NEONATE RESUSCITATION

PREPARE to resuscitate the newborn at every birth (**Respiratory focused Resus**)

30s for adequate stimulation (dry head)
Is baby dead? – if so were they dead in utero or post -delivery?

Crying Regular RR

Monitor (check BSL)

Mother skin-skin

HR present Irregular/ no RR (GASPING/APNOEA)

30 s ventilation (ROOM AIR)
- Airways positioned in **NEUTRAL position**
- 30 bpm

HR > 60

30s ventilation

HR < 60

Start CPR

Crying & Regular RR

NO HR

- **Call code blue**
- **CPR** 3:1
- **High FiO2** (100% O2)
- **Adrenaline** 0.1mL/kg (1:10000) for 1 min then 2nd cycle
- **ADMINISTER VIA UMBO VEIN**

SIGNS OF GOOD VENTILATION
1. CHEST Movement
2. Increase HR
3. Improved Sats + Reduced WOB and RR

Post resus care:
- S: Safe care and sugar
- T: Temp. (plastic bag, overhead heater)
- A: Airway
- B: BP
- L: Lab work
- E: Emotional support (families & staff)

IV Adrenaline 1:10,000 solution

Gestation (weeks)	Dose
23-26	0.1 mL
27-37	0.25 mL
38-43	0.5 mL

10-30 microg/kg (0.1-0.3 mL/kg)

If NOT improved?
- **M:** mask tightly fit?
- **R:** Reposition head into sniffing position
- **S:** suction nares and pharynx
- **O:** Open mouth + oxygen
- **P:** PPV – ensure adequate flow 8L/min
- **A:** Alternate airway adjunct (LMA, I+V)

Key Notes:
*Minimise oxygen → acts as drug → ROS production – cytotoxic – brain/organ damage
> BAD RESUS = HIE = CP!

Targeted pre-ductal SpO_2 after birth

1 min	60-70%
2 min	65-85%
3 min	70-90%
4 min	75-90%
5 min	80-90%
10 min	85-90%

CONSIDER ANATOMICAL CAUSES:
(if ventilation + CPR given)

Check equipment (from pt to wall)

A/B:
- **Upper airway** (obstruction, congenital airway anomalies)
- **Lower airway** (severe hMD, pulm. Hypoplasia, PHTN)
- **External**: PTX, pleural effusion, ascites, CDH

C – Congenital HB, cyanotic CHD

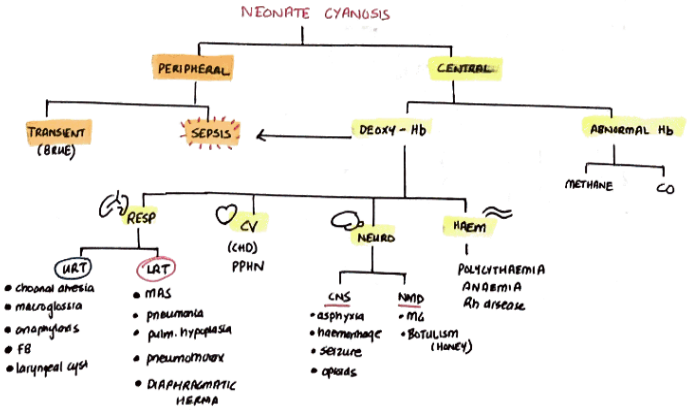
D - maternal meds, brain injury, encephalopathy, sepsis, NMD

Epidemiology

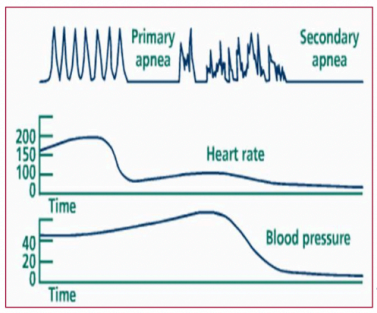
- **85%** → initiate resp. spontaneously
- **10%** → initiate resp. while drying
- **3%** → CPAP
- **2%** → vent. Support
- **0.1%** → CPR + adrenaline

Post-resus care:

- **Hypoglycaemia**
  - 10% dextrose or glucogel (0.5mL/kg)
- **Hypovolaemia**
  - 0.9% NS 10mL/kg
- **Infection**
  - BenPen (+)
  - Gent (-)
- **Lung maturation**
  - Artificial surfactant
  - NGT (meconium aspirate)



Physiology of ASPHYXIA (Brain Hypoperfusion)



Hypoxia/fetal compromise
↓
Rapid breathing
↓
Primary apnoea
↓
Irregular gasping
↓
Secondary apnoea

Responds to stimulation / facial O2 BP maintained

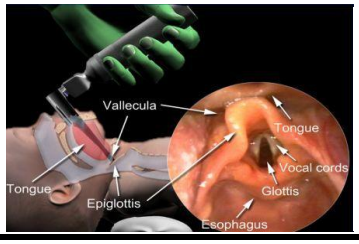
Will not respond to stimulation / facial O2 Assisted ventilation required

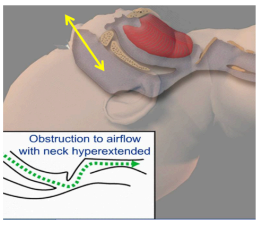
Cannot tell if primary or secondary apnoea.
Assume all apnoeic infants have secondary apnoea and provide PPV if initial stimulation fails because oxygen alone is not enough!

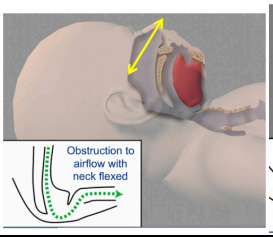
ARDS CAUSES

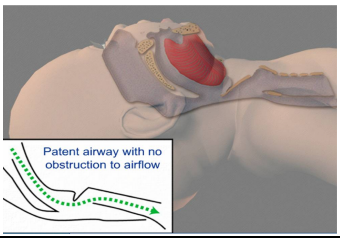
RESP	NON-RESP
TTN	Sepsis
Pneumonia	Metabolic acidosis
PTX	Anaemia
Meconium aspiration syndrome	HIE
Persistent PHT	Congenital HD
TOF	
Congenital diaphragmatic hernia	

Resp-focused neonate resuscitation:









Prep

Turn on Neopuff + prepare resus trolley ➔ light and heater on ➔ ensure ventilation working

- Check T-piece
- Check CPAP pressure – adjustable (lower for pre-term)

Check ante-natal notes:

Antepartum:
- Pre-eclampsia
- GDM
- Multiple pregnancy
- Oligo/poly hydramnios
- Reduced fetal movement
- Substance use

Intrapartum:
- Emergency LSCS
- Prem labour
- Chorioamnionitis
- Placental abruption
- Placental praevia

Important Q's to ask:
- Meconium in liquor
- PV bleeding or blood-stained liquor
- Maternal issues
- Foetal issues

Before delivery:
- Delivery method
- GxPy + ABO (anti-D)
- Infection status (BBV, TORCH, STI)
- Abnormal ante-natal scans or tests
- Substance abuse
- Vit K (IVH &haemorrhagic bleed of newborn)

D

- *Check* drips, sharps, remove furniture

Rs

- **Provide stimulation + warmth + dry baby using plastic bag**
- **Send for Help EARLY & Grab paeds resus trolley ➔ "**code-blue" + call "2222"

A

POSITION:
- Slightly extend neck
- chin lift
- jaw thrust

➔

Suction:
- Aspiration meconium
- [NOT needed]

➔

Adjuncts
- *Oropharyngeal Guedel* (incisor to angle of jaw)
- **Laryngeal** mask (only for >34 wks GA or ETT unsuccessful)

B

- ***Check RR/HR***
- ***RESP:*** *Apnoea > 30s*

WoB:
- ***Chest wall movement***
- ***Tracheal tug***
- ***Grunting***

➔

- **BEGIN PPV** (bag-valve + Neopuff)
  - **Set ROOM AIR** + rate 40-60/min
  - **25/6 cmH20 (IPPV, PEEP/CPAP)**
  - **30/6 (If HR < 100)**
- *ALL ABOUT BAGGING WELL*
- **Correct paediatric mask fit (ensure you see chest rise and fall)**
- ***Assisted ventilation of a baby's lungs is the MOST effective action to resuscitating a compromised infant***

➔

Commence "oxygen" if:
- Infant needs cardiac massage
- No improvement after ventilation (i..e bradycardic + intercostal recession + apnoea)
- **ETT (skill dependent) used ONLY if:**
  - No heartbeat heard
  - Ineffective PPV
  - To administer adrenaline
  - Suspected congenital diaphragmatic hernia

C

Acrocyanosis: normal at birth

Central cyanosis: Indicates hypoxaemia

Pallor: Indicates hypovolaemia or hypoxaemia/asphyxia

- **Apply ECG & SaO2 (**RIGHT HAND as pre-ductal**) esp. if there is PDA**
- **CPR ➔ After** 2 effective rescue breaths **in lifeless infant**
  - Pulse check → femoral + brachial **ONLY** for infants
- **Neonate** 3:1 (3 compressions to 1 breath))
- **Infant 15:2 breaths** (best = thumbs) ➔ 100-120 bpm (1/3rd depth)

HR	Action	Stop compressions +
>100	No action (aim 120bpm)	Stop PPV → APGAR score 1, 5 and 10 min
60-100	Continue PPV	Continue PPV
<60	Start CPR + PPV + **FiO2 100%**	Intubate + adrenaline (**via ETT or UVC)**

Defib

- **Defibrillated** (**place pads + perform rhythm check**) = if in shockable rhythm (VF, VT)
  - COACHED → deliver shock at 4J/kg
  - Recommence compressions after shock delivered
  - When **sinus rhythm returned or PEA**→ check for pulse
- **Disarm machine** = if non-shockable rhythm

Drugs

Oxygen	MoA	INDICATION	Route
Adrenaline (1:10000)	• ↑ CO + HR = ↑ MAP • **Vasoconstrict = ↑TPR**	• HR < 60 after effective CPR, PPV, FIO2 • Repeat dose every 3-5 mins	• Umbilical vein (best) @ 0.1-0.3 mL/kg
Vasodilators (Normal NaCl & O neg blood)	• ↑ vascular vol. • ↓met acidosis by increasing tissue perfusion	• HR not increasing • Blood loss suspected (pallor, weak pulse, poor perfusion)	• Umbilical vein (best) 10mL/kg over 5-10 mins

*ADMINISTER MEDICATIONS VIA umbilical vein → into umbilical vein (biggest collapsible thin walled vein)

- If UVC catheter wanted → confirm position in IVC via AXR (should be at T10 level)
  - **Should not be in T12 (renal vein)**

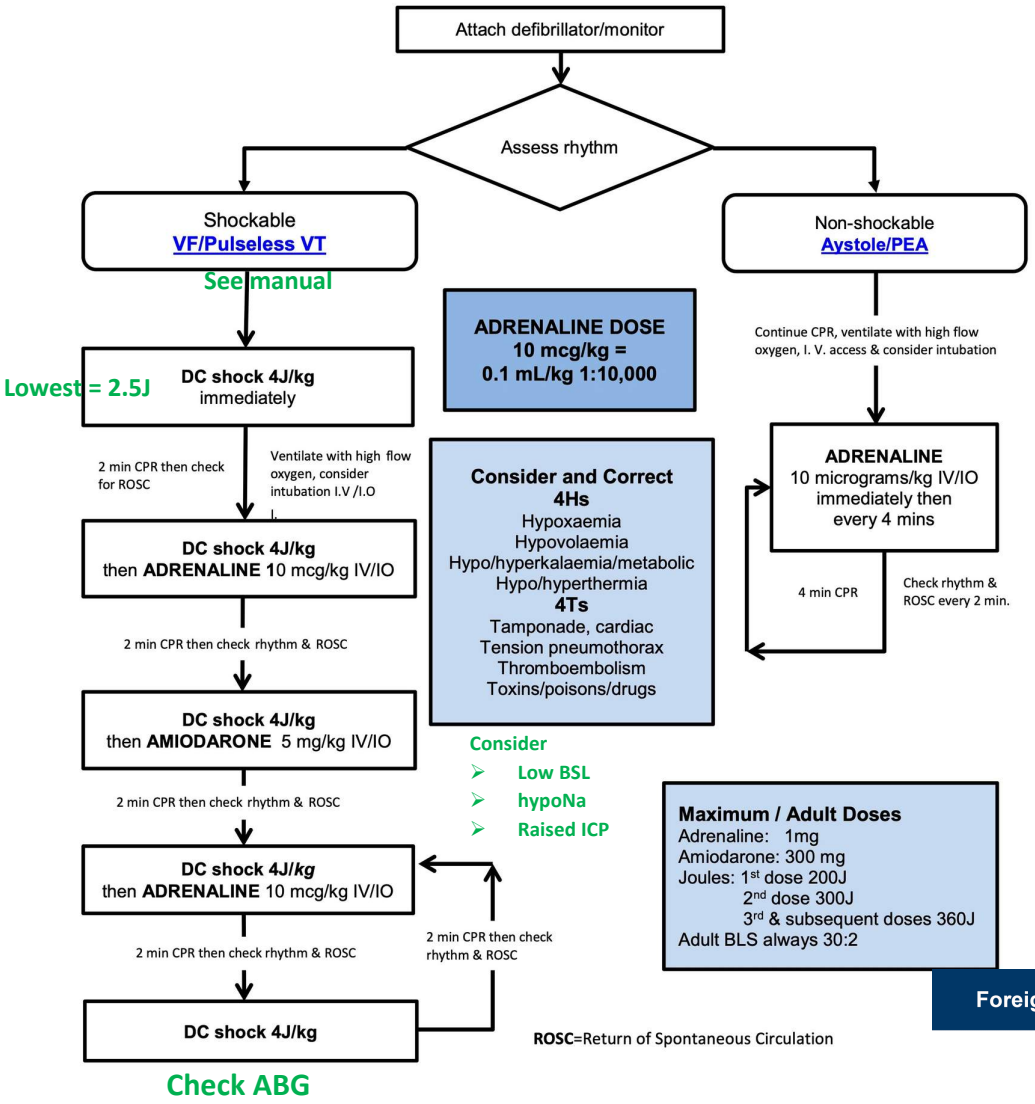
After math

Debrief	Document	When to stop
• **Parents** • **Delivery room staff** (Nurses, obstetrician, anaesthetist) • **NICU staff** (if baby going there for further management) • **NETS** (if baby to be transferred) *May need interpreter	• Tone, breathing, HR & HCW involved • Time/details of intervention: – When Ventilation + CPR commenced – Drugs given (route?) – Vital signs (incl. post-resus Obs) – Apgar score • Management plans	• **Depends on infant** *E.g. In infants with an Apgar 0 after 10mins of resuscitation, if the HR is undetectable, it may be reasonable to stop assisted ventilation.* • ***APGAR (1 after 1 min)*** *= due to low HR → signs of acidosis + ↑ lactate → resp. compensation to blow out CO2* • ***APGAR (8 after 5 mins)*** *→ lost in activity and colour*

PAEDIATRIC RESUSCITATION

Algorithm B: Paeditaric Advanced Life Support

Paediatric Advanced Life Support (ALS) for Healthcare Workers

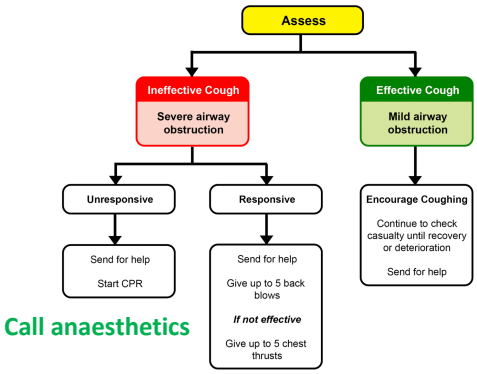


Note:

- Keep parent in room w/ appropriate personnel
- DRS ABCD:
  - Send for help if in **red zone**
  - Emergency type
  - Patient location
  - Adult or paeds
- A = Patent?
  - Neutral position + chin lift
  - Airway adjunct (incisor → angle of jaw)
- B = Sats, RR, WoB, cough
  - FiO2 (mask fit) – high flow FiO2
  - Nebuliser? (Neb adrenaline)
  - OR turn adult mask upside down
- C = HR, BP, CRT, check brachial pulse
  - IV access
  - IV drugs – Anti-pyretics, ABx
  - Bloods – culture priority → FBC, EUC, CRP, BSL
  - CPR below nipple line (15:2) + 2 effective breaths
- D = AVPU/GCS, PEARL, posture, tone
- E = rash, bruises/petechiae, organomegaly, oedema
- F = fluids – resus IV 0.9% NS 20mL/kg
- G = glucose
- H = hospital t/f

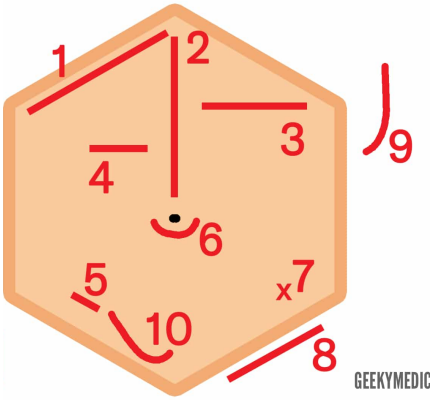
- **Check ABG** → after 3rd cycle of CPR + 2 shocks, one dose of adrenalin, one dose of amiodarone and a fluid bolus.& the bag and mask is connected to oxygen.

Foreign Body Airway Obstruction (Choking)



Call anaesthetics

No.	Incision type	Associated procedure
1	**Kocher's incision**	• Biliary surgery (e.g. cholecystectomy) • Hepatic surgery
2	**Midline laparotomy (variable length)**	• Fundoplication • Major abdominal surgery
3	**Transverse upper abdominal incision**	• congenital diaphragmatic hernia • Splenic surgery
4	**Pyloromyotomy scar**	• Treatment of pyloric stenosis
5	**Grid-Iron incision at McBurney's point**	• Appendicectomy
6	**Umbilical/sub-umbilical scars**	• Hernia repairs Gastroschisis repair Exomphalos
7	**Point incision marks**	• Laparoscopy port sites • Drain sites • VP shunts
8	**Inguinal incisions**	• Inguinal hernia repairs • Vascular access scars
9	**Lateral thoracolumbar incision**	• Renal surgery (nephrectomy)
10	**'Hockey-Stick' scar**	• Renal transplant



Identifying The UNWELL Child

	Signs	Actions	Differentials	
A	• **Patent** • Choking	• Airway adjunct (nasopharyngeal) • Anaesthetics?	**Upper airway obstruction**	• **Foreign body (choking + resp. distress) → back blows → call for help** • **Anaphylaxis →** stop allergen/drug → IM adrenaline 0.15mg Junior, 0.3mg adults) • **Croup (6/12 – 6 yo) = barking cough** → Ax peads → neb Adrenaline (keep calm – avoid irritation + sit up) +/- oral dexamethasone ○ *Unvaxxed* ➔ **epiglottitis → bacterial tracheitis** (serious) • **Congenital malformations** • **Trauma**
B	• **RR** • **Sats** • **WoB** (*Stridor @ rest , wheeze, intercostal recessions, tracheal tug)* • **Apnoea** (> 30s) • **Grunting / wheeze / stridor** • **Tripoding** • **Head bobbing** (SCM contraction)	• **Listen to chest sounds** (creps, wheeze, absent) • **FiO2** • *Prepare radiology (E.g. coarse crackles, reduced air entry)* • *Neonates = nasal breathers (as BF)* ➔ ***suction nose for relief (mouth breathing = congenital issue)*** • *Child > 2yp = nasal and mouth breathers*	**LRT (breathing difficulty)**	• **Asthma →** Inhaled salbutamol +/- oral prednisone → asthma action plan (wean prednisone after 5 days) • **RSV → Viral bronchiolitis (< 18/12) or viral pneumonitis →** supportive care (analgesia, fluids, bed rest) • **Pertussis / Whooping Cough** (*unvaxxed*) • **Pneumonia**, = coryza, high RR, HR • **Pneumothorax** = *absent BS unilaterally* • **GORD / aspiration**
			Resp. depression	• **Seizures** • **CO poisoning,** • **Raised ICP** (cushing's triad= impending herniation = irregular RR, widened PP, bradycardia)

C	**Hydration/perfused status**
	• **BP**
	• **HR**
	• **CRT** < 3
	• **Pallor** (mottled, pale, perfused)
	• **Pulse** (rhythm)-brachial
	• **Temp** (warm vs cold)
	• **Fontanelles** (bulging vs sunken)
	• **MM** (dry/moist)
	• **UO** (↓)
		• IV access
		IV input:
		• IVF (0.9% NS 20mL/kg)
		• ABx
		• Anti-pyretics
		• Analgesia
		IV output
		• Bloods (culture → FBC, EUC, LFT, CRP, lipase, albumin)
		• VBG/ABG + lactate
		• *IDC*
		CPR – resuscitation (15:2)
			Hypovolaemia	• **Dehydration**
				  ○ **Diarrhoea** = **gastroenteritis** – norovirus, Salmonella, Shigella
				  ○ **XS vomit** = **DKA**, pyloric stenosis
				  ○ **Bilious vomit** = pyloric stenosis, DKA, ISS, Malrotation, duodenal atresia
				• **Haemorrhage** (int/ext bleed)

			Distributive	• **Sepsis (***neonatal sepsis, ENT infection, LRTI, UTI, meningitis, appendicitis, cellulitis***)** • **Anaphylaxis** • **Peritonitis** • **Intestinal obstruction** (ISS, Malrotation, bowel atresia or stenosis) • **Febrile Neutropenia (**neutrophils < 1x 10^9L**)**

			Cardiogenic	• **Arrythmia** (SVT, VT, VF)
				  ○ **SVT → vasovagal (cooling blankets) → 3x adenosine → cardiovert**
				  ○ *Non-sinus tachycardic regular rhythm (DDx: WPW – 12-lead ECG)*
				  ○ *Beware adenosine = bradycardia + impending sense of doom*
				• **ACS** (MI)
				• **HF** (LVF, RVF – congenital issue)

			Neurogenic	• **SCI**
D	**REDUCED LOC** • **GCS/AVPU** *Wakes w/ stimulation* • **PEARL** • **Posture/Tone** • **Temp** • **Glucose**	*Correct underlying cause* • Hypoglycaemia • Hypothermia • hypoK/hyperK/Hyper Ca • Hypovolaemia • Tension pneumothorax • Tamponade • Thrombosis • Toxins	**Post-ictal status epilepticus**	• **Electrolyte a**bnormality (post-XS vomit, diarrhoea) • **Drug-induced** • **Hx of epilepsy**

			Fever	• **FUO = UTI, malaria, febrile neutropenia (neutrophils < 1 x 10^9L)**
				• **Prolonged fever** = Kawasaki, typhoid
				• **Fever + limp** = osteomyelitis/septic arthritis, transient synovitis, acute leukemia
				• **Fever + petechiae** = dengue, meningococcal sepsis, HSP
				• **Returned traveller** =
				  ○ *alone* (Hep A, typhoid, dengue, malaria),
				  ○ *diarrhoea* (cholera, dysentery, ETEC),
				  ○ *resp* (TB, malaria, flu, COVID-19, malaria)

			Reduced LOC	• **Meningitis** (Bulging fontanelle + photophobia +non-blanching rash + leg raise – Kernig's sign) • **Encephalitis** (altered mental state)
			Metabolic	• **DKA or Hypoglycaemia** • **Electrolyte disturbance** (Ca, Mg, Na) • **Inborn error of metabolism** (e.g. glycogen storage, lysosomal storage)
			Head injury (PECARN)	• **Trauma vs non-accidental**
			Drug /poison ingestion	• **Gastric lavage w/ NGT**
			SoL	• **ICH, tumour, infarct, abscess (infection),** • **swelling** (contusion) vs **hydrocephalus**
E	**Rash**	**Top-toe inspection (+ back)** • *Blanching vs non-blanching* • *Distribution (Dermatomal, localised)*	• **Slapped cheek rash =** *parvovirus – slapped cheek* • **Widespread maculopapular rash** = measles, roseola (HHV6), dENGUE • ***Widespread vesicular rash*** *= coxsackie (HFM disease), chicken pox (viral prodrome), S. aureus (impetigo)* • ***Urticarial rash (wheals)*** = anaphylaxis • ***Erythema marginatum = GAS (scarlet fever 2° to pharyngitis) → acute rheumatic fever → IE*** • **Drug-induced** • **Sepsis** (tachycardic, tachypnoea, hypoTN, warm/cool/ febrile) ➔ non-blanching rash (septicaemia?)	
	Scars	**Top-toe inspection (+ back)**	Surgical adhesions → bowel obstructions (e.g. volvulus, hernias)	

	Petechiae / bruises	**Top-toe inspection (+ back)**
		• *Blanching vs non-blanching*
		• *Distribution (Dermatomal, localised)*
			• ***Meningococcal septicemia* (non-blanching petechiae)**
			• ***Acute leukaemia*** (bone pain, limp, all cell lines depressed)
			• ***HSP*** (assoc. ISS) → UA (haematuria), Abdo USS
			• ***Dengue Fever →*** *ME + India → widespread petechial rash -→ myalgia, metallic taste → NS1 serology*
				• ***Epistaxis + Rash*** → **ITP** (recent URTi), **TTP** (jaundice, SOB, headache), **HUS** (jaundice, GE)
				  ○ *DDx*: leukaemia, aplastic anaemia, vWF disease, SLE, drug induced
				  ○ *Rx*: **oral pred → IVIg → TXA → haem referrral**
				• ***MUST ALWAYS EXCLUDE NAI***

	ENT	***Otoscopy** – ear, nose, throat*	• ***Otitis media /externa*** ➔ fluid level behind eardrum + non-reflective ➔ painful on pinna pulling • ***Tonsillitis vs EBV vs pharyngitis*** (CENTOR)➔ Tonsillar exudate + large tonsil • ***Sinusitis*** ➔ facial pain (red face) + nasally congested	
	Masses/Lumps/Pain	***Palpation*** **Top-toe (+ back)**	***Fontanelles, lymph nodes (***infection, autoimmune – kawasaki, SLE, lymphoma, secondary METs) ***Organomegaly, masses, hernias, ascites*** • ***Oedema*** (pitting vs non-pitting) → HF?, hypoalbuminemia (AKI – nephrotic syndrome (PSGN), acute liver failure)	
	Abdo pain + vomit	***Palpation***	• *Bowel = ISS, Strangulated bowel, UTI, malrotation, appendicitis* • *GU = Testicular torsion,, UTI* • *OTHER = HEAD INJURY*	
G	***Glucose***	***Drowsy? DKA?*** ***3-5 mM***	• *Hypoglycaemia = SEVERE dehydration low caloric intake (eating disorder), alcohol, severe sepsis, congenital metabolic abnormality* • *Hyperglycaemia = DKA (high RR + abdo pain)*	
H	***Hospital T/F + Input/Outputs***		• **Who to call? → t/f to tertiary hospital** • **ECG /ECHO** • **MSU, 1ST pass ➔ dipstick, UA + M/C/S** • **Imaging: USS/ECHO → X-ray → CT → MRI**	

CLINICAL HANDOVER (ISBAR)

1) WHO, WHERE
2) What happened? Deterioration
3) Septic? Haem unstable?
4) Working Diagnosis?
5) **Explain ABCDE** – why did you do what you did
6) **PMHx**
7) **Recommend** → transfer of care, escalate care, need more help

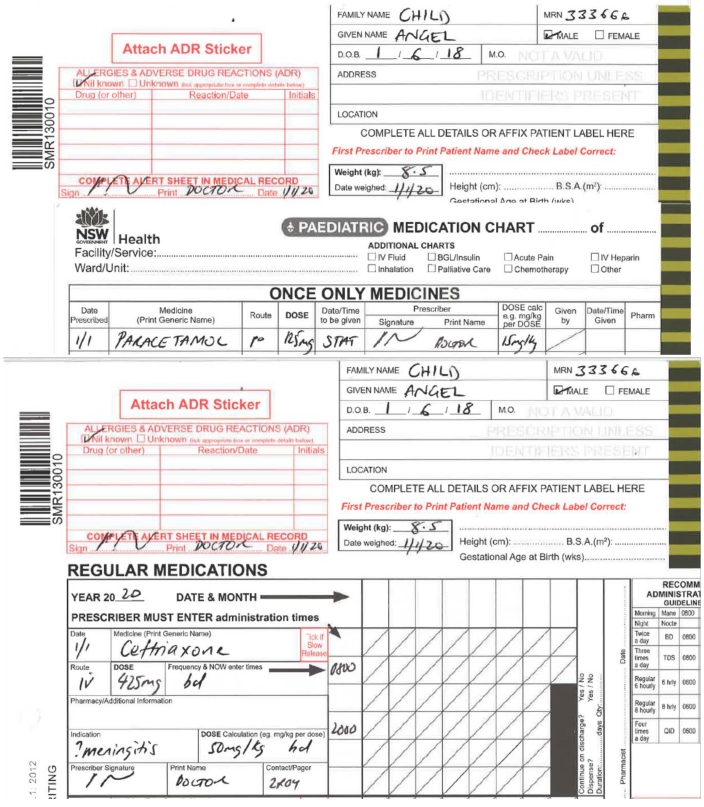
Paediatric Prescription – Drugs

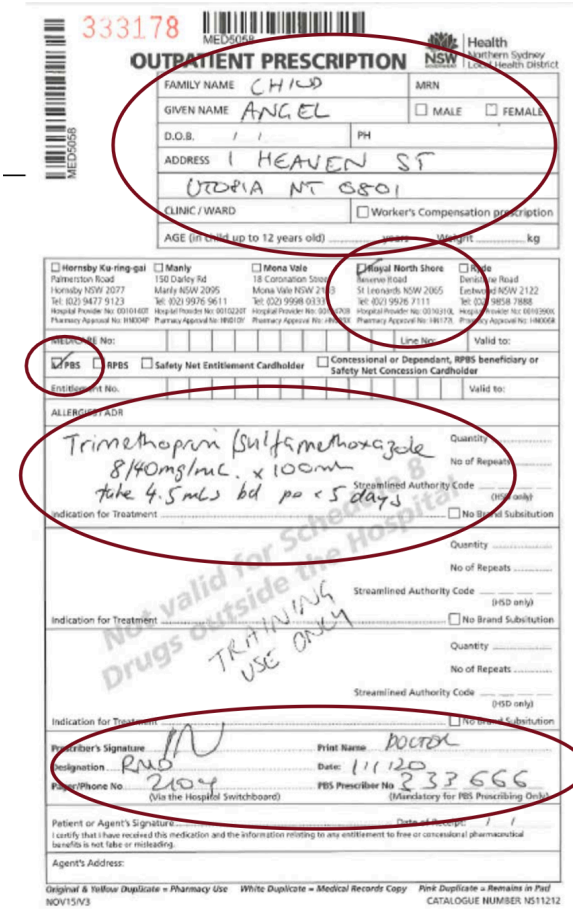
Medications:	**Fluids:**

• **Check dose**
• **Check weight**
• *What does box say? Concentration of medication as per manufacturer*
• **Prescriber and patient**;
  ○ Name and Address
  ○ Item, dose, form, strength, quantity, instructions
  ○ Signed and Dated.
	• **Resuscitation**: 10-20mL/Kg Normal Saline.
	• **Maintenance**: 100, 50, 20 OR 4, 2, 1 Rules.
	• **Replacement**: Weight x % dehydrated x 10
	• **Ongoing losses**: Calculated and replaced 1-4 hours Normal Saline + 5% Dextrose +/- 20mmol KCl.
	
	Max blood draw in newborns
	➢ 80mL/kg
	General feeds
	➢ Term > 37 wks + more than week old ➔ 150mL/kg/day
	➢ Pre-term > 37 wks + more than week old ➔ 180mL/kg/day

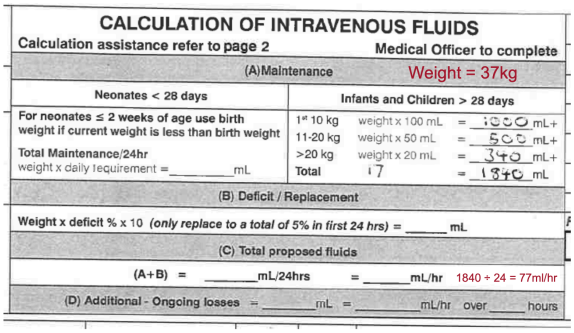
Practice Calculation Examples:

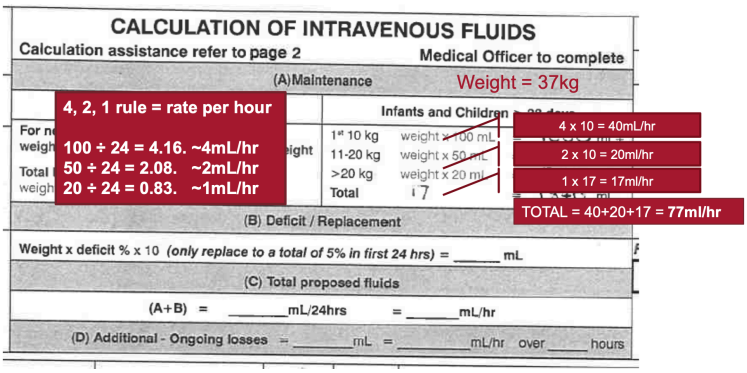
2yo, weight 12kg, needs paracetamol (15mg/kg; adult dose 1g). Box says 100mg/ml. **What is the dose; how much syrup should be administered?**	• **Dose in mg**: 12 x 15 = 180mg • **Dose in mLs**: 180 ÷ 100 = 1.8mLs.
2yo, weight 12kg, needs paracetamol (15mg/kg; adult dose 1g). Box says 240mg/5mls. **What is the dose; how much syrup should be administered?**	• **Dose in mg**: 12 x 15 = 180mg. • **Preparation**: 240 ÷ 5 = 48mg/ml • **Dose in mLs**: 180 ÷ 48 = 3.75mls.
15 year old, weight 80kg, needs paracetamol (15mg/kg; adult dose 1g). **What dose should be prescribed?**	• **Dose in mg**: 80 x 15 = 1200g, which exceeds adult dose • Prescribe 1g (adult dose)
4 year old, weight 18kg, needs amoxycillin for 5 days. Dosage: 15mg/kg tds; Preparations: 125mg/5ml, 250mg/5ml; 100ml bottles. **What is the dose; how much syrup should be administered; how many bottles are required?**	• **Dose (mg):** 18 x 15 = 270mg; Preparation: 125 ÷ 5 = 25mg/mL • **Dose (mLs)**: 270 ÷ 25 = 10.8mL (~10mL) • **Quantity**: 10mLs tds x 5 days = 150mls (10 x 3 x 5) → 2 bottles would be needed. • **OR**, for 250mg/mL: 270 ÷ (250 ÷ 5) = 5.4mLs. 5.5 x 3 x 5 = 82.5mLs.





Paediatric Prescription - Fluids

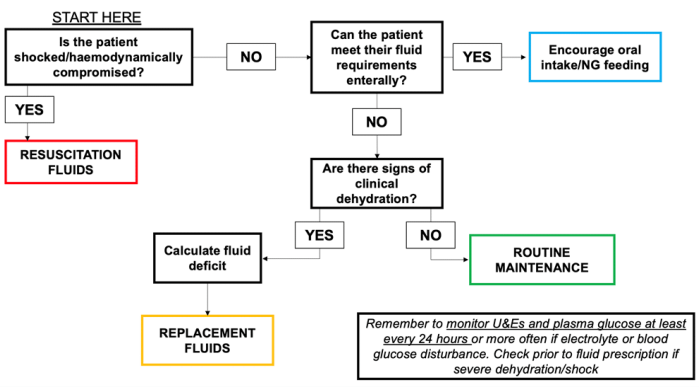


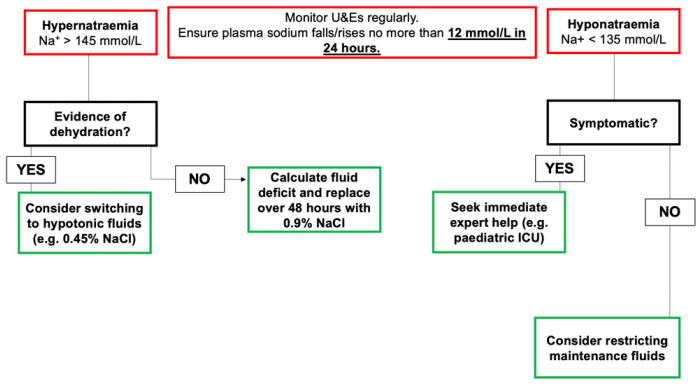


PRACTICE QUESTIONS – Please chart fluids for the following children

1. **Resuscitation**: 10-20mL/Kg Normal Saline.
2. **Maintenance**: 100, 50, 20 OR 4, 2, 1 Rules.
   a. **[100ml/day x 10kg + 50ml/day x 10kg + 20ml/day x 10kg]/ 24 hrs**
   b. **[4ml/hr x 10kg + 2ml/hr x 10kg + 1ml/day x ___kg]**
3. **Replacement**: Weight x % dehydrated x 10
4. **Ongoing losses**: Calculated and replaced 1-4 hours Normal Saline + 5% Dextrose +/- 20mmol KCl.

		What to do?	Calculation	Fluid given
1	1: A 10 month child is nil by mouth for orchidopexy. Euvolaemic. Weight: 8kg	Maintenance 4, 2 1 rule:	4x10 + 2x10 + 8x1 = 68ml/hr.	Normal saline + 5% glucose
2	A 23 month child with tonsillitis is refusing fluids. Mild dehydration. Weight: 13kg. EUCs pending	Maintenance: :	4x10 + 2x3 = 46.	Normal saline + 5% glucose. (No potassium until K+ & creatinine known).
		Replacement	13x3x10 = 390. Rate: 390/24+46 = 62ml/hr	
3	A baby is born pale with cap refil 6s after an antepartum haemorrhage. Estimated weight 3.5kg	Resuscitation:	3.5 x 20 = 70mL	Normal Saline STAT (NB: could be given as 35mLs x 2)
4	A 5yo child has rotavirus gastroenteritis. Moderate dehydration. Weight 17kg. K+ 3.2mmol/L.	Maintenance::	100x10 + 50x7=1350.	Normal saline + 5% glucose + 20mmol KCl.
		Replacement	17x5x10=850. Rate:(1350+850)/24 = 92ml/hr	
5	A 3mo baby post malrotation repair. Euvolaemic. Weight: 4.7kg. NG output:75mL in 4 hours. K 3.1mmol/L	Maintenance::	4.7x4=18.8.	Normal saline + 5% glucose + 20mmol KCl.
		Replacement	0.	
		Ongoing losses:	75÷4=18.75. Rate: 18.8+18.75=37ml/hr.	





ACUTE PAEDIATRIC MANAGEMENT (ABCDE)

Seizure (*febrile VS afebrile*)

Key Hx

- How long seizure (> 5mins)
- Head injury or headache prior to surgery
- Prodrome symptoms + post-ictal phase
- Anti-seizure meds
- Focal signs (febrile seizure) – LOC, weakness in limbs, blue

Cause

- Hypoglycaemia
- Electrolyte issues
- Meningitis
- Drug/toxin overdose
- Trauma
- Stroke and ICH
- Arrythmia
- Breath holding spell (the crying child)
- Vasovagal syncope w/ anoxic seizure (postural change, preceded by dizziness and nausea)
- Non-epileptic paroxysmal disorder

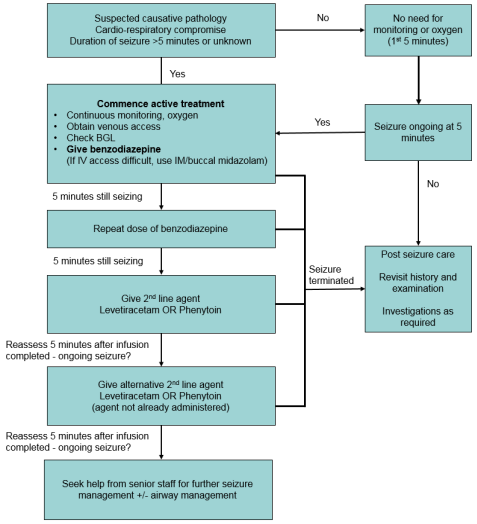
Exam / Ix

- Weight measurements
- A – airway (patent)
- B – FiO2, sats, RR → breath sounds
- C – CRT, HR, BP, UO, temp →
- D – GCS, BSL – exc. hypoglycaemia
- **Bloods** - BSL, VBG
- **ECG** (**once stable**)

Acute Mx

Medication Doses

- 1st line = IV/IM **midazolam** 0.15mg/kg (0.3 buccal/IN), diazepam
- 2nd line = **Levetiracetam** 40mg/kg IV/IO, **phenytoin** (20mg/kg IV/IO loading dose)
- 3rd line = **midazolam** (1mcg/kg/min)



Post-seizure care:

- Position child in recovery position (maintain airway)
- Monitor for further seizure activity
- *Febrile seizure = reassure that it is common – outgrow by 5yo
- Safety net (dial 000)= recurs >5 mins, LOC, looks sick after seizure
- Imaging if: focal seizure, <6/12 old, raised ICP signs,
- Refer to paediatrician if: <6/12 old, prolonged seizure, incomplete recovery, developmental delay, known epilepsy

Hypoglycaemia

Key Hx

- XS vomiting (non-bilious)
- Lethargic, Pale
- Dehydrated signs
- **CNS** = abnormal behaviour, drowsy, seizure, coma
- **SNS (adrenergic)** = sweaty, anxiety, tremor

Cause

- **Neonate** = Pre-term, IUGR, sepsis, GDM mother, inborn error of metabolism, syndrome (Beckwith)
- **Child** = malnutrition, GH deficiency, T1DM
- **Teen** = eating disorder, T1DM (or XS insulin)

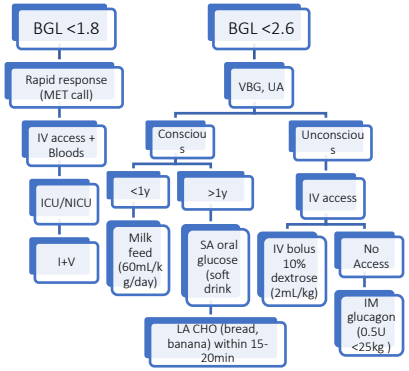
Exam / Ix

- Wt, ht, BMI
- A – airway (patent)
- B – FiO2, sats, RR → breath sounds
- C – CRT, HR (palpable pulse), BP, UO,
- D – GCS, BSL – exc. hypoglycaemia
- **Bloods** - BSL, VBG
- **Urine** - ketones

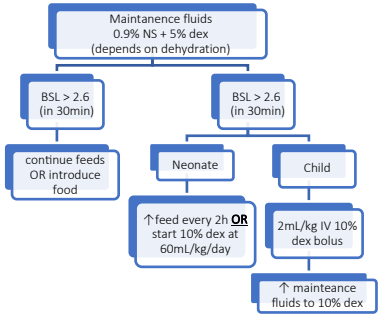
Acute Mx

Aim of treatment

- Return BSL within > 3.9mM
- D/C if BSL > 2.6mM (neonates after 3 consec feeds)
- D/C if BSL > 3mM (child)
- Paeds consult if not responding after 1st line



- Complete above then



DKA

Key Hx

- T1DM (known or new)
- Kussmaul breathing
- Abdo pain
- Dehydration signs
- *Trigger*: stress, infection, no insulin usage

Cause

- T1DM (known or new)
- **UTI**
- **DI**
- **HHS**

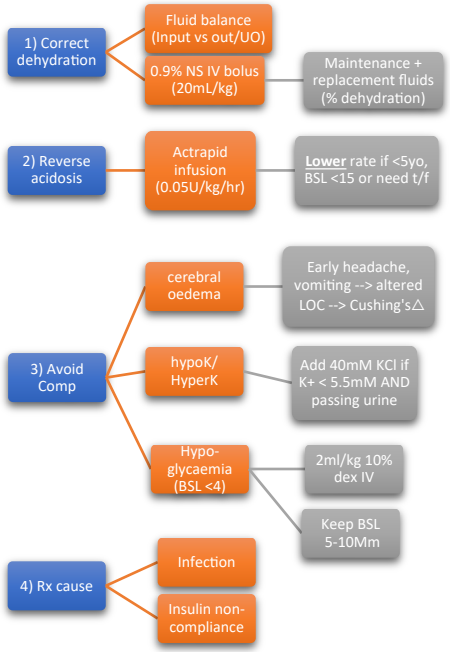
Exam / Ix

- Wt and fluid status
- A – airway (patent)
- B – FiO2, sats, RR → breath sounds
- C – CRT, HR (palpable pulse), BP, UO,
- D – GCS, BSL – exc. hypoglycaemia
- **Bloods** = FBC, EUC, CMP, serum BSL > 11
- **VBG** – pH <7.3, HCO3 <15
- **Urine** - ketones

Acute Mx

Aim of treatment :

- IV insulin (0.05U/kg/hr)
- IV fluid resus 0.9% NS 20mL/kg



Local peads referral for:

- Any DKA
- Hyper/hypoNa
- New diagnosed DM

D/C when:

- BSL >3.5mM
- Provide resources
- Paeds referral

Dehydration

Key Hx

- **Oral intake (food and fluids)** – what is the normal feeding pattern?
- **Stools and urine** – What is the normal output pattern?

Risk factors:

- Infant < 6/12 old
- Immunocompromised
- Congenital heart defects or FTT issue

Cause

- XS vomiting and diarrhoea
  - Infection (gastroenteritis, UTI)
  - GI malabsorption (Hirschsprung, short gut syndrome, ileostomy
- CF
- Renal impairment
- Metabolic disorder (DKA, DI)
- Drugs (diuretics, nephrotoxins)

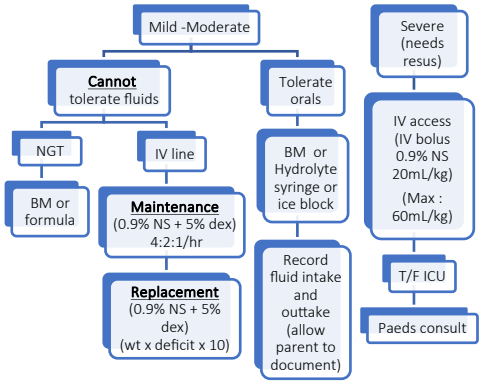
Exam / Ix

- Measure Wt and fluid status
- **Mild** (3%) – looks ok
- **Moderate** (5%)- ↑HR, ↑RR, ↑CRT, dry MM, sunken eyeball,
- **Severe/Shock** (>8%) – **hypoTN**, cold peripheries (pale/mottled skin colour) and deep acidotic breathing, **altered LOC**
- **FBC, EUC, BSL**

Acute Mx

Aim of treatment :

- Assess degree of dehydration
- Investigate cause
- Manage Electrolyte and BSL abnormalities
- Rehydrate via **appropriate route + close obs**



Important considerations:

- Avoid rapid Na Corrrection → osmotic demyelination syndrome → cerebral oedema → irreversible dysarthria, dysphagia, paresis

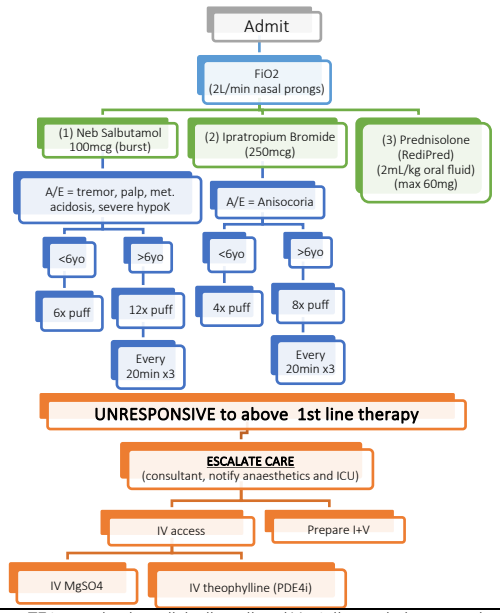
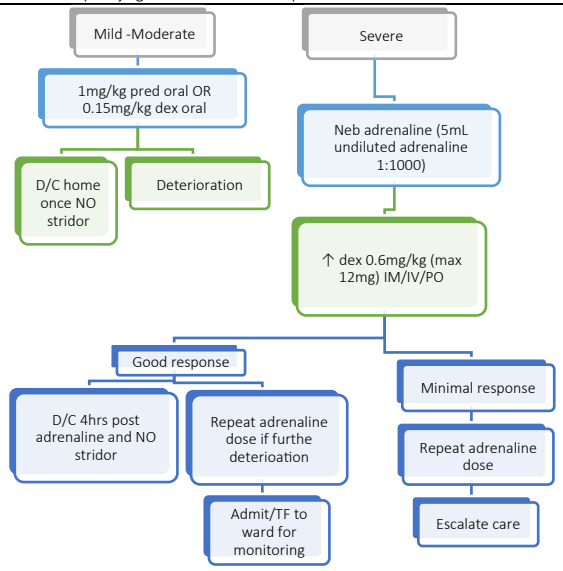
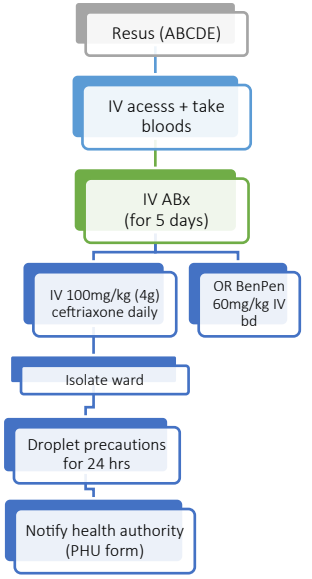
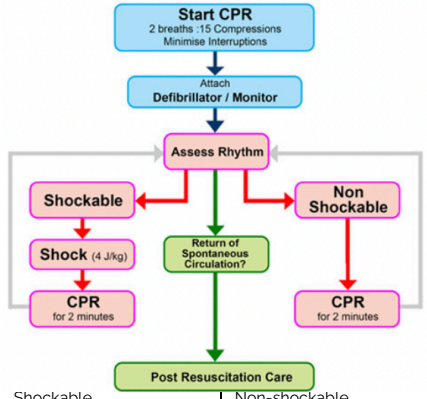
Local peads referral for:

- Hypovol. Shock
- Unexplained electrolyte disturbance
- Clinical signs of shock despite maximum 40mL/kg fluid boluses

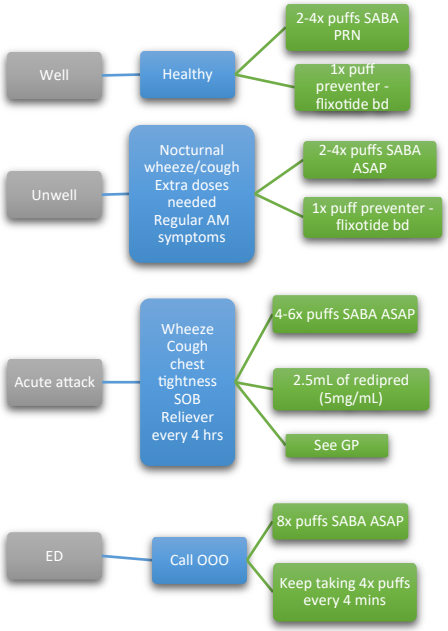
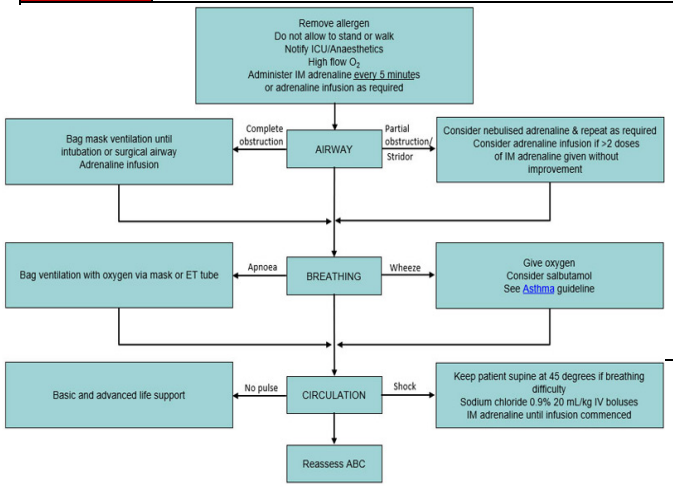
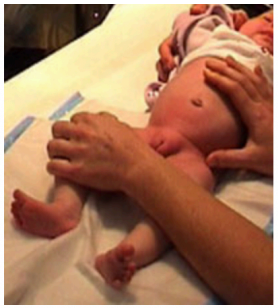
D/C when:

- Child w/ mild dehydration
- Underlying causes excluded
- GP review within 48 hr

ACUTE PAEDIATRIC MANAGEMENT #2 (ABCDE)

	Wheeze	Stridor (Croup)	Meningococcal Septicemia	Cardiac Arrest (SVT)
Key Hx	• +WoB – tracheal tugs, intercostal recession • Wheeze • Speaking incomplete sentences • Low sats • Hx of asthma, or FHx • Atopy – eczema, allergic rhinitis, asthma	• Croup (Paraflu) → 6/12 – 6yo • Barking cough, hoarse voice • inspiratory stridor, • Widespread wheeze • +WoB • Abnormal behaviour (agitated and drowsy)	• **Rapid onset <12 hr** • Fever + photophobia + neck stiffness • **Bulging fontanelle** + headache • Non-blanching purpuric rash • Lethargy and **reduced feeds** • **Altered LOC**	• **Unresponsive child** • **Not breathing properly** • Get help ASAP and start CPR ASAP • **Early role allocation critcal** (team leader, airway, circulation, cardiac compression, defib, scribe)
Cause /DDx	***Non- Bronchodilator responsive:*** ➢ Anaphylaxis + foreign body ➢ Viral bronchiolitis (<12/12) ➢ Viral pneumonitis (12-18/12) ***Bronchodilator responsive*** ➢ Viral induced wheeze ➢ X-Asthma (recurrent episodes >3-4x) ➢ Reactive airway diseases (known trigger)	➢ URTi = croup, epiglottitis, bacterial tracheitis ➢ Must exclude: Anaphylaxis + foreign body ***Risk factors:*** ➢ Unvaxxed → epiglottitis (HiB) ➢ Daycare children ➢ Underlying lung disease ➢ Immunocompromised	**Meningitis** o 0-2mths = GBS ➔ BenPen + Cefotaxime o ≥2 mths = Neisseria, Hib, Strep ➔ ceftriax + dexamethasone **Encephalitis (usu. viral)** ➢ **HSV →** 20mg/kg acyclovir IV bd ➢ **Mycoplasma pneumo →** azithromycin	➢ **Hypovoleamic** ➢ **Hypothermic** ➢ **HypoK, HypoNa** ➢ **Hypoxia** ➢ Toxin ➢ Thrombin ➢ Tension pneumothorax ➢ Tamponade
Exam/Ix	➢ A – airway (patent) ➢ B – FiO2, sats, RR → listen to breath sounds (*wheeze or crackles, silent chest)* ➢ C – CRT, HR, BP, UO, temp ➢ D – GCS, BSL ➢ E – viral exanthem ➢ Ix = CXR (**only** if consolidation/ pneumothorax suspected)	➢ A – airway (patent – blood, vomit, foreign body) ➢ B – FiO2, sats, RR → listen to breath sounds (*widespread wheeze better than no sound)* ➢ C – CRT, HR, BP, UO, temp Ix = ➢ CXR (**only** if consolidation suspected or bacterial tracheitis) ➢ Nasopharyngeal swab (viral multiplex)	➢ A – airway (patent) ➢ B – FiO2, sats, RR → auscultate ➢ C – CRT, HR, BP, UO, temp ➢ D – GCS, BSL ➢ Bloods – FBC, CRP, blood cultures ➢ LP + PCR (only when stable)	➢ A – airway (patent) → suction secretion/blood/ vomit + optimize head position ➢ B – FiO2 + adjuncts, sats, RR → look listen feel ➢ C – HR (palpable pulse?), + **IV access critical** ➢ D – GCS, BSL ➢ Bloods – FBC, CRP, cultures ➢ ECG
Acute Mx	***If unsure if asthma – treat as anaphylaxis*** 			 Shockable: 2nd = adrenaline 10mcg/kg; Check rhythm + pulse; 3rd = amiodarone 5mg/kg Non-shockable: 2nd = adrenaline 10mcg/kg; Check rhythm + pulse **If SVT with NO signs of shock:** 1) **Vagal manoeuvres** (*carotid massage, knees to chest)* 2) **IV adenosine** (*impending sense of doom, flushing, headache)*
Haem stable	1. *TF to wards when clinically well and Ventolin needed every 1-2 hours → Stretch Ventolin to 3 hrly* 2. *Asthma action plan* o ***Weaning pred dose*** *(1mg/kg daily for further 1-2 days)* o ***Stretch Ventolin*** *(from 3 hourly to PRN)* o ***Copy plan to GP, school and family*** 3. *Inhaler technique and education (consider spacer + preventer usage)* 4. *Advise on avoiding triggers – pollen, dust, exercise,* 5. *Follow up w/ GP in 1 week*	**Discharge ONLY when:** 1) Stridor free at rest AND 2) 4hours post-adrenaline OR 30 minutes post oral pred 3) Provide parental reassurance a. No Abx needed as typically viral in origin b. Anti-tussives **NOT** known to prevent c. Humidified air does not change severity	**Discharge ONLY when:** 1) Haem stable 2) Afebrile	**Post-resus care:** 1) Re-evaluate ABCD – ensure A and B optimised 2) Ventilate to normal CO_2 (avoid XS oxygen) 3) Maintain BP - ?ionotropes 4) CXR = confirm ETT – exc. pneumothorax 5) 12-lead ECG – exc. ACS 6) ECHO – exclude tamponade 7) FBC, EUC, BSL– exc. electrolyte, toxin, fluid status 8) ABG (pH) – exc. hypoxia 9) Check Temp – hypothermia (warm blanket), hyperthermia (anti-pyretics)

Education on:

	Anaphylaxis Mx (EpiPen)	Asthma Action Plan	Seizure Safety / Plan	Sterile Urine Collection (suprapubic aspiration)	Lumbar Puncture
Ind	Anaphylaxis = life-saving medication to buy time	Asthma – uncontrolled	Unprovoked seizure **Goal** = live with active normal lifestyle	• unwell children < 2 y. • suspected UTI • child on prophylactic Abx	Part of septic work up to identify source of infection esp. for FUO
Method	1) Stop/remove allergen 2) Lay child **flat** 3) Call 000 or notify ICU/anaesthetics 4) Take off blue safety release 5) IM adrenaline 10mcg/kg on lateral thigh **removing clothing** → hold for 3 seconds ○ 0.15mg = epipen Jr (<5yo or <20kg) ○ 0.3mg = epipen adult (>5yo or >20kg) 6) Release and orange needle protector should be seen 7) Repeat after 5min if no improvement	**Plan depending on severity:** 	1. Move away from danger 2. Stay with person 3. Roll to recovery position 4. Monitor breathing 5. Don't restrain 6. Don't put anything into their mouth 7. Get **midazolam IM 0.15mg/kg**	**Suprapubic aspiration (SPA)** **1) Gold standard to collect uncontaminated UA for culture in children <2yo** 2) Bladder USS scanner to identify bladder (**which must be FULL**) 3) Alcohol swab 4) Insert needle to hub and aspirate. 5) If urine is not immediately aspirated, continue aspirating as the needle is withdrawn	1) Sterile field → on ward 2) *Firmly hold baby down* (may need assistance of mother) 3) **Oral sucrose** = infant < 3/12 for distraction and comfort 4) **Topical anaesthesia cream** = infant > 3/12 5) Insert small needle into L3 level spinal fluid from the back (**DOES NOT** GO near the spinal cord) 6) CSF collection → send to pathology
Risks	• Sweating • Dizziness • Tremor • Feelings of anxiety and unease • **Infection at injection site → urgent Medical attention** **Important FU** • Distribute Anaphylaxis Action (family, school GP) • Always carry 2 Epipen injectors (if need more → need doctor)		• **Sports** e.g. swimming in outside lane to reduce risk w/ specialised instructor watching patient • **Avoid Bath times** → prefer showers • **Cycling** – wear helmets and stay on roads • Avoid locked doors → can restrict access	1) microscopic haematuria 2) bladder haemorrhage 3) intestinal perforation **Important FU** • Share results found w/ parents • Check for urine/blood leakage from aspirate site • Signs of septic shock	1) Failure to obtain sufficient sample for analysis [BIGGEST ISSUE] 2) Infection - meningitis 3) Bleed 4) Nerve injera 5) Coning **Important FU** Share results found w/ parents Check for postural HypoTN
	**Important FU** • Distribute Asthma Action Plan (family,, school) • Explain difference b/w reliever and preventer • Inhaler technique education • IUTD – flu, COVID-19 • Avoid triggers - ↓passive smoking, dust, pollen • Always carry 2 Epipen injectors (if need more → need doctor) *Improve ASTHMA control:* • **NO** daytime Sx of nocturnal waking • **NO** activity limitaitons • **NO** Hospital Ax • **Consider step-wise increases:** • SABA → Low dose ICS → High-dose ICS + LABA → oral pred	**Important FU** • Distribute Epilepsy Action Plan (family, school GP) • Open discussion w/ child about school and plan • PENNSW website •	 Positioning of infant during the procedure