patients. (See note below.)</td>
<td></td>
</tr>
</tbody>
</table>

IF IV/IO access is unavailable, **Atropine** 40 micrograms/kg may be administered tracheally but absorption may be unreliable.

In patients on long term opiates in whom complete reversal of analgesia, or precipitation of acute withdrawal may be dangerous, a lower dose of 4 micrograms/kg should be used initially (max 200 micrograms).

Naloxone is very rarely indicated in patients receiving End of Life care (e.g. accidental 10 fold overdose with respiratory depression), but if required, the low dose regimen should be used.
<table>
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<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paraldehyde</td>
<td>Convulsions</td>
<td>10-20ml PR of prepared diluted solution</td>
<td>(Paraldehyde + olive oil mixed 1:1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Maximum dose 20mls)</td>
<td></td>
</tr>
<tr>
<td>Phenobarbital</td>
<td>Convulsions</td>
<td>20mg/kg IV IO loading dose</td>
<td>Dilute with water for injection to 20mg/ml.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Maximum dose 1g)</td>
<td>Infuse over 20 min.</td>
</tr>
<tr>
<td>Phenytoin</td>
<td>Convulsions</td>
<td>20mg/kg IV IO loading dose</td>
<td>Central lines and PICC lines – use NEAT (no need to filter)</td>
</tr>
<tr>
<td>(monitor ECG and BP)</td>
<td></td>
<td>Infuse over 20 - 30 minutes.</td>
<td>Peripheral lines - dilute to 10mg/ml only with Sodium Chloride 0.9% and administer through 0.22 – 0.5 micron filter.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Always administer with a large 0.9% Sodium Chloride flush.</td>
</tr>
<tr>
<td>Sodium Bicarbonate</td>
<td>Acidotic states</td>
<td>1mmol/kg (1ml/kg of 8.4%) IV IO</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hyperkalaemia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sodium Chloride</td>
<td>Raised ICP</td>
<td>3-5ml/kg IV or IO</td>
<td>Infuse over 15 min</td>
</tr>
<tr>
<td>2.7% or 3%</td>
<td></td>
<td></td>
<td>Single dose</td>
</tr>
<tr>
<td>Thiopental</td>
<td>Anaesthetic induction</td>
<td>4 – 7 mg/kg IV IO</td>
<td></td>
</tr>
<tr>
<td>Tranexamic Acid</td>
<td>Massive Blood Loss</td>
<td>15 mg/kg over 10 minutes</td>
<td>Then 2 mg/kg/hr infusion for 8 hours minimum or until bleeding controlled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Maximum dose 1gram)</td>
<td></td>
</tr>
</tbody>
</table>
ADULT LIFE SUPPORT
Unresponsive and not breathing normally

Call 999 and ask for an ambulance

30 Chest compressions

2 Rescue breaths

Continue CPR 30:2

As soon as AED arrives switch it on and follow instructions
Adult In-hospital Advanced Life Support

Unresponsive and not breathing normally

Call resuscitation team

CPR 30:2
Attach defibrillator/monitor
Minimise interruptions

Assess rhythm

Shockable (VF/Pulseless VT)

1 Shock
Minimise interruptions

Immediately resume CPR for 2 min
Minimise interruptions

Return of spontaneous circulation

Immediate post cardiac arrest treatment
- Use ABCDE approach
- Aim for SpO₂ of 94-98%
- Aim for normal PaCO₂
- 12-lead ECG
- Treat precipitating cause
- Targeted temperature management

Non-shockable (PEA/Asystole)

Immediately resume CPR for 2 min
Minimise interruptions

During CPR
- Ensure high quality chest compressions
- Minimise interruptions to compressions
- Give oxygen
- Use waveform capnography
- Continuous compressions when advanced airway in place
- Vascular access (intravenous or intraosseous)
- Give adrenaline every 3-5 min
- Give amiodarone after 3 shocks

Treat Reversible Causes
- Hypoxia
- Hypovolaemia
- Hypo-/hyperkalaemia/metabolic
- Hypothermia
- Thrombosis - coronary or pulmonary
- Tension pneumothorax
- Tamponade – cardiac
- Toxins

Consider
- Ultrasound imaging
- Mechanical chest compressions to facilitate transfer/treatment
- Coronary angiography and percutaneous coronary intervention
- Extracorporeal CPR
# Adult (>18 years) Drug Doses

Adult Pre filled Drug Syringes available in Green Emergency drug box in ED/PCCU/theatres/main hospital trolley

<table>
<thead>
<tr>
<th>DRUG</th>
<th>INDICATIONS</th>
<th>DOSAGE</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adrenaline</td>
<td>All cardiac arrest rhythms</td>
<td>1mg IV 10ml 1:10,000</td>
<td>All IV/IO Adrenaline doses must be flushed with 20mls of 0.9% Sodium Chloride after each dose</td>
</tr>
<tr>
<td>Adrenaline</td>
<td>Anaphylaxis</td>
<td>0.5ml 1:1000 IM</td>
<td>Repeat dose after 5 min as necessary</td>
</tr>
<tr>
<td>Amiodarone</td>
<td>VF / Pulseless VT</td>
<td>300mg IV bolus</td>
<td>From a pre filled syringe (300mg in 10ml) or diluted in 20 ml Glucose 5%</td>
</tr>
<tr>
<td></td>
<td>(monitor ECG)</td>
<td></td>
<td>Consider a further dose of Amiodarone 150 mg IV after a total of five defibrillation attempts.</td>
</tr>
<tr>
<td>Atropine</td>
<td>Symptomatic Bradycardia</td>
<td>0.5 mg IV IO</td>
<td>Repeat as necessary every 3 – 5 min to a maximum of 3 mg</td>
</tr>
</tbody>
</table>

# Adult (>18 years) Defibrillation

Deliver 1st shock of 150-200 J (biphasic defibrillator), followed by 2nd and subsequent shocks of 150-360 J.