## ABCDE – HOW TO RECOGNISE AND TREAT THE SERIOUSLY ILL CHILD

<table>
<thead>
<tr>
<th>Possible Problems</th>
<th>Management Options</th>
</tr>
</thead>
</table>
| **A** Airway obstruction  
- Partial or complete  
- Foreign body  
- Secretions/blood/vomit  
- Infection  
- Swelling e.g. anaphylaxis  
- Trauma  
Loss of airway reflexes due to decreased LOC | **OXYGEN**  
Airway positioning  
- Neutral position in infant  
- Sniffing position in children  
**Clearance of secretions / FB e.g. suctioning**  
**Airway adjuncts**  
- oropharyngeal, nasopharyngeal, Advanced airway e.g. intubation  
In awake child, let them adopt their own position of comfort |
| **B** Respiratory failure  
- Inadequate oxygenation  
- Inadequate ventilation  
Look for increased work of breathing, signs of respiratory failure (decreased LOC, hypotonia, cyanosis, bradycardia) | **OXYGEN**  
Treatment of underlying condition e.g. infection, asthma, pneumothorax  
Manual ventilation if poor effort e.g. BVM |
| **C** Shock  
- Hypovolaemia e.g. haemorrhage  
- Distributive e.g. sepsis  
- Cardiogenic e.g. myocarditis  
- Obstructive e.g. tension PTX  
- Dissociative e.g. CO poisoning  
Remember ↓BP is a late sign | **OXYGEN**  
**IV/IO access**  
**Fluid bolus of 0.9% NS**  
- 10mls/kg in trauma / DKA  
- 20mls/kg in other medical conditions |
| **D** Decreased LOC  
- check AVPU  
- check pupils for size + reactivity  
- posture  
Localising signs e.g. complex seizure, meningitis | **OXYGEN**  
**CHECK BM**  
Protect airway and breathing  
Consider recovery position  
Treat under lying condition  
Consider CT Brain |
| **E** Assess for other signs of illness e.g. rash  
Assess for other signs of injury e.g. long bone fractures | **KEEP WARM**  
Preserve dignity |
Notes:
1. Get senior EM doctor and paediatric team early
2. Children are more likely to have a primary respiratory arrest than a primary cardiac arrest. The cause is often **HYPOXIA – GIVE OXYGEN**

**Contacting Paediatric team in an emergency**

1. Fast bleep 6000 and ask for PAEDIATRIC TEAM if urgent help needed
2. Bleep 6666 and ask for PAEDIATRIC ARREST TEAM if cardiac arrest

**TRAFFIC LIGHT SYSTEM**

The Traffic light system should be used to assess serious illness (NICE).

**Table 1 Traffic light system for identifying likelihood of serious illness**

<table>
<thead>
<tr>
<th>Colour</th>
<th>Green – low risk</th>
<th>Amber – intermediate risk</th>
<th>Red – high risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity</td>
<td>• Normal colour of skin, lips and tongue</td>
<td>• Pallor reported by parent/carer</td>
<td>• Pal/ashen/blue</td>
</tr>
<tr>
<td>• Responds normally to social cues</td>
<td>• Not responding normally to social cues</td>
<td>• No response to social cues</td>
<td></td>
</tr>
<tr>
<td>• Content/smiles</td>
<td>• Wakes only with prolonged stimulation</td>
<td>• Appears ill to a healthcare professional</td>
<td></td>
</tr>
<tr>
<td>• Stays awake or awakens quickly</td>
<td>• Decreased activity</td>
<td>• Unable to rouse or if roused does not stay awake</td>
<td></td>
</tr>
<tr>
<td>• Strong normal cry/not crying</td>
<td>• No smile</td>
<td>• Weak, high-pitched or continuous cry</td>
<td></td>
</tr>
<tr>
<td>Respiratory</td>
<td>• Nasal flaring</td>
<td>• Grunting</td>
<td>• Reduced skin turgor</td>
</tr>
<tr>
<td>• Tachypnoea: RR &gt; 50 breaths/minute age 6–12 months</td>
<td>• Tachypnoea: RR &gt; 60 breaths/minute</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• RR &gt; 40 breaths/minute age &gt; 12 months</td>
<td>• Moderate or severe chest indrawing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Oxygen saturation ≤ 95% in air</td>
<td>• Crackles</td>
<td></td>
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</tr>
<tr>
<td>Hydration</td>
<td>• Normal skin and eyes</td>
<td>• Dry mucous membrane</td>
<td>• Age 0–3 months, temperature ≥ 38°C</td>
</tr>
<tr>
<td>• Moist mucous membranes</td>
<td>• Poor feeding in infants</td>
<td>• Age 3–6 months, temperature ≥ 39°C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• CRT ≥ 3 seconds</td>
<td>• Non-blanching rash</td>
<td>• Bulging fontanelle</td>
</tr>
<tr>
<td></td>
<td>• Reduced urine output</td>
<td>• Neck stiffness</td>
<td>• Status epilepticus</td>
</tr>
<tr>
<td>Other</td>
<td>• None of the amber or red symptoms or signs</td>
<td>• Fever for ≥ 5 days</td>
<td>• Focal neurological signs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Swelling of a limb or joint</td>
<td>• Focal seizures</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Non-weight bearing/not using an extremity</td>
<td>• Bile-stained vomiting</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• A new lump &gt; 2 cm</td>
<td></td>
</tr>
</tbody>
</table>

CRT: capillary refill time
RR: respiratory rate
### Vital Signs: Normal Ranges

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Respiratory rate (breaths/min)</th>
<th>Systolic BP (mmHg) 5th centile</th>
<th>Systolic BP (mmHg) 50th centile</th>
<th>Pulse (beats/min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1</td>
<td>30–40</td>
<td>65–75</td>
<td>80–90</td>
<td>110–160</td>
</tr>
<tr>
<td>1–2</td>
<td>25–35</td>
<td>70–75</td>
<td>85–95</td>
<td>100–150</td>
</tr>
<tr>
<td>2–5</td>
<td>25–30</td>
<td>70–80</td>
<td>85–100</td>
<td>95–140</td>
</tr>
<tr>
<td>5–12</td>
<td>20–25</td>
<td>80–90</td>
<td>90–110</td>
<td>80–120</td>
</tr>
<tr>
<td>&gt;12</td>
<td>15–20</td>
<td>90–105</td>
<td>100–120</td>
<td>60–100</td>
</tr>
</tbody>
</table>
Paediatric Choking Treatment Algorithm

Assess severity

Ineffective cough
- Unconscious
  - Open airway
  - 5 breaths
  - Start CPR
- Conscious
  - 5 back blows
  - 5 thrusts (chest for infant)
  - (abdominal for child > 1 yr)

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

Figure 4.13 Back blow in an infant
Figure 4.14 Chest thrusts in an infant
Figure 4.15 Back blows in a small child
Figure 4.16 Heimlich manoeuvre in a standing child
Paediatric Basic Life Support
(Healthcare professionals with a duty to respond)

UNRESPONSIVE?

Shout for help

Open airway

NOT BREATHING NORMALLY?

5 rescue breaths

NO SIGNS OF LIFE?

15 chest compressions

2 rescue breaths
15 compressions

Call resuscitation team
ADVANCED PAEDIATRIC LIFE SUPPORT: CARDIAC ARREST

Unresponsive? Not breathing or only occasional gasps

CPR (5 initial breaths then 15:2)
- Attach defibrillator / monitor
- Minimise interruptions

Assess rhythm

Shockable (VF / Pulseless VT)
- 1 Shock 4J/kg
- Immediately resume CPR for 2 min
- Minimise interruptions

Non-Shockable (PEA / Asystole)
- Return of spontaneous circulation
- Immediate post cardiac arrest treatment
  - Use ABCDE approach
  - Controlled oxygenation and ventilation
  - Investigations
  - Treat precipitating cause
  - Temperature control
  - Therapeutic hypothermia?

Immediately resume CPR for 2 min
- Minimise interruptions

During CPR
- Ensure high-quality CPR: rate, depth, recoil
- Relaxations before interrupting CPR
- Give oxygen
- Vascular access (intravenous, intramuscular)
- Give adrenaline every 3-5 min
- Consider advanced airway and capnography
- Continuous chest compressions when advanced airway in place
- Correct reversible causes

Reversible Causes
- Hypoxia
- Hypovolaemia
- Hypo/hyperkalaemia/metabolic
- Hypothermia
- Tension pneumothorax
- Toxaemia
- Tamponade - cardiac
- Thromboembolism
Newborn Life Support

**Dry the baby**
Remove any wet towels and cover
Start the clock or note the time

**Assess (tone), breathing and heart rate**

**If gasping or not breathing:**
Open the airway
Give 5 inflation breaths
Consider \( \text{SpO}_2 \) monitoring

**Re-assess**
If no increase in heart rate
look for chest movement

**If chest not moving:**
Recheck head position
Consider 2-person airway control and other airway manoeuvres
Repeat inflation breaths
Consider \( \text{SpO}_2 \) monitoring
Look for a response

**If no increase in heart rate**
look for chest movement

**When the chest is moving:**
If heart rate is not detectable or slow (< 60 min\(^{-1}\))
Start chest compressions
3 compressions to each breath

Reassess heart rate every 30 s
If heart rate is not detectable or slow (< 60 min\(^{-1}\))
consider venous access and drugs

**ASoC (Acceptable \text{SpO}_2):**
- 2 min: 60%
- 3 min: 70%
- 4 min: 80%
- 5 min: 85%
- 10 min: 90%
ADVANCED PAEDIATRIC LIFE SUPPORT: BRADYCARDIA

Figure 10.1 Algorithm for the management of bradycardia
Figure 10.4 Algorithm for the management of supraventricular tachycardia
ADVANCED PAEDIATRIC LIFE SUPPORT: VENTRICULAR TACHYCARDIA

Figure 10.5 Algorithm for the management of ventricular tachycardia

- VF protocol
- Pulse present?
  - Yes
  - Shock present?
    - No: Amiodarone 5 mg/kg over 30 min
    - Yes: DC shock* 1 J/kg
      - DC shock* 2 J/kg
      - Amiodarone

* See text for further clarification
Figure 12.1 Status epilepticus algorithm. ICU, intensive care unit; RSI, rapid sequence induction.
Figure 11.2 Algorithm of the initial management of coma. ICP, intracranial pressure.
The Paediatric Glasgow Coma Scale

<table>
<thead>
<tr>
<th>Glasgow Coma Scale (4–15 years)</th>
<th>Response</th>
<th>Score</th>
<th>Children’s Glasgow Coma Scale (&lt;4 years)</th>
<th>Response</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Eye opening</td>
<td></td>
<td></td>
<td>Eye opening</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spontaneously</td>
<td>4</td>
<td></td>
<td>Spontaneously</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>To verbal stimuli</td>
<td>3</td>
<td></td>
<td>To verbal stimuli</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>To pain</td>
<td>2</td>
<td></td>
<td>To pain</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>No response to pain</td>
<td>1</td>
<td></td>
<td>No response to pain</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td><strong>Best motor response</strong></td>
<td></td>
<td></td>
<td><strong>Best motor response</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Obey verbal command</td>
<td>6</td>
<td></td>
<td>Spontaneous or obeys verbal command</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Localises to pain</td>
<td>5</td>
<td></td>
<td>Localises to pain or withdraws to touch</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Withdraws from pain</td>
<td>4</td>
<td></td>
<td>Withdraws from pain</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Abnormal flexion to pain (decortic)</td>
<td>3</td>
<td></td>
<td>Abnormal flexion to pain (decortic)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Abnormal extension to pain (decerbrate)</td>
<td>2</td>
<td></td>
<td>Abnormal extension to pain (decerbrate)</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>No response to pain</td>
<td>1</td>
<td></td>
<td>No response to pain</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td><strong>Best verbal response</strong></td>
<td></td>
<td></td>
<td><strong>Best verbal response</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Orientated and converses</td>
<td>5</td>
<td></td>
<td>Alert; babbles, coos words to usual ability</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Disorientated and converses</td>
<td>4</td>
<td></td>
<td>Less than usual words, spontaneous irrigable</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Inappropriate words</td>
<td>3</td>
<td></td>
<td>Cries only to pain</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Incomprehensible sounds</td>
<td>2</td>
<td></td>
<td>Moans to pain</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>No response to pain</td>
<td>1</td>
<td></td>
<td>No response to pain</td>
<td>1</td>
</tr>
</tbody>
</table>
ADVANCED PAEDIATRIC LIFE SUPPORT: ANAPHYLAXIS

Call for help
Remove allergen
Administer O₂ via face mask
Administer IM adrenaline

Intubation or surgical airway

Complete obstruction

Partial obstruction / stridor

Assess A

Assess B

Apnoea

Wheeze

Repeat adrenaline IM if no response
Nebulised adrenaline & repeat every 10 min as required
Hydrocortisone

No problem

Repeat adrenaline IM if no response
Nebulised salbutamol, repeat as req'd
Hydrocortisone
Consider salbutamol IV or aminophylline IV

No problem

Assess C

No pulse

Shock

Repeat adrenaline IM if no response
Crystalloid
Adrenaline IV infusion

No problem

Reassess ABC

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Drugs in anaphylaxis

<table>
<thead>
<tr>
<th>Drugs in anaphylaxis</th>
<th>Less than 6 months</th>
<th>6 months to 5 years</th>
<th>6 – 12 years</th>
<th>More than 12 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adrenaline IM - pre-hospital practitioners</td>
<td>150 micrograms</td>
<td>300 micrograms</td>
<td>500 micrograms</td>
<td>500 micrograms</td>
</tr>
<tr>
<td>Adrenaline IM - in hospital practitioners</td>
<td>10 micrograms/kg</td>
<td>10 micrograms/kg</td>
<td>10 micrograms/kg</td>
<td>10 micrograms/kg</td>
</tr>
<tr>
<td>Nebulised adrenaline</td>
<td>0.01 ml/kg of 1:10,000 (infants and young children) OR 0.001 ml/kg of 1:1000 (older children)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adrenaline IV</td>
<td>Titrate 1 microgram/kg</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crystalloid</td>
<td>20 ml/kg</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrocortisone (IM or slow IV)</td>
<td>25 mg</td>
<td>50 mg</td>
<td>100 mg</td>
<td>200 mg</td>
</tr>
</tbody>
</table>

* 1 microgram/kg given over 1 minute (range 30 seconds to 10 minutes), e.g. 0.5 ml/kg of 1:10,000 adrenaline made up to 50 ml saline 0.9% and run at 1 ml/min is 1 microgram/kg/min

1 The strength of IM adrenaline is not intended to be prescriptive. 1:1000 or 1:10,000 could be used depending on what is practicable. The problem with sticking solely to 1:1000 is that when used in infants and small children, you are then drawing up very small volumes.

Figure 9.1 Emergency treatment of anaphylaxis
This will present to you as cardio-respiratory arrest in an infant. Commence CRP as per APLS algorithm unless the baby has rigor mortis or stasis skin changes.

You must get senior EM (get a nurse to phone the on-call consultant) and get Paediatric help immediately in this situation – bleep 6666 and ask for paediatric arrest team.

**The patient**
The paediatric registrar will follow the agreed protocol for the investigation of SUDI. This is in the SUDI pack which the registrar will have. The pack is kept on A2.

**The parents**
The child should be dressed and a photograph taken in case the parents should ask for this now or at a later date. The parents should be allowed to hold their child for as long as they wish.

They should be told that their baby was dead on arrival +/- it was not possible to resuscitate him/her.

If they ask questions about the cause etc tell them that you do not have the answers yet – it’s too soon.

When they are ready for more information tell them that the Coroner must be notified and that the police will be coming to co-ordinate this.

**The Coroner**
A message must be left on the Coroner’s answer phone including the name and personal contact number of the doctor who pronounced life extinct. This is usually a senior member of the paediatric team.

**Other people who need contacted**
GP, Social worker, Health Visitor

**You**
The death of a child is always difficult for the staff involved, even if expected. Take time to collect your thoughts after the death. It is often helpful to talk it over with senior nursing or medical members of the team, they often have experience of similar situations and will be able to offer you support. Remember that you can talk to your mentor or one of the consultants at any time if you have questions or difficulties with any the treatment of any patient.
• Refer to the www.meningitis.org management pathway

Presentation
Features include fever, myalgia, rigors and confusion. By contrast with neurological features seen in meningitis, those with septicaemia usually have a clear sensorium. Early on clinical features are fever, toxic appearance and tachycardia. With progression, features alter to circulatory failure and shock with poor peripheral perfusion and the gap between core and peripheral temperature increases. Oliguria/anuria may develop and lethargy and confusion leading to coma may result as cerebral perfusion diminishes.

Please note that hypotension is not a feature of shock in children until a pre-terminal stage is reached, even in the face of significant reduction in circulating volume.

This is a most fulminant infection. Some children may be symptomatic for several days, others die in <12 hours from the onset of first symptom. Pharyngitis may precede onset in some but others simply get ill and hot. Early recognition is the key to success with requires careful examination of febrile children in a good light, looking for evidence of a purpuric rash in those who are more ill. About 10% of patients develop an initial maculopapular rash (blanches on pressure) prior to the onset of purpura (will not blanch on pressure); in others no rash is present, however, look at the conjunctivae since one purpuric spot in an ill, febrile child is enough to begin therapy.

Management
Suspicion goes more than 50% of the way towards actual diagnosis.

• Assess ABC and treat. Get senior help early

• Administer IV ceftriaxone 80mg/kg– (max 2-4g, over 2-4min). Add in ampicillin /amoxicillin 100mg/kg IV in the under 6 months to cover Neisseria.

The meningococcal packs are in the paediatric resus area, please complete before antibiotics if it will not unduly delay administration of the antibiotic.