Nepal Paediatric Society

Dedicated to the health of all Children

Paediatric Clinical Standards

2023

unicef

for every child

RCPCH Global

Contents

Common Conditions

» Paediatric Basic Resuscitation Protocol 5
» Triage and Management of the Child with Emergency Signs 6
» Transfer of the Sick Child 10
» Febrile Child 11
» Acute Gastroenteritis 12
» Sepsis/Septic Shock Protocol 13
» Severe Acute Malnutrition 15
» Snake Bite Management 18

Respiratory Section

» Child with Breathing Difficulties 26
» Approach to the Child with Stridor 27
» Asthma 28
» Croup (Acute Laryngotracheobronchitis) 31
» Pneumonia 33
» Management of Anaphylaxis 36

Poisoning Section

» Kerosene Poisoning 38
» Acetaminophen (Paracetamol) Poisoning 40
» OPC Poisoning 42

Neurology Section

» Acute Onset of Coma 44
» Treatment of Prolonged Paediatric Seizures 45

Neonatal Section

» Newborn Resuscitation Algorithm 46
» Kangaroo Mother Care 48

Appendices

» Paediatric Vital Signs Chart 50
» SAM Volume Guidance Table 51

Paediatric Basic Resuscitation Protocol

Unresponsive?

↓

Safe approach, Stimulate, Shout for help,
Setting - Gloves

↓

Airway
Open airway by Head tilt + chin lift/jaw thrust.
Is there any obstruction? If so, manage

↓

Not breathing normally, no signs of life.

↓

Breathing
Give FIVE rescue breaths with bag and mask.
Make sure that chest rises – *if it does not, adjust airway position and consider adjunct*.
Add oxygen

↓

Circulation
Check for signs of circulation – HR must be > 60bpm
Attach ECG monitoring/defibrillator if available

↓

If no signs of life, or HR<60, commence chest compressions.
15 chest compressions: 2 ventilation breaths - 7 cycles per minute

↓

Return of spontaneous circulation
Stop CPR,
Recovery position,
Give oxygen,
Monitor closely

→

During CPR

- Ensure high quality CPR: rate, depth and recoil
- Plan actions before interrupting CPR
- Give oxygen
- Vascular access – (after airway/breathing assessment and treatment) using IV/IO
- Give adrenaline 0.1ml/kg of 1 in 10,000* IV/IO every 3-5 minutes
- Consider advanced airway if possible
- Continuous compressions if definitive airway – endotracheal tube – established
- Correct reversible causes

Reversible causes

- Hypoxia
- Hypovolemia
- Hypo/Hyperkalemia/ metabolic
- Hypothermia
- Tension pneumothorax
- Toxins
- Tamponade - cardiac
- Thromboembolism

Immediate post arrest care

- Use ABCCCD approach
- If possible, control oxygenation and ventilation
- Investigations
- Treat precipitating cause
- Temperature control

*If 1:10,000 adrenaline not available:

Use 0.01mL/kg of 1:1000 Adrenaline =10mcg/kg (Recommend drawing up the whole 1mL in 1:1000 adrenaline concentration vial and dilute with 9mL 0.9% Sodium Chloride for injection so 0.1mL/kg dosage (10mcg/kg) is always administered.

Triage and Management of the Child with Emergency Signs

- Start by looking for emergency signs – if any present, start treatment immediately
- Move the child to a treatment area as quickly as possible and call for help
- (Do not move neck if cervical spine injury possible)
- Ensure the most senior healthcare worker available assesses the patient as soon as possible

Airway or Breathing Problem
- Obstructed breathing
- Central cyanosis
- Severe respiratory distress (nasal flaring, grunting, head bobbing, chest indrawing)
- Weak/absent breathing

Yes
- Quickly check inside mouth and remove *visible* secretions or foreign body
- If history of foreign body aspiration, give backslaps and chest/abdominal thrusts
- Position and open the child's airway (jaw thrust, chin lift)
  - Age less than 1 year = Neutral position
  - Age over 1 year = Sniffing position
- Give oxygen (aiming for oxygen saturations ≥ 94%
- If the child conscious and has severe respiratory distress then prop them up in sitting position
- Diagnose and treat underlying cause

No

Circulation Problem

Cold hands
+
Weak and fast (or absent) radial pulse
+
Capillary refill time >2 seconds
= SHOCK

Yes
- If visible bleeding, apply direct pressure to stop blood loss
- If pulse not felt, start basic life support immediately
- Give oxygen if oxygen saturations < 94%
- Make sure the child is warm

If **no** evidence of severe malnutrition:
- Insert IV cannula (if difficult to site cannula, insert IO needle instead)
  - Give 10 ml/kg of normal saline or Ringer's Lactate, only if child has all these three signs of shock
- If child looks pale, check Haemoglobin urgently
  - Give blood transfusion if Hb <6 g/dl
- Reassess early after first treatment and if no improvement, consider further fluid bolus of 10 ml/kg of normal saline/Ringers Lactate
- Diagnose and treat underlying cause
- Consider giving antibiotics (IV Ceftriaxone 80-100 mg/kg OD)

No

Coma or Convulsion
- Convulsing (currently)
- Coma (Responding only to Pain or Unresponsive on AVPU scale)

Yes
- Manage airway of child (see above)
- Check blood sugar and if low/unable to check give IV Dextrose 5ml/kg 10% Dextrose
- If child currently convulsing
  - give oxygen to keep oxygen saturations ≥ 94%
  - give anti-convulsant: IV Diazepam, or if no IV access, rectal Diazepam (see Seizure Standard)
- Diagnose and treat underlying cause (see Coma Standard)

If severe malnutrition present, see Severe Acute Malnutrition Standard
If restless, irritable or floppy, see Coma Standard

No

Dehydration (Severe)

Lethargy plus 2 or more of:
- Sunken eyes
- Slow skin pinch
- Inability to drink
- Normally accompanied by diarrhoea

Yes
- Make sure the child is warm
- If lethargic, check blood sugar and if low/unable to check give 5 ml/kg of 10% dextrose.

If no severe malnutrition:
- Insert IV line. If signs of shock give fluids, as above; if no shock give fluids as per WHO diarrhoea and dehydration guidance

If severe malnutrition present, see SAM Standard

If the child has no emergency signs, quickly go on to look for priority signs:

Priority Signs

- These patients must **not** be left in a queue and must be seen early by senior healthcare worker
- **All** are vulnerable to early deterioration or may indicate severe disease
- All require **ABCCCD assessment and treatment**
- Remember 3TPRMOBB
- There may children in the queue with other problems who also have priority

Tiny	any small child (<3months) or <5kg is high risk for deterioration and must be seen early
Temperature	high fever usually indicates sepsis, child can deteriorate quickly and must be seen early; if signs are severe, must have antibiotics early
Trauma or other surgical	if major, trauma pathway must be activated early; use C-ABCCCDE approach (first C is control of visible haemorrhage); minor injuries may mask severe injuries, call surgeon early
Pallor	severe anaemia may indicate severe underlying illness
Poisoning	specific antidotes, e.g. atropine for OP poisoning, must be given early
Pain	this may indicate a severe problem; no child should be left in severe pain without early assessment and treatment
Respiratory distress	may be respiratory or indicate other severe illness, assess early, measure oxygen saturations and give oxygen if <94%
Restless, Irritable or floppy	check ABC, may indicate cerebral problem or signs of severe illness (e.g. shock) assess early, check glucose, follow Coma Standard
Referral	all urgent referrals to your hospital must be seen early; treatment may not have started, and deterioration may have occurred
Malnutrition	visible signs of severe malnutrition and/or MUAC< 11.5cm, high risk for deterioration: see SAM Standard for emergency fluid management
Oedema (both feet)	may indicate severe malnutrition (or heart failure or other conditions)
Burns	activate burn protocols early and requires early attention to ABC and pain relief
Bleeding	control visible bleeding, look for cause, think external or internal cause

Paediatric Triage Form

Date: Ticket arrival time: Triage time:

Clinician name _____

Patient name_____

Presenting complaint:

Age:

Sex: M/F

Weight:

RED: EMERGENCY SIGNS - circle if present → MUST BE SEEN IMMEDIATELY in ER
If in OPD → Healthcare worker accompany to ER

Airway
- Obstructed breathing

Breathing
- Weak/absent breathing
- Central cyanosis
- Severe respiratory distress (Grunting, chest indrawing, nasal flaring, head bobbing)

Circulation:
- Cold hands + Weak and fast/absent radial pulse + CRT >2seconds = SHOCK

Coma or **C**onvulsion
- Coma (responding only to Pain or Unresponsive on AVPU)
- Actively convulsing

Dehydration (Severe)
- Lethargy + 2 or more of the following
  - → Sunken eyes
  - → Slow skin pinch
  - → Inability to drink/severe vomiting

Please complete the following assessment in all cases

Temperature ____

HR _____

Respiratory rate ____

Conscious level (please circle):
Alert **V**oice **P**ain **U**nresponsive

YELLOW: PRIORITY SIGNS – circle if present → put in YELLOW area in ER

3 T	**3 P**	**3 R**	**MOBB**
Tiny (less than 3months old)	Pallor	Restless	Malnutrition
Trauma	Pain (severe)	Respiratory distress	Oedema (both feet)
Temperature (>39.5°C)	Poisoning	Referral	Burns
			Bleeding (severe)

GREEN: If none of above present – Green (Non-urgent) → place in general waiting area / send to OPD

Clinical assessment

Time:

Clinician Name:

Designation:

Clinical findings:

Paediatric Triage

RED: EMERGENCY SIGNS → MUST BE SEEN IMMEDIATELY in ER

If in OPD → Healthcare worker accompany to ER

Airway
- Obstructed breathing

Breathing
- Weak/absent breathing
- Central cyanosis
- Severe respiratory distress (Grunting, chest indrawing, nasal flaring, head bobbing)

Circulation
- Cold hands + Weak and fast/absent radial pulse + CRT >2seconds = SHOCK

Coma
- Coma (responding only to pain or unresponsive on AVPU)

Convulsion
- Actively convulsing

Dehydration (Severe)
- Lethargy + 2 or more of the following
  - → Sunken eyes
  - → Slow skin pinch
  - → Inability to drink/ severe vomiting

YELLOW: PRIORITY SIGNS → put in YELLOW area in ER

3 T	3 P	3 R	MOBB
Tiny (less than 3 months old)	Pallor	Restless	Malnutrition
Trauma	Pain (severe)	Respiratory distress	Oedema (both feet)
Temperature (>39.5^{o} C)	Poisoning	Referral	Burns
			Bleeding (severe)

GREEN: If none of above present – Green (Non-urgent) → place in general waiting area / send to OPD

Transfer of the Sick Child

Assessment and decision for referral to be made by the most senior member of the team

Communicate with the guardians

Decide about accompanying guardian and healthcare professional* during transfer

Communication about the child between the referring and the transfer team:
- Situation
- Background
- Assessment
- Recommendation

Transfer team ensures availability of:
- Oxygen (with back-up), tube, oxygen mask
- AMBU bag with mask (function checked)
- IV fluids, IV giving set
- Infusion/syringe pumps if available
- Any emergency use medications recommended by referring team

- **Transfer the child in appropriate vehicle (four-wheeler ambulance most common)**
- **Ensure continuity of treatment recommended by referring team**
- **Make additional interventions as necessary as much as possible with available resources and expertise eg. anti-seizure medications, IV fluids, inotropes etc.**

- **Continue care until handover to the transfer team:**
- Resuscitate and stabilize
- Consider and optimize the balance between time spent in stabilization vs the urgency for transfer

Handover necessary equipment and medicines (labelled) to the transfer team.

Provide transport incubators if appropriate and available

Provide documents:
Case summary with interventions, condition at referral and recommendations

As far as possible,
- Communicate with the higher centre where patient is planned to be transferred.
- Confirm availability of services before transfer.

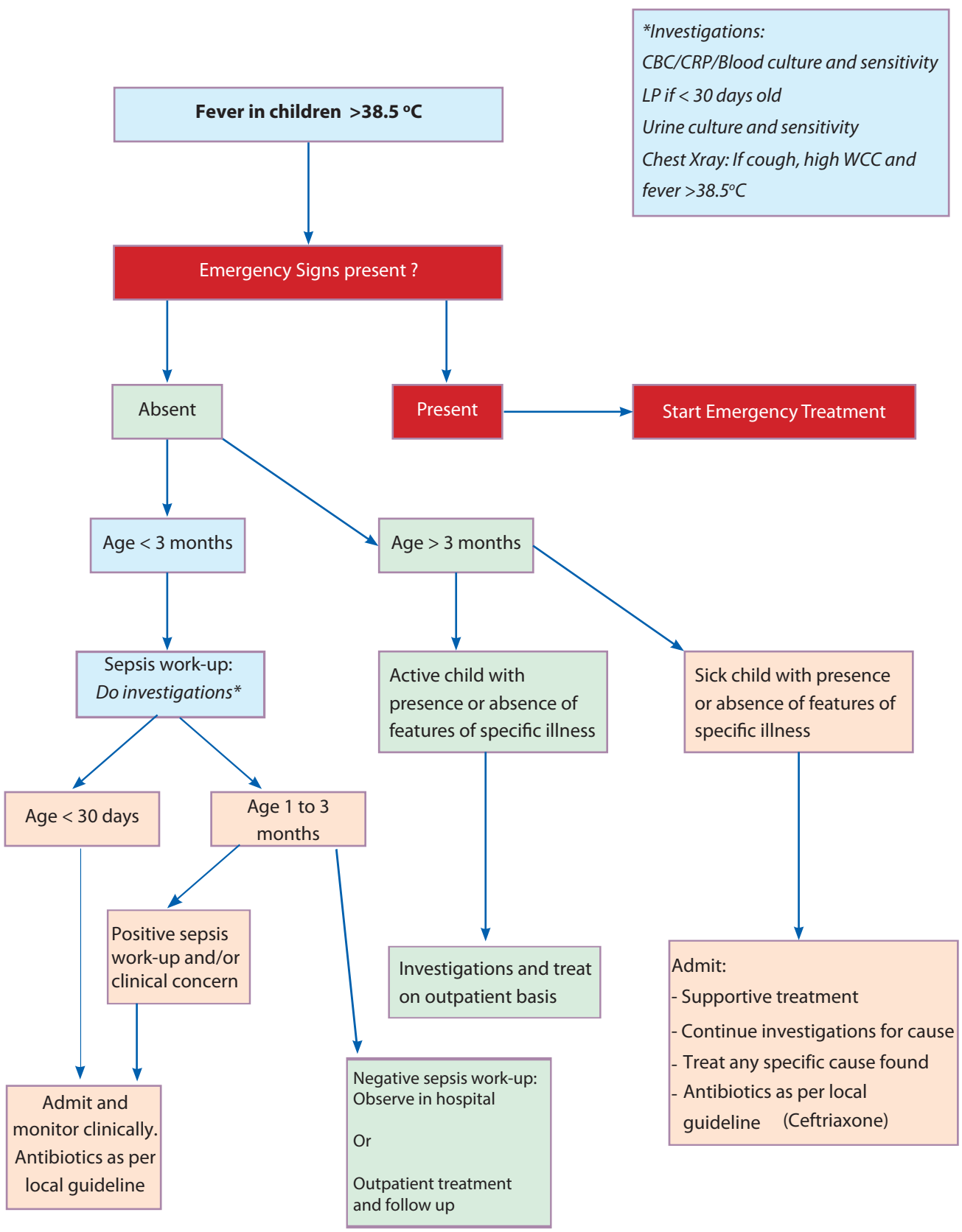
Communicate about:
- Clinical details
- Relevant test results
- Treatment provided
- Condition at transfer
- Possible services needed and recommendations
- Estimated time for arrival

Receiving centre prepares for receiving the child in ER and/or in an intensive care unit

- **Receive the child in ER or ICU**
- **Ensure receipt of all documents and information from referring centre**
- **Take handover of events during transfer**
- **Assess and provide necessary immediate interventions**
- **Contact referring centre for any relevant information not available in documents**
- **Counsel the guardians**
- **Start definitive treatment**

*** Sick child should ideally be transferred accompanied by a healthcare professional.**

Management of the Febrile Child



Acute Gastroenteritis

Perform ABCCCDE assessment

Assess level of dehydration

ALL of:

- Fast weak pulse
- Cool peripheries
- Prolonged capillary refill
- Sunken eyes or prolonged skin pinch

Hypovolaemic Shock

Give **oxygen**
Shout for help

Ensure no severe anaemia or malnutrition

PLAN C

Step 1
30ml/kg Ringer's Lactate

over 60 mins if under 1 year old
over 30 mins if over 1 year old

Reassess

In shock

Repeat step 1 (30ml/kg)

Not in shock

Step 2
70ml/kg Ringer's Lactate

Over 5 hours if <1 year old
Over 2.5 hours if >1 year old

2 or more of the following signs:

- Lethargy (AVPU<A)
- Unable to drink
- Sunken eyes
- Skin pinch >2 seconds

Severe Dehydration

Assess ability to drink

Give oral rehydration (ORS) as soon as the child can drink (about 5ml/kg/hour)
Reassess every 15-30 minutes whilst in shock and every 1 hour after this.

2 or more of the following signs:

- Restless or irritable
- Drinks eagerly/ is thirsty
- Sunken eyes
- Skin pinch >1 second

Some Dehydration

PLAN B

75ml/kg ORS over 4 hours

Continue breast feeding
Re-assess after 4 hours, or sooner if child cannot drink.
If child vomits, wait 10 minutes and then continue.
If child wants to drink more – encourage this

Fewer than 2 of the above signs

No Dehydration

PLAN A

Consider discharging HOME
Take fluid after each diarrhoea (50-100ml <2 years or 100-200ml >2 years after each stool) Advise parent on signs of dehydration and return in 5 days if not improving.

Give **ZINC** to all cases of diarrhoea for 14 days : 10mg daily <6months; 20mg daily >6 months
ONLY give **antibiotics** for bloody stool, suspected cholera or sepsis present eg pneumonia

Sepsis/Septic Shock Protocol

WHO definition of sepsis:
'Sepsis is a life-threatening condition that arises when the body's response to infection causes life threatening injury to its own tissues and organs.'

Diagnose shock if all of the below features present:
Cold extremities
Fast and weak peripheral pulses
CRT >3secs

Suspect septic shock when there is:

- Hypotension despite adequate fluid resuscitation
- Requirement of inotropes
- Oliguria
- CRT>3 secs
- Toe/core temp gap >3° C
- Reduced consciousness
- Elevated lactate
- Acute respiratory distress syndrome
- Evidence of other organ dysfunction

Management

Timeline	ABCCCDE	Look for	What to do
0 min	Airway	Secretion/bleeding Obstruction Added sounds Cyanosis Maintainable/ not maintainable	Provide airway support: If unconscious- - Position airway - Suction if required - Consider airway adjuncts (e.g. Guedel airway, nasopharyngeal airway)
	Breathing	Respiratory rate + SpO_2 Respiratory distress: - indrawing, nasal flaring, grunting, head bobbing Auscultation: - wheezing, crackles, reduced air entry	If signs of respiratory distress or SpO2 <94%: Give high flow oxygen (via NRM at 10 L/min)
5 min 1 hour	Circulation	Cold hands Peripheral pulses weak and fast or absent CRT >3 secs Diagnose shock if all of the above present	Obtain IV access (2 in shock) - Use IO if 3 unsuccessful attempts with IV cannulation Send CBC, RFT, LFT, blood culture, coagulation profile, blood group, CRP, serum calcium If shock: NS/RL 10 ml/kg over 30 mins, repeat if necessary at 10 ml/kg, till 40 ml/kg - NB. must assess if has SAM, in which case give 15ml/kg DRL fluid bolus over 1hr first and reassess IV antibiotics (broad spectrum within 1 hour) Start inotropes after 40 ml/kg IVF bolus if features of shock persist: - Dopamine 5-20 mcg/kg/min if no improvement, - Add peripheral adrenaline 0.03-1 mcg/kg/min - If unresponsive, IV hydrocortisone 2 mg/kg Give IV calcium if low

	Coma Convulsion	Check glucose Assess AVPU	If Blood glucose <54mg/dL (3mmol/L), give 5 ml/kg 10% dextrose IV/IO If convulsion: NEPAS Treatment of Prolonged Paediatric Seizures Standard
	Exposure	Temperature Bite mark bleeding	Manage hypo and hyperthermia Stop active external bleeding by pressure bandage Replace with PRBC if significant bleeding
	Dehydration	Check for: Sunken eyes Skin pinch lethargy Thirst/ Able to drink	Follow WHO protocol

Target of therapy

Target

- CRT<2 secs
- Normal pulse rate and volume
- Normal MAP
- Urine output >1 ml/kg/hour
- Hb >6 g/dL

If not met →

ACTION

Titrate IVF and inotropes

Transfuse PRBC: 10-15 ml/kg if Hb <6g/dL + haemodynamically unstable:

- *hypotension*
- *persistent/progressive end organ dysfunction*
- *persistence of lactate >2mmol/L*
- *hypoxia*
- *requiring vasopressor*

Transfuse Platelets: 15ml/kg if platelets are <30,000/microlitre

AFTER RESUSCITATION

- Search for underlying source of infection
- Detailed history and examination
- Other investigations: urine culture, stool culture and other
- Lumbar puncture if possibility of meningitis

MONITORING

- Monitor vitals at least hourly
- Consider complications (progression of shock, AKI, coagulopathy)
- If no improvement after 48 hours: consider 2nd line antibiotics, or alternate diagnosis

SEVERE ACUTE MALNUTRITION: Diagnosis and Assessment

DIAGNOSIS

Diagnose Severe Acute Malnutrition (SAM) if a child has any of the following:

- Weight for length Z-score <-3
- Mid-Upper Arm Circumference (MUAC) <11.5cm (if age >6 months)
- Bilateral pitting oedema

ASSESSMENT

Assess child using an **ABCCCDE approach**
Check: Temperature, Respiratory Rate, Heart Rate, Oxygen Saturations, Blood glucose

STEP 1 – TREAT/PREVENT HYPOGYLCAEMIA
If **Blood Glucose < 54mg/dl (3mmol/l)** and **child conscious (or unable to check blood glucose)** give 50ml of 10% Dextrose or 10% Sucrose solution (1 rounded teaspoon of sugar in 3.5 tablespoons/50ml of water) orally or via NG tube
If child **unconscious or convulsing**, give 5ml/kg of 10% Dextrose IV
Encourage child to breast feed/aim to **start feeds as soon as possible**

Assess for Medical Complications/Danger Signs:

- Child lethargic or unconscious or fitting
- Child vomits everything
- Child has severe diarrhoea and/or dehydration
- Child has fever (T > 38.5°C) or low temperature (T < 35°C axillary or <35.5°C rectal)

(See **Step 2 – Treat/Prevent Hypothermia and Step 3 – Treat/Prevent Infection** for guidance on management of these complications)

- Child has fast breathing (Respiratory rate >60 if < 2 months, or > 50 from 2-12 months, or >40 from 1-5 years or>30 if >5 years or any chest indrawing (if > 6 months) –> **give oxygen**
- Child is not able to drink or breastfeed and/or does not eat
- Child has severe anaemia (palmar pallor) –> **check urgent haemoglobin**
- Child has severe oedema (+++, generalised including both feet, hands, arms and face)

Perform Appetite Test: Are they able to eat test dose of RUTF (ready-to-use therapeutic food)?

Ask about: Feeding/Appetite, Breastfeeding, Vomiting, Diarrhoea, Stools and Urine, Cough, Fevers, Swelling, and further questions as appropriate (duration of symptoms, immunisation status)

CRITERIA FOR ADMISSION

Child has **3+ oedema** or
Medical complication/danger sign (see above) or
Poor appetite or
Infant < 6 months with SAM:
ADMIT to

INPATIENT CARE

No Medical Complications or Danger Signs
Demonstrates appetite by eating RUTF
If oedema present only 1+ or 2+

OUTPATIENT CARE

Severe Acute Malnutrition: INITIAL MANAGEMENT

1) TREAT/PREVENT HYPOGLYCAEMIA

If **Blood Glucose <** 54mg/dl (3mmol/l) and child conscious give 50ml of 10% Dextrose or 10% Sucrose solution (1 rounded teaspoon of sugar in 3.5 tablespoons/50ml of water) orally or via NG tube

If child **unconscious or convulsing,** give 5ml/kg of 10% Dextrose IV

Give **first feed of F75** orally (or NGT if vomiting or unable to take orally) **as soon as possible** – Please see below appendix with volume guidance table

2) TREAT/PREVENT HYPOTHERMA

If axillary temperature is <35°C or rectal temperature <35.5°C:

Feed child immediately as above, **check blood sugar** (if not already done)

Actively warm child: put hat and warm clothes on them, place a heater or lamp nearby, or place skin-to-skin with mother or carer and cover them

Commence intravenous antibiotics if child not already receiving them

Re-check temperature every 30 minutes until > 36°C

3) TREAT/PREVENT DEHYDRATION

Assess children with a history of vomiting or diarrhoea for shock and dehydration – assume dehydration in all children with history of recurrent vomiting or frequent watery stools and recent change in appearance/weight loss

Suspect shock if child has cold extremities, CRT >3 seconds and peripheral pulses weak and fast or absent with decreased conscious level (lethargy or unconsciousness)

If dehydration suspected:

Give 5ml/kg of ReSoMal every 30 minutes for 2 hours orally or by NGT

If ReSoMal not available use F75 or make up ReSoMal according to WHO recipe (don't use standard ORS)

Monitor closely and reassess child after 2 hours

– if child still dehydrated continue 5-10ml/kg ReSoMal alternate hours with F75 up to a maximum of 10 hours

Give Zinc 10-20mg a day for 10-14 days (unless receiving F75/RUTF which already has Zinc added)

If signs of shock:

(Use IV fluids with extreme caution in children with SAM)

Give **15ml/kg of DRL IV,** monitor closely for signs of fluid overload and check observations every 10 minutes

Commence intravenous antibiotics if child not already receiving them

If shock does not improve after 1 hour, give blood transfusion (10ml/kg over 3 hours)

Management of anaemia - Give blood

(10ml/kg over 3 hours) to children with SAM if:

Hb < 4g/dL

Hb <6g/dL and signs of respiratory distress

4) CORRECT ELECTROLYTE IMBALANCE

Start feeding with F75 (with contains the necessary electrolytes, do not give diuretics

5) TREAT/PREVENT INFECTION

Give all children with SAM antibiotics:

If child is well with **no medical complications/danger signs – give oral Amoxicillin**

If child has **medical complications/danger signs or is shocked or hypothermic** – give IV/IM antibiotics (Ampicillin and Gentamycin)

Give all children in malarial areas (Terai) Chloroquine and Primaquine for 3 days

Give Albendazole to all children > 1 year of age, if not already had in last 6 months

(Dose: 1 – 2 years: give 200mg stat, over 2 years: give 400mg)

6) CORRECT MICRONUTRIENT DEFICENCIES

Give Vitamin A to all children (unless have oedema/have received in last month)

- Child under 6 months 50 000 IU stat PO
- Child aged 6 – 12 months 100 000 IU Stat PO
- Child aged over 12 months 200 000 IU Stat PO

Iron and Folic acid should not be given routinely – consider giving after 1st 14 days if child has moderate/ severe anaemia

If child not receiving F75/100/RUTF may need to consider supplementing other micronutrients

7) START CAUTIOUS RE-FEEDING

Start feeding as soon as possible with F75 – give via NGT if vomiting, very lethargic or unable to take orally, encourage breast-feeding on top if appropriate

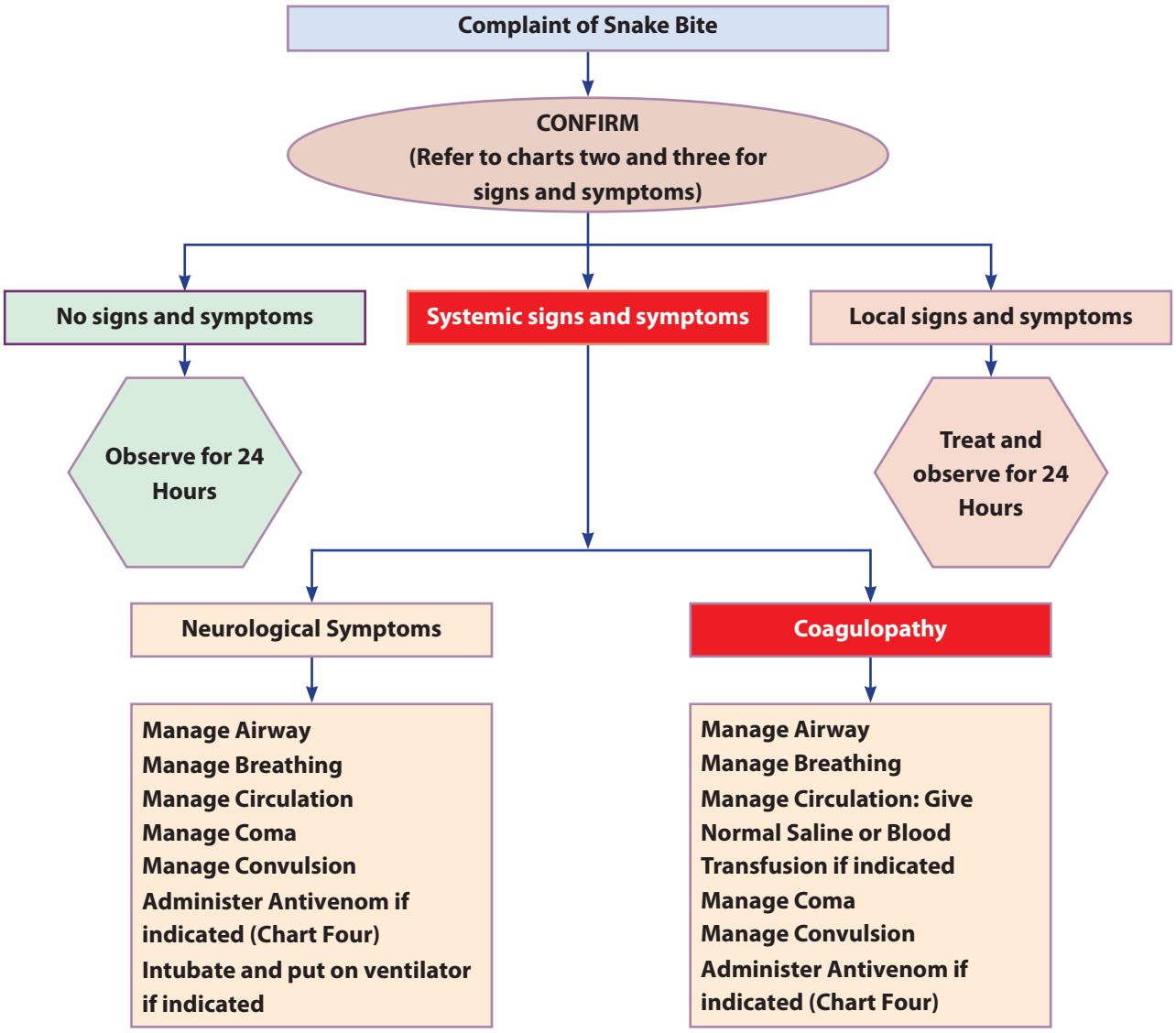
Give 130ml/kg/day of F75 divided into 8 feeds (every 3 hours) – give feeds day and night

In children with severe oedema consider starting with 100ml/kg/day

For children < 6 months, refer to Nepal IMAM guidelines

MONITOR CHILD CLOSELY FOR COMPLICATIONS - Severe acute malnutrition has a high mortality: monitor children very closely for complications such as hypoglycaemia, hypothermia, infection, vomiting and diarrhoea. Refer to NEPAL IMAM guideline for Steps 8-10, and guidance on transitioning to stage 2 of management.

Snake Bite Management
Chart One



Principles of management of snake bite

Management of respiratory depression and shock
Timely administration of antivenom
Timely initiation of assisted ventilation

A: Airway clearance, intubate if needed
B: O2 by any means available. Bag and Mask ventilation. Mechanical Ventilator (Neurotoxic envenomation)
C: If hypotensive, or profuse bleeding: NS, Blood Transfusion, vasopressor support

For Neurotoxicity:
Inj. Atropine 0.02 mg/kg up to 0.6mg
Followed by Inj. Neostigmine 0.025 – 0.04 mg/kg up to 0.6 mgIV or IM every 30 minutes.

Adapted from:
National Guideline for Snake Bite Management in Nepal, DoHS, 2019

Local Features of Snake Bite
Chart Two

Bite Mark	
• Fang mark may be obvious as single puncture, dual puncture or marks of multiple tooth marks. There may only be scratch mark. • Presence or appearance of fang mark is not helpful in diagnosing venomous versus non-venomous snake bite: Venomous snake can have single puncture if one tooth is broken or nonvenomous may have distinct two punctures if they have large teeth. Krait bite may leave no mark at all. • Arm or lower limb bite occurs in victim who unintentionally steps on or otherwise disturbs a snake while working in the field or walking: This is common in farmers, foresters, students etc. • Nocturnal snake bite occurs to people sleeping on ground, the bite may occur in trunk or other body parts.	
Local Effects	
Cobra	• Envenoming usually produces local effects in the form of swelling and local pain with or without erythema or discoloration at the bite site. Blistering, bullae formation and local necrosis are also common. If it is infected, there may be abscess formation.
Krait	• Usually do not cause signs of local envenoming and can be virtually painless.
Viper	• Envenoming results in local pain and tissue damage, characterized by swelling, blistering, bleeding, and necrosis at the bite site, sometimes extending to the whole limb. Consequences of the local envenoming may last for weeks and can produce significant morbidity. • Russell's viper envenoming may lead to persistent bleeding from fang marks, wounds or any injured parts of the body due to venom induced coagulopathy. • Bleeding disorder is usually not seen in pit viper bite in Nepal. However, recently it is reported (case report) from southern and eastern Nepal. • Swelling or tenderness of regional lymph node denotes venom spread.

Adapted from:
National Guideline for Snake Bite Management in Nepal, DoHS, 2019

Systemic Features of Snake Bite
Chart Three

Neurotoxic features (Common with Cobra and Krait):
• Ptosis (unable to look up) • Ophthalmoplegia (double vision) • Pupillary dilation (often not reactive to light) • Difficulty in opening mouth • Inability to protrude tongue beyond the incisors • Difficulty in swallowing • Inability to hold the neck (head) upright • Limb weakness • Loss of gag reflex • Respiratory failure
Features of coagulopathy (common with Vipers):
• Excess bleeding from venipuncture site • Gum bleeding • Epistaxis • Haemoptysis • Melena • Haematuria, PV bleed • Subconjunctival haemorrhage • Petechiae, Purpura, ecchymosis • Visceral bleed, Intracranial bleed, Intra-abdominal bleed • Hypovolemic shock and AKI • Prolonged BT and CT, PT and INR. Abnormal 20-minute whole blood clotting test (20WBCT)

Adapted from:
National Guideline for Snake Bite Management in Nepal, DoHS, 2019

Indication and Use of Antivenom
Chart Four

Antivenom available in Nepal is polyvalent and effective against: Russell's viper, Common Cobra and Common Krait.
Antivenom should be used as early as possible when indicated i.e. when patient develops systemic features of envenomation.
Antivenom administration has risk of anaphylactic reactions.

Indications:

Evidence of Neurotoxicity	• Ptosis, external ophthalmoplegia, broken neck sign, respiratory difficulty, etc.
Evidence of Coagulopathy	• Evidence of coagulopathy primarily detected by 20 WBCT or visible spontaneous systemic bleeding, bleeding gums, etc., including myoglobinuria and hemoglobinuria. • Rapid extension of local swelling (more than half of limb) which is not due to pit vipers or tight tourniquet application.
Evidence of Cardiovascular Collapse	• Shock and hypotension (in case of Russell's viper bite).
Evidence of Acute Kidney Injury	• Traditionally Acute Kidney Injury (AKI) is an indication for antivenom therapy. However, AKI in absence of haematotoxic manifestation is highly unlikely.

Reconstitution of Antivenom:
Each vial is diluted with 10 ml sterile water supplied with antivenom.

Administration:
Prophylactic Adrenaline to be given routinely prior to antivenom administration.
Reconstituted antivenom is further diluted in 3 to 5 ml per kg body weight of NS or D5 and administered as infusion at 2ml/minute.

Dose:
For neurotoxic features: 10 vials initially, then if neurologic features DETERIORATE, 5 vials every hour. Max. total 20 Vials.
For Haematotoxic features: 10 vials initially, then if after six hours 20WBCT or other coagulation test abnormal, five vials. Max. total 20 vials.

Adapted from:
National Guideline for Snake Bite Management in Nepal, DoHS, 2019

Referral
Chart Five

Indication for referral

Patient requiring

- Respiratory support
- Deteriorating neurological manifestations
- Surgical intervention - necrosis / fasciotomy
- Spontaneous persistent bleeding in spite of antivenom administration in adequate dose
- Co-morbid diseases like heart failure or chronic kidney disease
- Acute kidney injury

Where to refer

- Centre with facilities to provide mechanical ventilation in case of neuroparalysis
- In case of AKI - centre with dialysis facilities
- In case of necrosis (or likely need for fasciotomy) - centre with experience in management of snake bite wound

What to do before transfer

- Insert IV line
- Give antivenom if features of systemic envenoming exist. Adrenaline prophylaxis must be given before starting antivenom
- If antivenom not available - give neostigmine and atropine in case of neurotoxic envenoming

Instructions while referring/transferring the patient

- Explain the reason for referral to the patient party.
- If possible provide prior information to the receiving centre, identify the receiving hospitals capability for providing assisted ventilation - consider alternative hospital if ventilation is not available.
- Arrange for an ambulance and transfer the patient to centre where mechanical ventilator and dialysis facilities are available.
- It is critical to provide airway support while transferring patient. This should be done with the help of accompanying staff.
- A referral note should mention about the treatment given (specially antivenom) and the condition of the patient at the time of transfer.
- Instruct one staff to accompany the patient during transportation if required.

Adapted from:
National Guideline for Snake Bite Management in Nepal, DoHS, 2019

First Aid Treatment of Snake Bite
Chart Six

REASSURANCE

- The victim may be very frightened and anxious. Reassure victim that most of the suspected snake bite are caused by non-venomous snakes. Reassure victim that snake bite is a treatable condition.

IMMOBILISATION

- Immobilise the bitten limb with a splint or sling. Any cloth or bandage may be used for this. Any form of movement causing muscle contraction like walking, undressing will increase absorption and spread of venom by squeezing veins and lymphatics.
- Pressure immobilisation (PIB) is believed to delay in spread of venom to systemic circulation and PIB method is commonly recommended by many experts in pre-hospital management. However, the pressure-immobilisation technique demands special equipment and training and is not considered practical for general use in Nepal. Searching for the material to apply pressure immobilisation may cause delay in seeking much needed healthcare for treatment of envenoming. Moreover, envenoming by Cobra and Viper snakes causes local tissue damage and localization of toxin by PIB may worsen tissue damage.
- Pressure pad immobilisation has been found to be useful in Myanmar. Its applicability in Nepal is not known.
- Remove rings, jewellery, tight fittings and clothing and avoid any interference with the bite wound to help prevent infection, decrease absorption of venom and decrease local bleeding.

RAPID TRANSPORT

- The victim should be transported to the hospital where they can receive medical care.
- The most common cause of death due to snake bite envenoming in Nepal is due to respiratory paralysis (and rarely shock due to bleeding from Russell's viper envenoming). In one community-based study, 80% of patients with envenoming died even before reaching a snake bite treatment centre or hospital. Rapid transport using motorcycle has been found to decrease mortality in Nepal. The victim is seated and held between driver and pillion rider.

Adapted from:
National Guideline for Snake Bite Management in Nepal, DoHS, 2019

Twenty-minutes Whole Blood Clotting Test
Chart Seven

Procedure and interpretation

- Use the necessary precautions for taking blood.
- Place 3 ml of freshly sampled venous blood in a small, new, dry, glass tube.
- Leave the tube standing undisturbed for 20 minutes at ambient temperature.
- Gently tip the tube once.
- If the blood is still liquid (unclotted) and runs out, the patient has uncoagulable blood.

Timing of test

- The test should be performed on patient on admission, who is suspected to be bitten by Russell's viper.
- If on admission the test shows uncoagulable blood or if the patient has spontaneous bleeding, the test should be repeated every six hours after initiation of antivenom.
- If on admission the test is normal (coagulable blood), the test should be repeated when spontaneous bleeding occurs.

Important notes

- If the tube used is not made of ordinary glass or if it has been cleaned with detergent, the tube's wall may not stimulate clotting and the test will be invalid.
- If the result of the test is doubtful, repeat the test in duplicate, and include a blood sample from a control (non-envenomed person such as a relative).
- Do not confuse whole blood with serum; it is normal to have the clear serum running out when the tube is tipped after 20 minutes.
- It is not indicated in identified Cobra or Krait bite.

Adapted from:
National Guideline for Snake Bite Management in Nepal, DoHS, 2019

Common types of Snakes in Nepal
Chart Eight


Cobra species


Krait Species


Russell's and Pit Vipers

Adapted from:
National Guideline for Snake Bite Management in Nepal, DoHS, 2019

Child with Breathing Difficulties

Causes of breathing difficulties in children

A. Pathology within Respiratory system

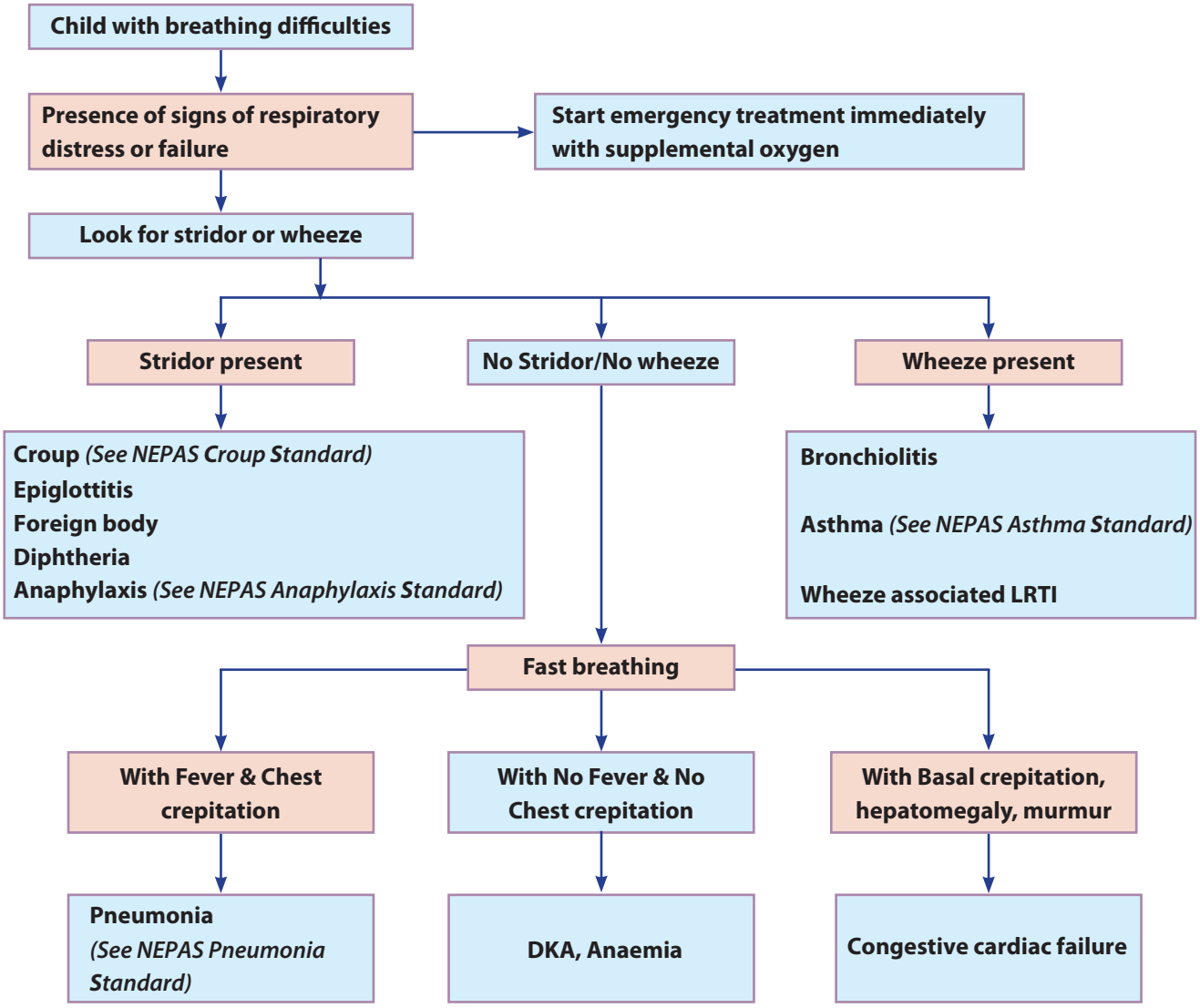
- Upper airway: Croup, Epiglottitis, Retropharyngeal abscess, Foreign body
- Lower airway: Tracheitis, Asthma, Bronchiolitis
- Lung parenchyma: Pneumonia, ARDS, Pulmonary oedema
- Pleura: Pneumothorax, Empyema

B. Pathology outside Respiratory system

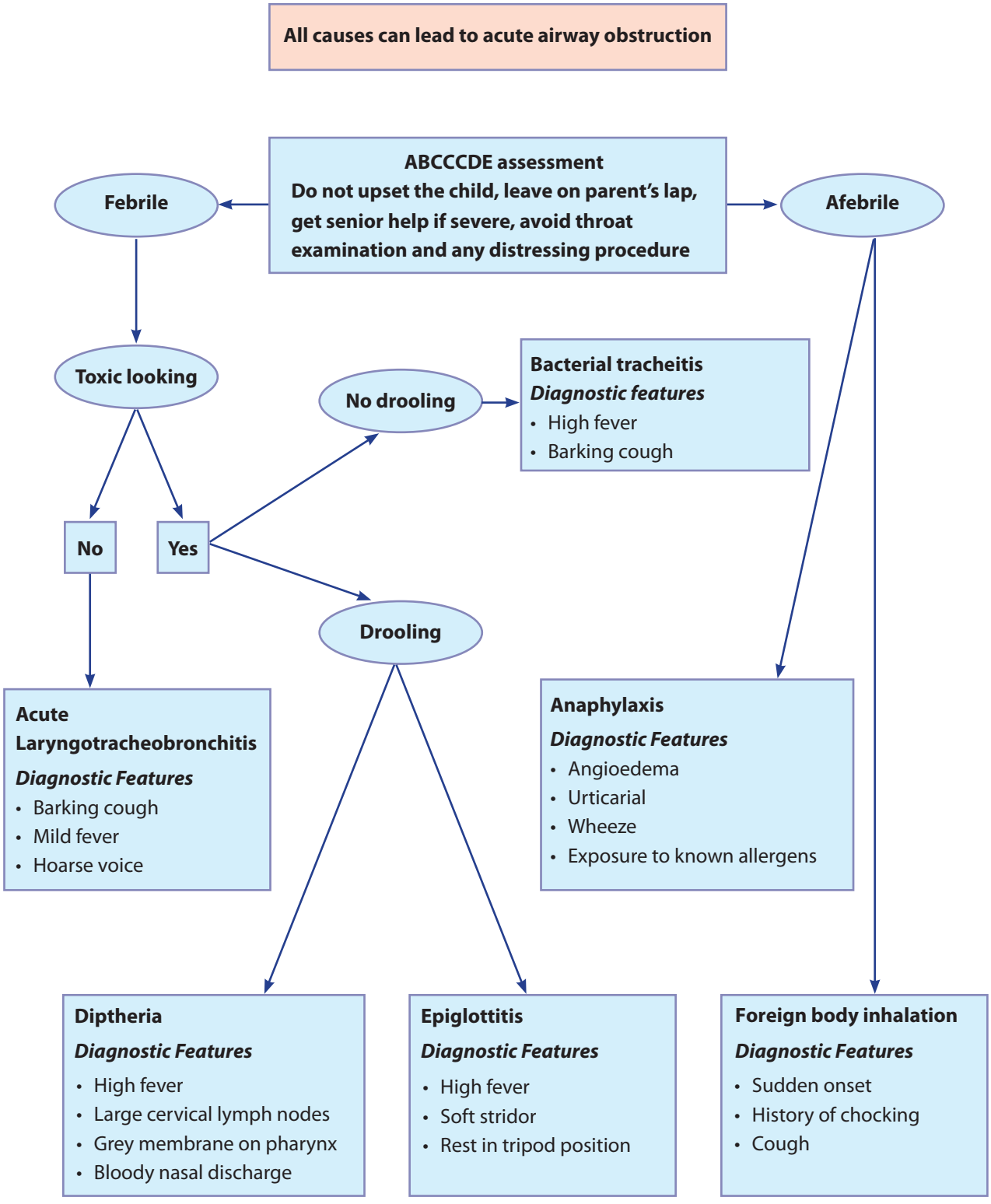
- Pathology increasing respiratory drive: Diabetic ketoacidosis, Cardiac failure, Shock, Poisoning, Anxiety
- Pathology decreasing respiratory drive: Coma, Convulsion, raised intracranial pressure
- Neuromuscular disorder: Guillain-Barré Syndrome (GBS)
- Others: Peritonitis, Abdominal distension

All children presenting in Emergency need primary assessment and stabilisation as per PAT/ABCCCDE approach. Once stabilised secondary assessment is done to find the possible cause of breathing difficulties as shown in the algorithm below.

Approach to the cause of breathing difficulties



Approach to the Child with Stridor
Algorithm 2: Recognising the Cause of Acute Stridor



Asthma

Acute severe asthma

- Asthma is the most common chronic inflammatory disease of childhood that is manifested by airflow obstruction.
- Airway obstruction results from triad of smooth muscle spasm, mucosal inflammation and mucous plugging.
- Severity depends on the degree of wheeze, respiratory rate and pulsus paradoxus.
- Arterial oxygen saturation by a pulse oximeter (SpO_2) is useful in assessing severity, monitoring progress and predicting outcome in acute asthma.
- More intensive inpatient treatment is likely to be needed for children with SpO_2 <90% on air after initial bronchodilator treatment.

Table. Severity of Asthma Attack

Moderate	Acute severe asthma	Life-threatening asthma
Able to talk	Too breathless to feed or talk	Exhaustion
May be agitated	Usually agitated	Drowsy, confused
	Use of accessory muscles; suprasternal retractions	Poor respiratory effort
Respiratory rate: <30/min (>5 years) <40/min (2-5 years)	Respiratory rate: >30/min (>5 years) >40/min (2-5 years)	
Heart rate: 100-120 beats/min	Heart rate: >120 beats/min (>5 years) >130 beats/min (2-5 years)	Bradycardia Hypotension
Wheeze throughout exhalation	Wheeze during both inhalation and exhalation	Silent chest
SpO2 90-95% in room air	SpO2 <90% in room air	Hypoxia despite oxygen therapy
		Consider whether this could be anaphylaxis

(Adapted from APLS 6th edtn and IAP text book of PICU protocol. 3rd edtn)

Management of Asthma

Initial Assessment ABC
Any of these: Drowsiness, confusion, silent chest

No → **Mild to Moderate**

Yes → **Severe/ life threatening** → **Needs PICU admission**

Oxygen to maintain SpO2 > 94%

Short acting beta-agonist (SABA):
Salbutamol MDI 100mcg/actuation
- **For 0-5 yrs: 2-4 puffs** every 20 mins for 1 hour
- **For ≥6yr: 4-10 puffs** every 20 mins for 1 hour

If unable to take MDI:
Salbutamol nebulisation (5mg/ml)
-For 0-5 yrs: 2.5 mg
-For ≥6yrs: 5 mg

Ipratropium bromide
-For < 2 years 125 mcg every 20-30 mins initially
-For ≥ 2 years 250 mcg every 20-30 mins initially

and
- Prednisolone 2mg/kg (max 40 mg)

Continue treatment:
SABA as needed and reassess after 1 hour or earlier if worsening

Deteriorating:
Will need PICU admission

Improving:
Symptoms relieved
Maintaining SpO2 >94% in room air

Plan for discharge
- SABA as and when required
- Controller to be continued
- Prednisolone to continue for 3 days
- Follow up in 2-3 days
- Assess inhaler technique

Continue ongoing treatment
- **High flow oxygen**
- **Oxygen driven SABA nebulisation**
- **Ipratropium nebulisation** 6-8 hourly
- **Systemic corticosteroid**
- **IV Magnesium Sulphate** 25-40 mg/kg over 30 minutes as a single dose
- **Adrenaline** (1mg/ml 1:1000) SC. OR IM: 0.01 mg/kg (max dose 0.5 mg); may repeat after 15-30 min
- **Terbutaline:** SC 0.01mg/kg/dose (max 0.3 mg) doses may be repeated every 20 mins for up to 3 doses. OR IV Loading dose 10 mcg/kg over 10 mins followed by 0.1 to 1 mcg/kg/min continuous infusion
- Consider **Aminophylline** Loading dose 5 mg/kg IV over 20 minutes*
  Continuous infusion of 0.5 to 1 mg/kg/h
- **Non-invasive ventilation (NIV)**

Intubation and Mechanical ventilation if clinically indicated:
- Poor or deteriorating respiratory effort
  OR
- Altered mental status
  OR
- Increased work of breathing causing child to get exhausted
  OR
- Refractory hypoxia & hypercarbia despite maximum oxygen therapy or NIV

Ventilator strategy
- Low breath rate with long expiratory phase. Judicious use of PEEP (3-5 cmH2O)
- Ketamine infusion in intubated patient (20- 60mcg/kg/min)

Asthma Emergency Treatment

Table: Medications in Asthma

Oxygen	High-flow
Nebulised ß2 bronchodilator-Salbutamol (5 mg/ml) solution	0.5 ml for <5 years or 1 ml for 5 years or above as required according to severity and response.
Nebulised ipratropium bromide	125 mcg for < 2 years and 250 mcg for ≥ 2 years every 20-30 mins initially
Steroid	**Prednisolone:** 2 mg/kg/day for 3 days (max. dose/day 40 mg) or **Intravenous hydrocortisone succinate:** Loading dose 8-10 mg/kg (max 300 mg) followed by 4-5 mg/kg 6 hourly on day 1, every 12 hourly on day 2 once daily thereafter on day 3 and if needed on day 4 and day 5. **Intravenous Methylprednisolone:** Loading dose of 2 mg/kg (max 60 mg) followed by 1 mg/kg every 6 hourly on day 1 every 12 hourly on day 2 once daily thereafter on day 3 and if needed on day 4 and day 5.
IV Magnesium sulphate	25-40 mg/kg over 30 minutes as a single dose
Injection Adrenaline (1mg/ml 1:1000)	SC or IM: 0.01 mg/kg (max dose 0.5 mg); may repeat after 15-30 min.
IV Aminophylline*	Loading dose 5 mg/kg IV over 20 minutes Continuous infusion of 0.5 to 1 mg/kg/h
Terbutaline**	IV Loading dose 10 mcg/kg over 10 mins followed by 0.1 to 1 mcg/kg/min continuous infusion. SC 0.01mg/kg/dose (max 0.3 mg) doses may be repeated every 20 mins for up to 3 doses.

*Only if the child is not on oral theophylline other methylxanthines (APLS 6th edn)

** Source-IAP management algorithm for common pediatric illness (2016)

Croup (Acute Laryngotracheobronchitis)

Assessment of severity: The severity assessment of croup generally incorporates a number of clinical features, which include the presence and degree of chest wall retractions, whether stridor is present at rest, and evaluation of the child's mental status (e.g. agitation, anxiety, lethargy).

Clinical Parameter	Mild	Moderate	Severe
Behaviour	Normal	Intermittent mild agitation	Increasing agitation, drowsiness
Stridor*	No stridor, or only when active or upset	Intermittent stridor at rest	Persistent stridor at rest
Respiratory Rate	Normal	Increased	Marked increase or decrease
Use of Accessory Muscles	None or minimal	Moderate chest wall retraction	Marked chest wall retraction
Oxygen saturations**			Hypoxia

* Loudness of stridor is not a good indicator of severity of obstruction. Soft stridor in the presence of worsening clinical picture may be a sign of imminent airway obstruction
**Not necessary to measure oxygen saturations in children with mild to moderate croup
**Hypoxia is a late sign which indicates life-threatening croup
*(**Source:** Clinical practice guideline. The Royal Children's Hospital Melbourne)*

Risk factors for severe croup include:

- pre-existing narrowing of upper airways
- previous admissions with severe croup
- young age: uncommon <6 months old, rare <3 months of age. Consider alternative diagnosis and causes of upper airway obstruction

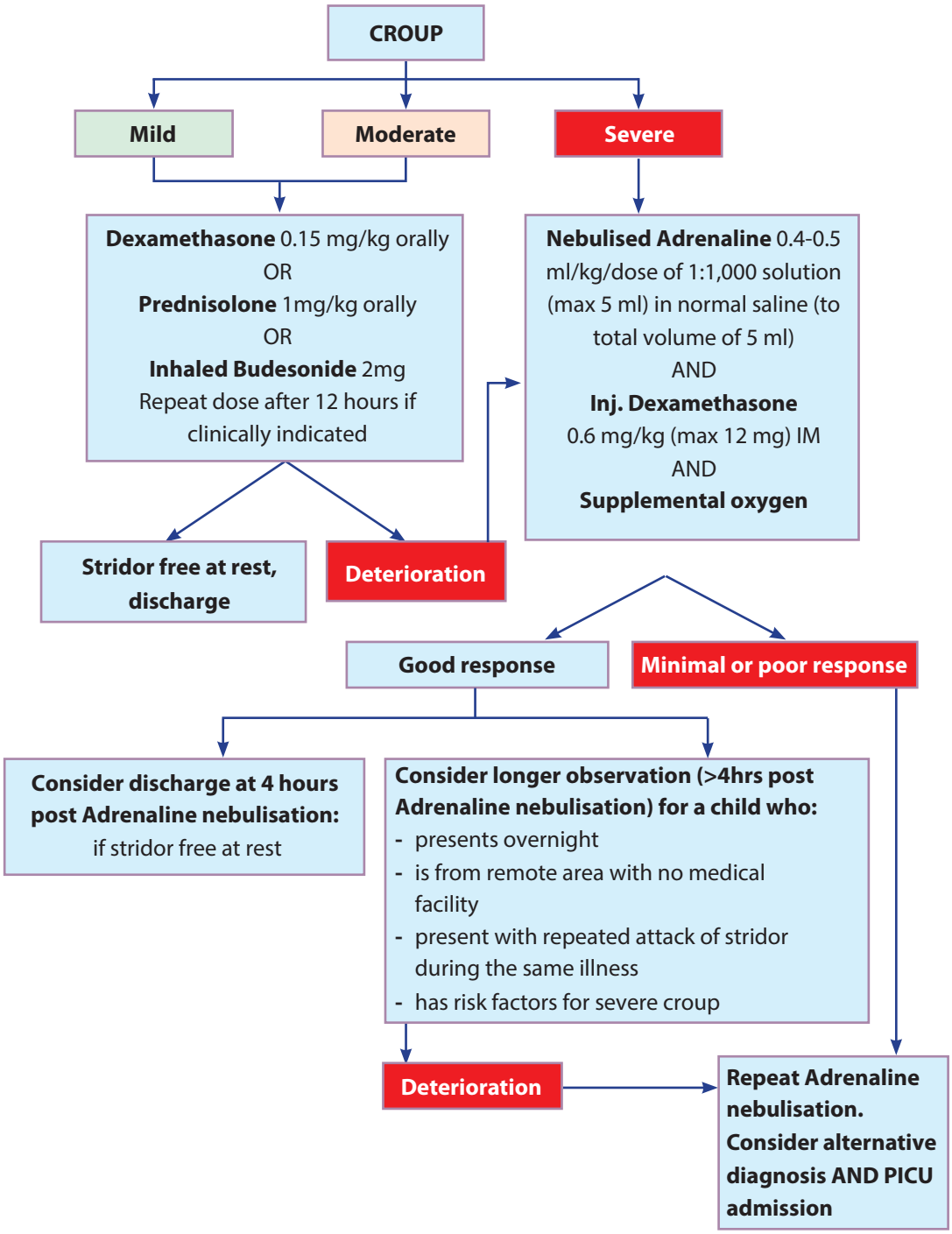
Specific management of Croup:
Follow the algorithm below. Oxygen should be administered for hypoxia, and supportive care with analgesics and antipyretics is reasonable for fever and discomfort.

Specific treatment for Epiglottitis:

- All potentially distressing interventions, such as IV insertion, blood sampling, and throat examination with tongue depressor should be deferred until the airway has been secured.
- Intubation is likely required. Examination under anaesthesia and tracheal intubation with smaller ET than usually required for child's size. ENT surgeon capable of doing tracheostomy should be present.
- After securing airway, blood sample for culture should be sent followed by third generation cephalosporin for 10 days.

Suspect anaphylaxis or inhaled foreign body if a child presents with a very sudden onset of upper airway obstruction, without fever or other signs of illness

Management of Croup (Adapted from APLS 6th, IAP PICU protocol 3rd and Clinical practice guideline. The Royal Children's Hospital Melbourne)



Pneumonia

(Source: IMNCI/WHO)

Cough and/or difficulty in breathing with or without fever, plus any of the following?
Fast breathing, Lower chest wall indrawing

Yes | **No**

Pneumonia

No Pneumonia/Probably URTI

Oral Amoxicillin (40 mg/kg/ dose twice a day for 5 days)
Treat wheeze with Neb Salbutamol or MDI Salbutamol
Avoid cough syrup

Advise to follow-up in 2 days or earlier if the child becomes sicker or is unable to drink or breastfeed

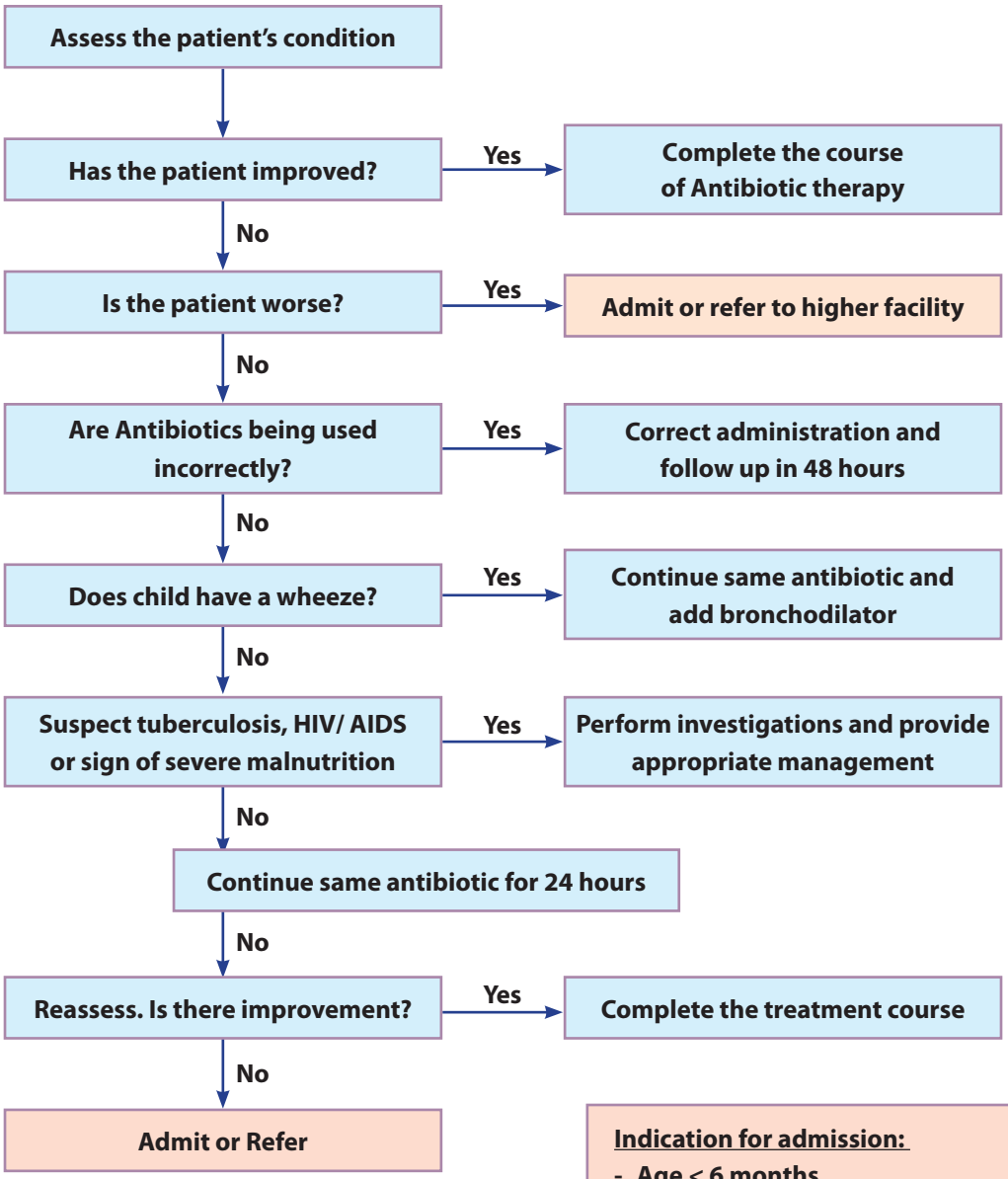
Fast breathing:
Age <2 months RR > 60/min
Age 2-12 months, RR > 50/min
Age 1-5 years, RR > 40/min

Increased work of breathing (WOB):
Intercostal, subcostal & suprasternal retraction
Nasal flaring and use of accessory muscles

Abnormal breath sounds:
Diminished breath sounds, scattered crackles and/or wheeze

Systematic Assessment of Children with Non-severe Pneumonia at Follow-up

(Source FB-IMNCI)



Indication for admission:

- Age < 6 months
- Multiple lobe involvement
- Immunocompromised state
- Toxic appearance
- Hypoxia
- Dehydration
- Vomiting or inability to tolerate oral fluids or medications
- No response to appropriate oral antibiotic therapy
- Inability of caregivers to administer medications at home
- Inability to come for follow-up

Severe Pneumonia
(Adapted From IMNCI)

Cough and/or difficult breathing with at least one of the following:
- **Central cyanosis**
- **Severe respiratory distress**
  - Respiratory rate >70/min
  - Head nodding, grunting, severe chest indrawing
  - Inability to breastfeed or drink due to respiratory distress
- **Emergency signs like coma, convulsion, shock**
- **Presence of crackles, bronchial breath sounds, decreased breath sounds**

↓

Severe Pneumonia

↓

- **Admit**
- **Supplemental oxygen or CPAP:** if SpO2<92%*
- **NPO/ IV fluid**
- **Inj Ampicillin IV** 50 mg/kg/dose 6 hourly AND
- **Inj Gentamicin IV** 5 mg/kg once a day**
- **CXR**

↓

Monitor at least 3 hourly for emergence of new danger signs and/or complications

→ **Worsen at any time**

↓

Reassess at 48 hours

→ **No improvement or deterioration despite adequate therapy**

→ **Improved**

↓

Complete antibiotics

Duration of antibiotics
Clinical response within 48 hours: 7 days
Clinical response after 48 hours: 10 days

↓

- Review the diagnosis
- Review for wheeze
- CXR for complications (e.g empyema; increased or new onset)
- Upgrade antibiotics to third generation Cephalosporin***
- Add inj Cloxacillin** if Staphylococcal infection is suspected
- Refer for possible ventilator support if not improved despite above therapy

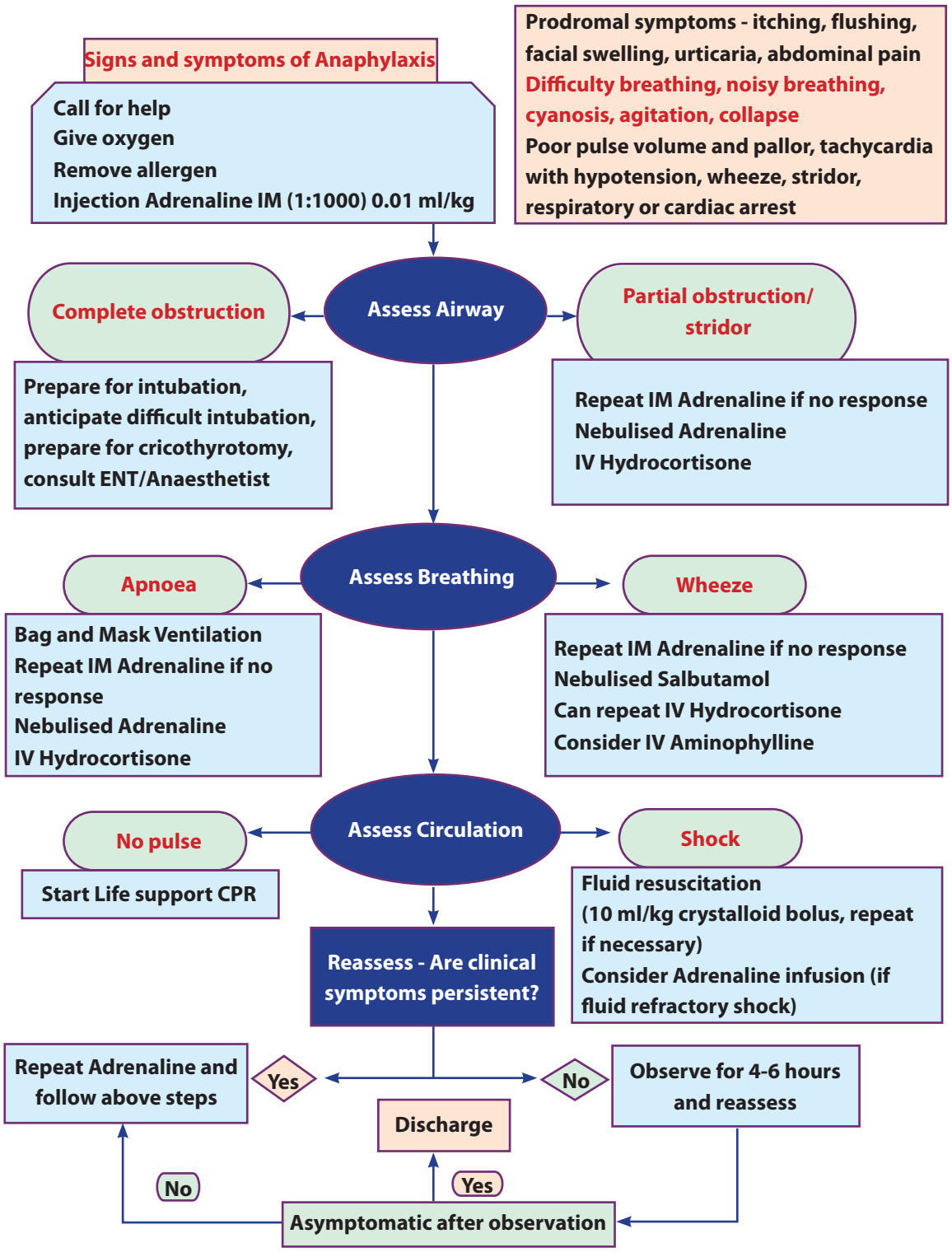
*Supplemental O_2 IF SpO2 <94% in presence of other emergency signs

** Add inj Cloxacillin 25 mg/kg/dose 6 hourly for suspected Staphylococcal infection.

*** Inj. Ceftriaxone 50 mg/ kg/dose twice daily or Cefotaxime 50 mg/kg/dose every 6 hours

Management of Anaphylaxis

(Adapted from APLS)



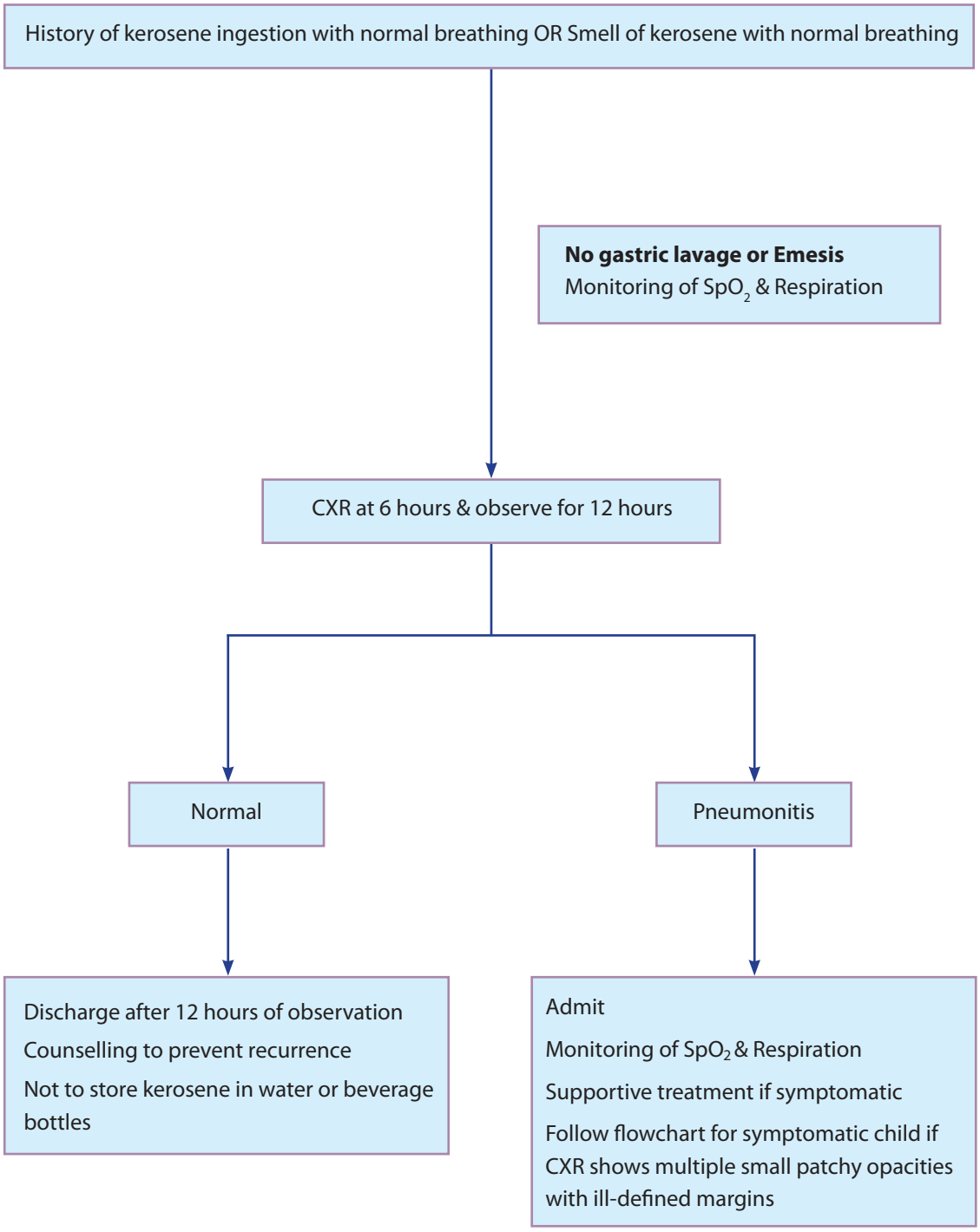
Medicines in Anaphylaxis

(Adapted from APLS-6th Edition)

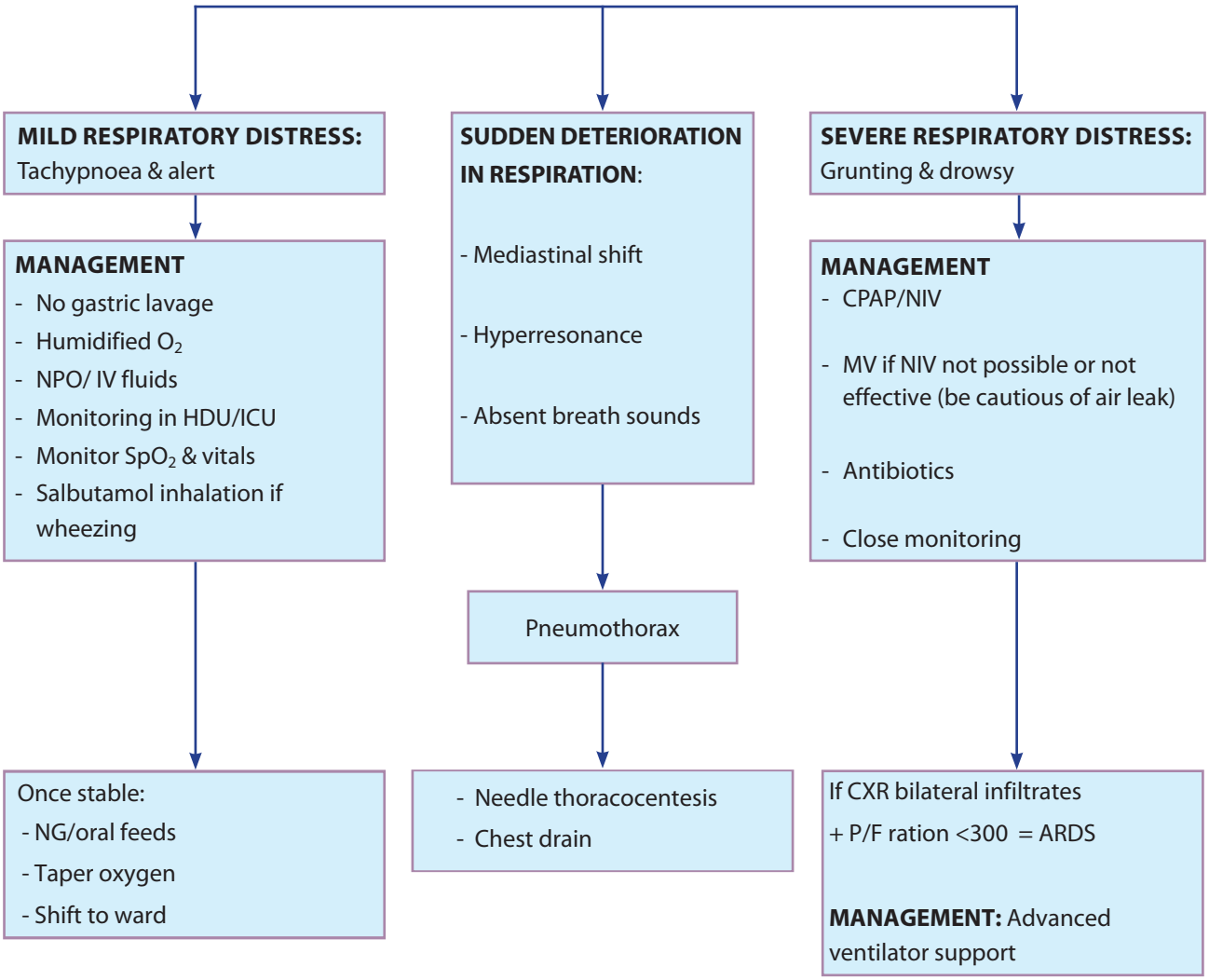
Medicines	Dosage by age			
	< 6 months	6 mths to 6 years	6-12 years	>12years
Adrenaline IM Pre-hospital practitioner	150 micrograms (0.15ml of 1:1000)	150 micrograms (0.15ml of 1:1000)	300 micrograms (0.3ml of 1:1000)	500 micrograms (0.3ml of 1:1000)
Adrenaline IM In-hospital practitioner	10 microgram/kg 0.1ml/kg of 1:1 0000 (infants and young children) OR 0.01ml/kg of 1:1 000 (older children)			
Adrenaline IV	Titrate 1 micrograms/kg given over 1 min (range 30 sec to 10 mins) Dilute 0.01mg/kg up to 10 ml and give 1ml/kg			
Hydrocortisone (IM or slow IV)	25 mg	50 mg	100 mg	200 mg

Age based dosage is advised because weight based dosage of 1:1000 Adrenaline when used in infants and small children will result in very small volumes being drawn.

Asymptomatic Kerosene Poisoning Management Algorithm



Symptomatic Kerosene Poisoning Management Algorithm



No role of steroids or routine antibiotics

Antibiotics if fever and respiratory distress reoccur or persist beyond 48 hours or if radiological findings worsen

Other supportive care

Counselling for prevention of recurrence

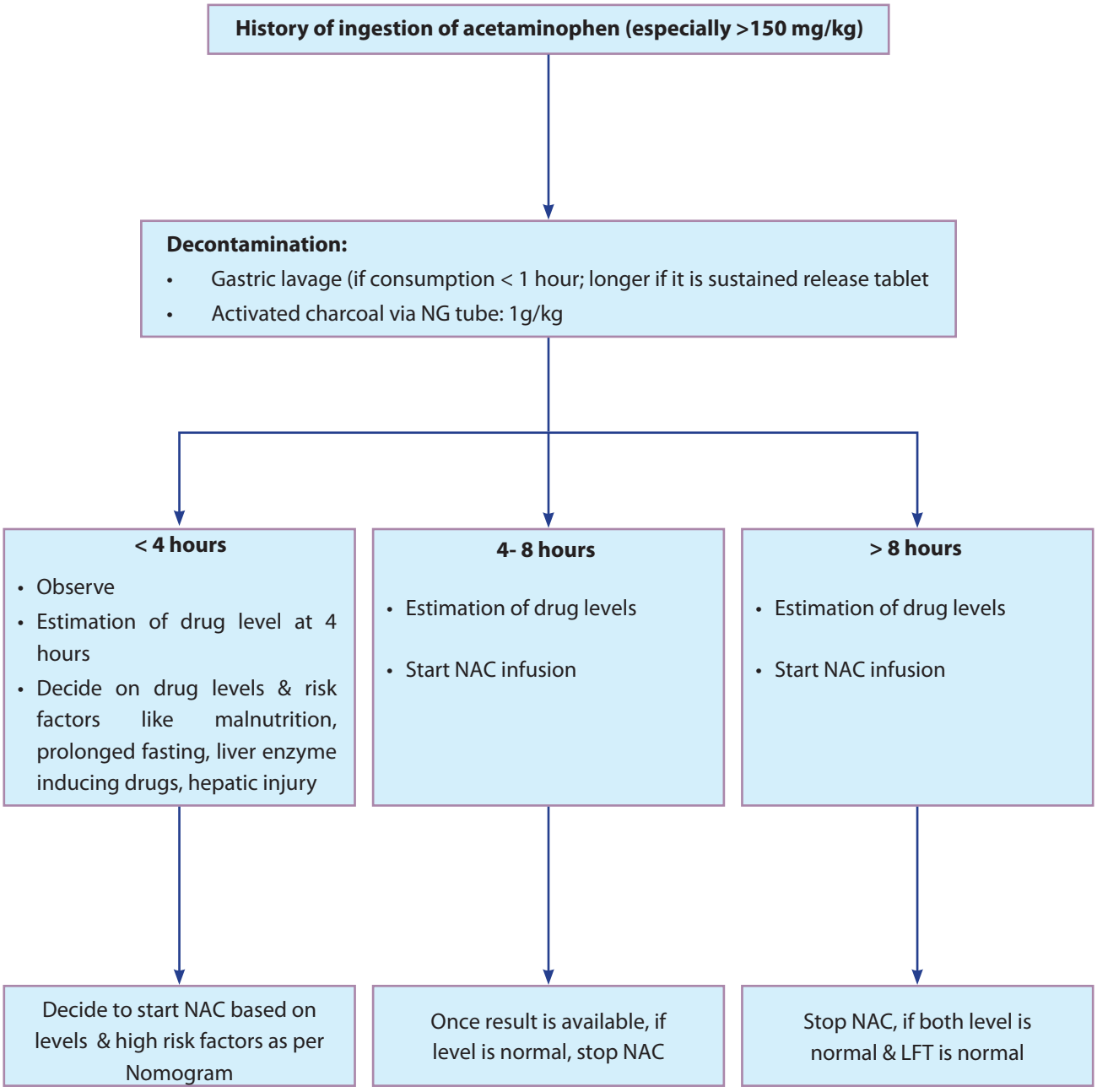
When to refer/ Things to do before referral:

- Complete the emergency management
- Ventilator support not available
- Deterioration of condition with multiple complications

Management of Acetaminophen (Paracetamol) Poisoning

Single or repeated doses more than 150 mg/kg or 4 grams in adolescent in 24 hours cause severe hepatic necrosis and sometimes acute tubular necrosis of the kidneys.

Flowchart for management of acetaminophen poisoning



N- acetylcysteine (NAC) Dose Regimen:

Oral regimen

- Loading dose: 140 mg/kg followed by 70 mg/kg 4 hourly for 17 additional doses (total 1330 mg/kg over 72 hours

IV regimen

- Loading dose: 150 mg/kg over 60 minutes
- Dose 2: 50 mg/kg over 4 hours
- Dose 3: 100 mg/kg over 16 hours

Alternative IV regimen

- Loading dose: 150 mg/kg over 60 minutes followed by 10 mg/kg/h over 24 – 72 hours.

Duration of NAC: Usually oral regimen is for 72 hours and IV for 24 hours.

When to refer /Things to do before referral:

- Complete the emergency management
- Ventilator support if needed and not available
- Deterioration with multiple complication

Management of OPC Poisoning

Clue to suspect

History of exposure, smell of pesticide

Toxidrome: (clinical Manifestation)

Severe toxicity manifests within 6 hours

Muscarinic effects:*

Nicotinic effects: **

Central nervous system: (Agitation, tremors, altered consciousness, and seizures)

Investigations

Estimation of pseudocholinesterase in the blood and RBC cholinesterase (more specific) for confirmation of the diagnosis.

Atropine test: if doubt exists, a trial of atropine of 0.01-0.02 mg/kg IV is given. The subsidence of signs or symptoms of cholinergic effects strongly supports the diagnosis. (Diarrhoea, diaphoresis, urinary frequency, miosis, bradycardia, bronchorrhoea, bronchospasm, emesis, lacrimation, salivation, seizures)

Supportive laboratory tests: CBC, sugar, electrolytes, RFT, LFT, ECG, amylase

Management

Airway and breathing: Positioning, clearing of secretions and ventilation if needed (may need prolonged ventilatory support).

Circulation: Judicious fluid, inotropes and vasopressors.

Decontamination:

Gastric lavage

- Activated charcoal: 1 gm/kg within 1 hour of ingestion

Removal of all clothing and wash skin with soap and water

Mild cases:

Decontamination and close monitoring for 48 -72h

Moderate and severe cases:

- Continue support of ABC
- Ventilatory support
- Atropine (maintenance drip is continued for 24-48 hours or longer)
- Pralidoxime (Continue til clinical recovery or 12-24 hours after atropine has been stopped or 7 days have lapsed)

Doses

Atropine: 0.05 mg/kg IV every 5 – 20 minutes. It can be doubled if no improvement.

- Continue atropinisation (drying up of secretions and absence of bronchoconstriction) and no tachycardia and mydriasis.
- Continue infusion at hourly rate of 10-20% of the total atropine dose.

Pralidoxime

- 25-50 mg/kg (maximum dose 2 g) in 100 ml of saline over 30 minutes.
- It may be repeated after 1-2 hours if the muscle weakness is not relieved and then every 10-12 hours if cholinergic signs reappear.
- A continuous infusion of 10-20 mg/kg/hrs after the initial bolus if improvement seen.

*Muscarinic effects: Diarrhoea, diaphoresis, urinary frequency, miosis, bradycardia, bronchorrhoea, bronchospasm, emesis, lacrimation, salivation, seizures (DUMBELS), and hypotension and cardiac arrhythmias.

**Nicotinic effects: Mydriasis, muscle cramps, tachycardia, weakness, twitching, fasciculation, fl accid paralysis, (MTWTF), respiratory failure and hypertension.

When to refer /Things to do before referral:

- Complete the emergency management
- Ventilator support not available
- Deterioration of condition with multiple complications

Nepal Paediatric Society

Dedicated to the health of all Children

Identification and Management of a Child with Acute Onset of Coma

Coma is

AVPU = V P or U
GCS ≤ 14

ABCCCDE Assessment and Treatment

A Intubate if GCS < 9 or if there is suspected/proven raised intracranial pressure **See 'signs of raised ICP box'**

B High Flow O_2 if SpO_2 <94%, look for acidotic breathing

C If circulation compromised and signs of raised ICP or DKA, give 10ml/kg isotonic fluid bolus

C *Perfom rapid bedside glusoce
If glucose <54mg/dL/3mmol/L, give 5ml/kg of 10% glucose

C If clinical diagnosis of raised ICP before imaging consider sedation, intubation and ventilation and normalise CO_2

D Look or signs of dehydration

E Rash, odour, injury

Core Investigations

glucose (capillary, venous)
blood gas (arterial, venous)
Urine dipstick
Electrolytes, renal, LFTs, CBC
Blood Culture

Start Observations

Record Hourly:
HR, RR, SpO_2, BP, Temp, physical appearance

Continuous
SpO_2, ECG

Consider differential diagnoses

DIFFERENTIAL DIAGNOSIS

Sepsis

Diagnosis
- Temp > 38°C or <35.5°C or ↑ HR or ↑ RR
- WCC >12x10⁹/L or <4x10⁹/L or purpuric rash

Investigation
- CXR
- Urine Culture
- Blood PCR (meningococcus/pneumonococcus)
- Clotting
- Skin swab (from inflamed areas)
- Joint aspiration (if septic arthritis)
- Thick and thin film (for malarial parasites)

Treatment
- Broad sectrum antibiotics ≤ 1 Hour + follow 'Sepsis 6 pathway'
- Early Senior Review

Prolonged fits/Post convulsive

Investigation
- Mg^{2+} and Ca^{2+} and Na^{+}

PICU

Discuss treatment if :
- Na<125mmol/L
- Ionised Ca^{2+} < 0.75mmol/L
- Mg^{2+} M 0.65 mmol/L

And convulsion ongoing despite treatment

Metabolic

Hypoglycaemia
- Hypoglycaemia screen if glucose <54mg/dl(3mmol/L)
- 5ml/kg bolus 10% glucose
- Follow with infusion of 10% glucose (aim 4-7mmol/L)

DKA
- See DKA guidelines

Hyperammonaemia
- If plasma level >100micromol/L
- Free flowing ammonia sample to lab (will need to notify lab and transport on ice)
- SEEK EXPERT METABOLIC ADVICE

Unclear cause

Investigation

Consider additional tests and involvement of specialists e.g. Neurology / Metabolic team
- CT / MRI
- LP
- Urine Toxicology
- Urine organic and plasma aminoacids
- Plasma lactate
- EEG

Hypertensive encephalopathy

Investigation
- Look for signs of raised ICP / papiloedema
- 4 limb BP
- Urinalysis for blood/protein & U&E

PICU & Nephrology
- Discuss with hypertensive (BP >95th centile for age

Shock

Diagnosis
- Long cap refill ,Mottled, cool extremities, fast& diminished peripheral pulses, Low BP or urine output <1ml/kg/hr

Differential
- Sepsis, trauma, anaphylaxis, heart failure

Treatment
- 20ml/kg isotonic fluid bolus
- (10ml/kg if raised ICP or ketoacidosis)

Reassessment
- ↓ HR, ↓ CRT, ↑ Consciousness, ↑ BP, ↑ Urine output, ↓ Lactate or improvement in base excess

PICU
- Consider for intubation / ventilation / inotropes if >40ml/kg given

Raised ICP

Diagnosis
- See 'signs of raised ICP' box
- Refer to NICE bacterial meningitis and meningococcal septicaemia guideline

Treatment
- Discuss acute management with local PICU
- Position head in midline
- 20° head up tilt
- Avoid internal jugular CVCs
- Isotonic fluids (restricted)
- Mannitol or hypertonic saline
- Intubate and ventilate to PaCO2 4.5-5

PICU

Intracranial infection

Differential
- Bacterial meningitis
- Herpes Simplex Encephalitis (HSE)
- Intracranial abscess
- TB meningitis

Investigation
- LP including CSF HSV PCR

Only if no contraindications

Treatment
- **Bacterial** : See NICE guidance CG102
- **HSE** : Acyclovir (consult local ID)
- **TB**: See NICE guidance CG117

Alcohol Intoxication

Investigation
- Consider blood alcohol test

Treatment
- ABCD / APLS
- Treat hypoglycaemia and start maintenance
- Caution for respiratory failure / aspiration / hypotension
- Other concurrent investigation
- Avoid emetogenic drugs

Consider
- Consider other contributory drugs
- Consider contacting local poisons unit

NEUROLOGICAL ASSESSMENT

AVPU SCALE: A = Alert (GCS15) V = Responds to voice(13)
P = Responds to pain (8) U = Unresponsive (6)

GLASGOW COMA SCALE (GCS)

Eyes		Motor		Voice	
4	Open	6	Obeys commands	5	Converses
3	To Command	5	Localises pain	4	Confused
2	To Pain	4	Flexion withdrawal	3	Inappropriate words
1	No response	3	Abnormal flexion	2	Incomprehensible
		2	Abnormal extension	1	No response
		1	No response		No response

GCS MODIFICATIONS IN < 5 YEARS

Motor		Voice	
6	Normal spontaneous movements	5	Alert, babbles, coos, words or sentences to usual ability
5	Localises to supraorbital pain **or** withdraws from touch	4	Less than usual ability, irritable cry
4	Withdraws from nailbed pain	3	Cries to pain
		2	Moans to pain

OBSERVATION NORMAL RANGES

Age	Resp Rate	Heart Rate	Systolic BP
Neonate	60	160	70
<1 year	35-45	110-1160	757
1-5 years	25-30	95-140	80-90
5-12 years	20-25	80-120	90-110
>12 years	Adult	Adult	100-120

SIGNS OF RAISED ICP

BRADYCARDIA (heart rate < 60)	or	HYPERTENSION (MAP > 95th centile for age)
Pupils abnormal: dilatation (unilateral or bilateral)	or	Loss / impairment of reaction to liight
Abdnormal breathing pattern	or	Abnormal posture

LP warning: Do not attempt an LP if:
- There are signs of raised ICP (even if GCS 15)
- GCS < 8 or deteriorating or focal neurological signs or GCS < 12 after seizure lasting >10 minutes
- CT/MRI suggesting CSF pathway obstruction
- Low platelets, abnormal coagulation
- Clinical evidence of shock / meningococcal disease

Treatment of Prolonged Paediatric Seizures

START THE CLOCK: 0 seconds
ABCCCD : recognise and treat : at all times
A: Airway obstruction requiring a jaw thrust, or Airway adjunct?
B: Respiratory failure?
C: Shock?
C C: Raised intracranial pressure, trauma, encephalopathy or focal neurology
D: Signs dehydration?

Don't Ever Forget Glucose:
if blood glucose <3mmol/L / <54mg/dLor cannot measure, treat immediately with 5ml/kg 10% Dextrose

Give IV calcium if infant <3 months

ABC problem YES → **Treat ABC first and always keep checking ABC**

ABC problem NO → **IV access: YES**

ABC problem NO → **IV access: NO**

5 minutes
IV Diazepam 0.2mg/kg *OR*
IV Lorazepam 0.1mg/kg (max 4mg) *OR*
IV Midazolam 0.2mg/kg

Rectal Diazepam 0.5mg/kg

10 minutes
IV Diazepam 0.2mg/kg *OR*
IV Lorazepam 0.1mg/kg (max 4mg) *OR*
IV Midazolam 0.2mg/kg

Rectal Diazepam 0.5mg/kg

15 minutes
Seizure uncontrolled or recurrence?

IV/IO Phenytoin 20mg/kg over 30mins

45 minutes
Seizure uncontrolled or recurrence?

IV Sodium Valproate 25 mg/kg over 1-5 minutes (dilute 1:1 with NS)
OR **IV Phenobarbitone** 20mg/kg over 20 minutes

60 minutes
Seizure uncontrolled or recurrence?

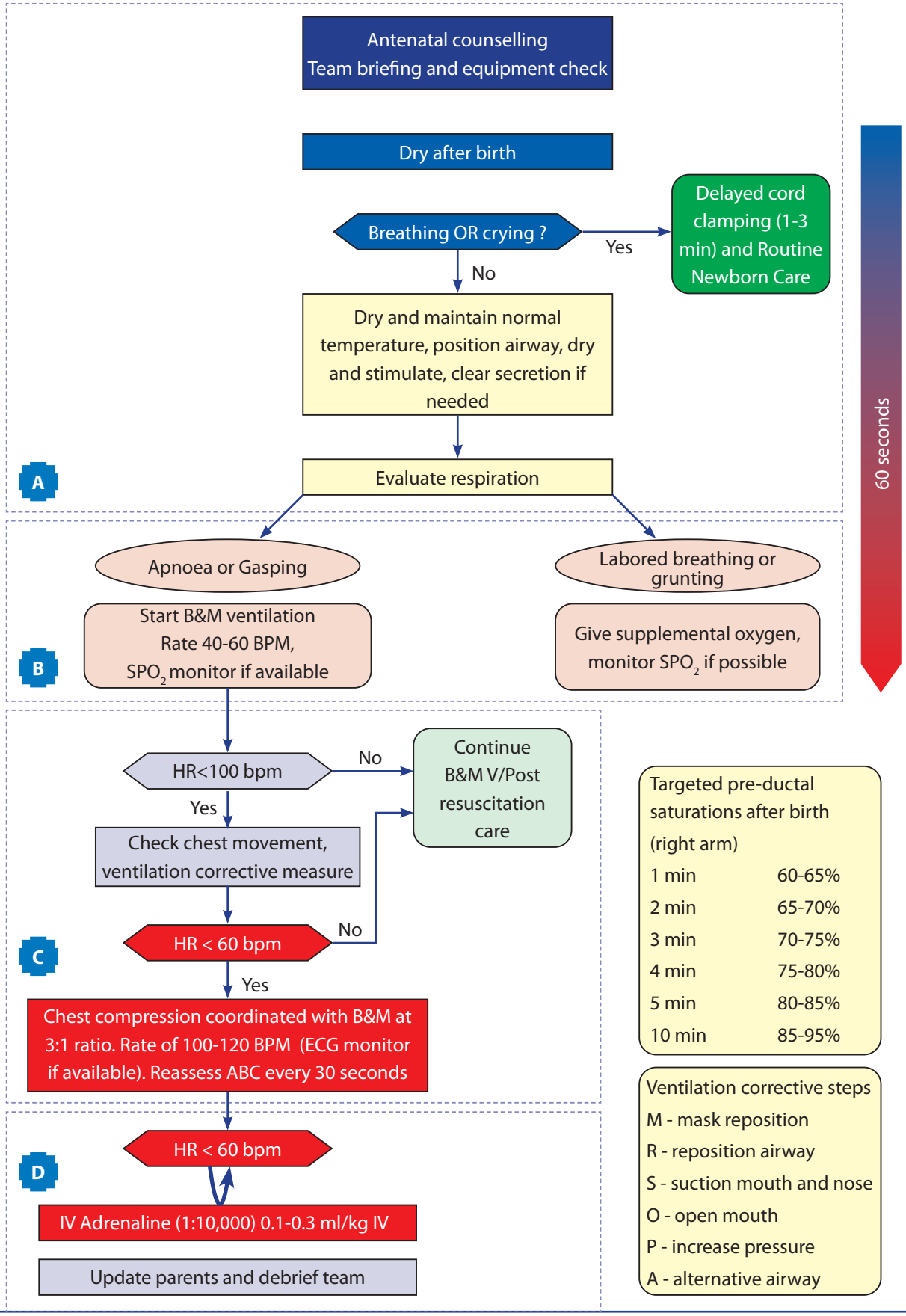
Anaesthetise to terminate seizure
Ketamine 2mg/kg & **Suxamethonium** 1mg/kg ABC and basic Neuroprotection
Propofol or midazolam boluses /infusion

All patients
- Control ABC
- Find and treat cause

Recheck Glucose and treat with 5ml/kg 10% Dex if <54 mg/dL
- IO if no IV access
- Maintain normothermia
- Treat infection: IV ceftriaxone 80mg/kg & aciclovir
- Treat hyponatraemia <125 mmol/L with 3-5 mls/kg of 2.7% sodium chloride
- Do not LP
- Check ammonia

Indications for CT scan
- ? raised ICP
- ? space occupying lesion
- Refractory seizures
- VP shunt in-situ
- Trauma
- New focal seizure
- New neurological deficit
- New prolonged seizure
- NAI
- Intracranial infection

Newborn Resuscitation Algorithm



Targeted pre-ductal saturations after birth (right arm)

1 min	60-65%
2 min	65-70%
3 min	70-75%
4 min	75-80%
5 min	80-85%
10 min	85-95%

Ventilation corrective steps
M - mask reposition
R - reposition airway
S - suction mouth and nose
O - open mouth
P - increase pressure
A - alternative airway

NEPAS Standard
Initial Newborn Care and Kangaroo Mother Care
Maya ko Angalo

ADAPTED FROM WHO Kangaroo Mother Care: a practical guide 2003

CARE FOR ALL BABIES

Initial post-delivery care for all babies:

Skin-To-Skin Care
- Recommended for all babies immediately after delivery to ensure warmth.
- It is also a recommended method when transferring sick newborns to a health facility.

Delayed Cord Clamping
- 1 – 2 minutes

Temperature
- Dry baby then skin to skin care with mum
- Hat, warm blankets
- Skin to skin can happen while cord still unclamped

Early Breastfeeding
- Initiate breast feeding within first hour for all well babies
- Feed on demand- at least 8 times in 24 hours

Feed more frequently if:
- Baby has low blood sugar
- Is small for dates
- Is on standard phototherapy
- If mother feels that there is not enough milk - suckling will encourage lactation

A hungry baby (>34 w) will suckle well and stimulate lactation

If baby is more premature:
- Express milk
- Give by cup or naso-gastric tube

KANGAROO MOTHER CARE

What is KMC

KMC is a method of caring preterm infants by skin-to-skin contact with the mother or family member.
Recommended routine care for all LBW (<2kg)

Premature: < 37 weeks
LBW 1.5 - 2.5 kg
VLBW 1.0 - 1.5 kg
ELBW <1.0 kg

3 components:

- Early, prolonged, and continuous skin-to-skin contact between the mother (or substitute) and her baby
- Exclusive breastfeeding or feeding with breast milk
- Facilitating early safe discharge home with regular follow up

When to start KMC

Should be initiated in healthcare facilities as soon as the newborns are clinically stable. (i.e. those who can breath air and have no major health problems)

KMC recommends continuous or as close to continuous skin-to-skin contact as possible.

>1800g + stable	Start KMC immediately after birth
1500- 1800g	Admit baby to SNCU for first few days due to risk of complications Start intermittent KMC* in SNCU Once stable start continuous KMC
<1500g	NICU admission for preterm care for days to weeks before starting KMC.

*Intermittent KMC - Few sessions of KMC per day started from SNCU or NICU and duration of each session should be not less than an hour.

When to discharge home

Once continuous KMC is established, mother-baby dyad can be discharged from hospital once they **fulfil discharge criteria**:

- Parents are confident to care the baby at home and ready to bring back the baby for scheduled follow-up
- Baby is feeding well, gaining adequate weight : weight gain of > 15-20gm/kg/day for 3 consecutive days, on exclusive breast feeding
- Maintaining stable body temperature in KMC position
- All other treatments e.g. phototherapy and antibiotics have been completed
- As a guide, services must plan at least 1 visit for every preterm week

Why do KMC?

Temperature regulation:
Baby stays warmer by keeping the baby skin-to-skin with the mother or a substitute such as the father.

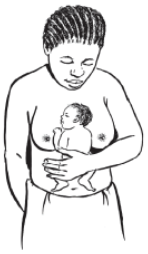
Supports nutrition:
Through continuous skin to skin contact mother can breastfeed her baby frequently and exclusively
Mother makes more milk and has a better chance of breastfeeding
Baby has improved weight gain

Multiple additional benefits:

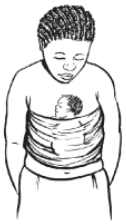
- Baby has decreased pain
- Reduces risk of cross infection
- Baby has improved heart rate and breathing rate
- Tactile stimulus reduces apnoea episodes
- Baby cries less and has lower stress levels
- Baby has improved sleep
- Improves baby and caregiver bonding
- Baby has better brain growth and development

How to do KMC

KMC positioning



Securely wrap the baby in KMC position



Put on loose clothing over the wrap

For Staff	For Parents
• Be aware of plan for KMC • Be available to assist mother/caregiver with positioning, ensure monitoring attached if required etc. • KMC can be done at baby's cotside in a chair • Keep room warm but not too hot • Position baby upright between breasts, skin to skin • Mother and baby covered with blanket or mother's shirt • Ensure mother comfortable • Advise parents to plan to spend **at least 1 hour** doing KMC at a time	• Shower before coming to hospital • Ensure no rashes or wounds on chest • Wear loose fitting shirt • Do not smoke before doing KMC • Eat and use toilet before starting KMC • Baby should only be in nappy, no other clothes • Mother/ caregiver should have baby on their bare chest (no bra) • Blanket/ shirt over both baby and mother/caregiver • Make yourself comfortable; feet up, rest and enjoy time with your baby

Starting KMC in your hospital: What to consider

Awareness

Training and information for staff and parents

- KMC should be discussed with mother as soon as preterm baby is born the mother as soon as a preterm baby is born and offered to her as an alternative to the conventional methods when the baby is ready.
- KMC does not require any more staff than conventional care. Existing staff (doctors and nurses) should have basic training in breastfeeding and adequate training in all aspects of KMC as described in this Standard.

Practicalities

- Doing bedside KMC even on sickest babies: Keep monitoring on
- Food and water for mothers
- Comfortable bed / chair
- In the room support
- Open clothing for mums and changing place

Privacy

- Privacy with screens
- Enough space around cot for reclining chair
- Reduce noise

Record keeping

- Documenting length and frequency of KMC sessions

Paediatric Vital Signs

Age	Heart Rate	Respiratory Rate
Newborn - 3 months	120 - 160	25 - 50 (up to 60 in newborns)
4 months - 11 months	110 - 160	25 - 45
12 - 24 months	100 - 150	20 - 35
2 - 4 years	90 - 140	20 - 30
5 - 11 years	80 - 120	16 - 30
>12 years	60 - 110	12 - 20

Adapted from APLS

Oxygen targets:

- Known Pneumonia or Bronchiolitis: Aim SpO2 >92%
- In all other cases: Aim Sp02 >94%

F-75 Reference Card - Volume of F-75 to give for children of different weights

Weight of child (kg)	Volume of F-75 per feed (ml)[a]			Daily total (130 ml/kg)	80% of daily total[a] (minimum)
	Every 2 hours[b] (12 feeds)	Every 3 hours[c] (8 feeds)	Every 4 hours (6 feeds)		
2.0	20	30	45	260	210
2.2	25	35	50	286	230
2.4	25	40	55	312	250
2.6	30	45	55	338	265
2.8	30	45	60	364	290
3.0	35	50	65	390	310
3.2	35	55	70	416	335
3.4	35	55	75	442	355
3.6	40	60	80	468	375
3.8	40	60	85	494	395
4.0	45	65	90	520	415
4.2	45	70	90	546	435
4.4	50	70	95	572	460
4.6	50	75	100	598	480
4.8	55	80	105	624	500
5.0	55	80	110	650	520
5.2	55	85	115	676	540
5.4	60	90	120	702	560
5.6	60	90	125	728	580
5.8	65	95	130	754	605
6.0	65	100	130	780	625
6.2	70	100	135	806	645
6.4	70	105	140	832	665
6.6	75	110	145	858	685
6.8	75	110	150	884	705
7.0	75	115	155	910	730
7.2	80	120	160	936	750
7.4	80	120	160	962	770
7.6	85	125	165	988	790
7.8	85	130	170	1014	810
8.0	90	130	175	1040	830
8.2	90	135	180	1066	855
8.4	90	140	185	1092	875
8.6	95	140	190	1118	895
8.8	95	145	195	1144	915
9.0	100	145	200	1170	935
9.2	100	150	200	1196	960
9.4	105	155	205	1222	980
9.6	105	155	210	1248	1000
9.8	110	160	215	1274	1020
10.0	110	160	220	1300	1040

[a] Volumes in these columns are rounded to the nearest 5ml.

[b] Feed 2-hourly for at least the first day. Then, when little or no vomiting, modest diarrhoea <5 watery stools per day), and finishing most feeds, change to 3-hourly feeds.

[c] After a day on 3-hourly feeds: If no vomiting, less diarrhoea, and finishing most feeds, change to 4-hourly feeds.

Volume of F-75 for Children with severe (+++) Oedema

Weight with +++ oedema (kg)	Volume of F-75 per feed (ml)[a]			Daily total (100 ml/kg)	80% of daily total[a] (minimum)
	Every 2 hours[b] (12 feeds)	Every 3 hours[c] (8 feeds)	Every 4 hours (6 feeds)		
3.0	25	40	50	300	240
3.2	25	40	55	320	255
3.4	30	45	60	340	270
3.6	30	45	60	360	290
3.8	30	50	65	380	305
4.0	35	50	65	400	320
4.2	35	55	70	420	335
4.4	35	55	75	440	350
4.6	40	60	75	460	370
4.8	40	60	80	480	385
5.0	40	65	85	500	400
5.2	45	65	85	520	415
5.4	45	70	90	540	430
5.6	45	70	95	560	450
5.8	50	75	95	580	465
6.0	50	75	100	600	480
6.2	50	80	105	620	495
6.4	55	80	105	640	510
6.6	55	85	110	660	530
6.8	55	85	115	680	545
7.0	60	90	115	700	560
7.2	60	90	120	720	575
7.4	60	95	125	740	590
7.6	65	95	125	760	610
7.8	65	100	130	780	625
8.0	65	100	135	800	640
8.2	70	105	135	820	655
8.4	70	105	140	840	670
8.6	70	110	145	860	690
8.8	75	110	145	880	705
9.0	75	115	150	900	720
9.2	75	115	155	920	735
9.4	80	120	155	940	750
9.6	80	120	160	960	770
9.8	80	125	165	980	785
10.0	85	125	165	1000	800
10.2	85	130	170	1020	815
10.4	85	130	175	1040	830
10.6	90	135	175	1060	850
10.8	90	135	180	1080	865
11.0	90	140	185	1100	880
11.2	95	140	185	1120	895
11.4	95	145	190	1140	910
11.6	95	145	195	1160	930
11.8	100	150	195	1180	945
12.0	100	150	200	1200	960

Volumes in these columns are rounded to the nearest 5ml. Feed 2-hourly for at least the first day. Then, when little or no vomiting, modest diarrhoea (<5 watery stools per day) and finishing most feeds, change to 3-hourly feeds. After a day on 3-hourly feeds: if no vomiting, less diarrhoea, and finishing most feeds, change to 4-hourly feeds.

F-100 Reference Card - Range of Volumes for Free-Feeding with F-100

Weight of Child (kg)	Range of volumes per 4-hourly feed of F-100 (6 feeds daily)		Range of daily volumes of F-100	
	Minimum (ml)	Maximum (ml)[a]	Minimum (150 ml/kg/day)	Maximum (220 ml/kg/day)
2.0	50	75	300	440
2.2	55	80	330	484
2.4	60	90	360	528
2.6	65	95	390	572
2.8	70	105	420	616
3.0	75	110	450	660
3.2	80	115	480	704
3.4	85	125	510	748
3.6	90	130	540	792
3.8	95	140	570	836
4.0	100	145	600	880
4.2	105	155	630	924
4.4	110	160	660	968
4.6	115	170	690	1012
4.8	120	175	720	1056
5.0	125	185	750	1100
5.2	130	190	780	1144
5.4	135	200	810	1188
5.6	140	205	840	1232
5.8	145	215	870	1276
6.0	150	220	900	1320
6.2	155	230	930	1364
6.4	160	235	960	1408
6.6	165	240	990	1452
6.8	170	250	1020	1496
7.0	175	255	1050	1540
7.2	180	265	1080	1588
7.4	185	270	1110	1628
7.6	190	280	1140	1672
7.8	195	285	1170	1716
8.0	200	295	1200	1760
8.2	205	300	1230	1804
8.4	210	310	1260	1848
8.6	215	315	1290	1892
8.8	220	325	1320	1936
9.0	225	330	1350	1980
9.2	230	335	1380	2024
9.4	235	345	1410	2068
9.6	240	350	1440	2112
9.8	245	360	1470	2156
10.0	250	365	1500	2200

[a]Volumes per feed are rounded to the nearest 5ml