Republic of Rwanda
Ministry of Health

Rwanda Biomedical Centre
Healthy People, Wealthy Nation

BASIC PAEDIATRIC PROTOCOL

Nov. 2023 Edition

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Rwanda Basic Paediatric Protocol is a standard Pocket Book for use by all Paediatric Emergency Providers at Hospital level.

FOREWORD

In 2015, the world set out new targets in the Sustainable Development Goals (SDGs) to be achieved by 2030. The proposed SDG target for child mortality aims to end preventable deaths of newborns and children under 5 years of age. SDGs targets for all countries to reduce neonatal mortality to 12 deaths per 1,000 live births and under-5 mortalities to 25 deaths per 1,000 live births. Rwandan ministry of health has a plan of achieving this target through improving the care offered to critically ill neonates and children. Empowering clinicians to develop and implement best practices guided by national guidelines and protocols will result in better patient care and target outcomes.

Children admitted to hospital often die within 24 hours of admission. Many of these deaths could be prevented if very sick children are identified soon after their arrival in the health facility, and treatment is started immediately. This can be facilitated by rapid triage for all children presenting to hospital, identify those needing immediate emergency care and provide the best evidence guided treatment.

Basic paediatric protocols is a pocketbook which contains guidelines on classification of illness severity, criteria for triage, admission, and inpatient management of the major causes of childhood mortality such as pneumonia, diarrhoea, malaria, severe malnutrition, meningitis, HIV and neonatal conditions. The guidelines target management of the seriously ill newborn or child in the first 24 - 48 hours of arrival at hospital.

It will be used in all hospitals in Rwanda as a guide for doctors, nurses and other health workers who take care of sick newborns and children.

This edition includes the principles of good care, important hospital policies, Clinical audits and use of the protocols, Hand Hygiene, Assessment and Admission, drugs and their dosages and intravenous fluid charts. In addition to this protocol provides paediatric clinical emergency case management. It has user friendly algorithms which will be used as job aides in emergency rooms, paediatric wards, delivery rooms and newborn units.

Prof Claude Mambo MUVUNYI

Director General,
Rwanda Biomedical Centre (RBC)

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We offer our sincere gratitude and appreciation to different people and organizations for their guidance, feedback, leading and coordinating the efforts to develop this essential protocol. Our appreciation also goes towards partners and individuals who contributed to the realization of this manual, especially, Rwanda Paediatric Association, USAID, USAID Ingobyi Activity, PIH, WHO, ENABEL, Save the Children, Health Builders and UNICEF.

Special thanks to all members of RMNCH Technical Working Group and subgroups, our distinguished development partners as well as technical experts including paediatricians and other individuals who specifically played a critical role in overseeing and coordination of this work until completion.

Dr Aline UWIMANA

MCCH DIVISION MANAGER
Rwanda Biomedical Center

Division Manager,
MCCH Division, (RBC)

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INTRODUCTION

The Emergency Triage Assessment and Treatment plus (ETAT+) guidelines provide guidance on the management of most common emergency conditions in children presenting at the health facility. These include but are not limited to airway obstruction and other breathing problems; circulatory impairment or shock; severely altered CNS function (coma or convulsive seizures); and severe dehydration which require urgent appropriate care to prevent death. The guidelines target management of the seriously ill newborn or child in the first 24 - 48 hours of arrival at hospital. ETAT + training is designed to introduce most up to date approaches to providing high quality care and improve safety e.g. reducing Drug errors using the simple resources available.

The ETAT+ training focuses on the FOUR ABC's

1. An ABCD for triage of all children
2. An ABC for infant / child life support
3. An ABCD to guide the provision of emergency care when there are signs of life
4. An ABC for newborn resuscitation

THE PRINCIPLES OF GOOD CARE

1. Facilities must always have basic paediatric and neonatal equipment and drugs in pharmacy. Resuscitation equipment and drugs should always be available on the ward (resuscitation trolley) checked daily and replaced when they are missing.
2. Sick children coming to hospital must be immediately assessed (triage) and if necessary, provided with emergency treatment as soon as possible.
3. Assessment of illness severity and diagnosis must be thorough and treatment carefully planned. All stages should be accurately documented.
4. The protocols provide a minimum standard and safe approach to most, but not all, common problems. Care needs to be taken to identify and treat even children with less common problems rather than just applying the protocols without thinking.
5. All treatments should be clearly and carefully prescribed on patient treatment sheets with doses checked by nurses before administration. (Please write dose frequency as 6hourly, 8hourly, 12hourly etc. rather than QID, TID etc.).
6. The parents / caretakers need to understand what the illness and its treatment are. They can often then provide invaluable assistance caring for the child. **Being polite to parents considerably improves communication.**
7. The response to treatment needs to be assessed. For very severely ill children, this may mean regular review in the first 3 –6 hours of admission or more frequently if needed. Such review needs to be planned between medical and nursing staff.
8. Correct supportive care – particularly adequate feeding, use of oxygen and fluids - is as important as disease specific care.
9. Laboratory tests should be used appropriately and use of unnecessary drugs needs to be avoided.
10. An appropriate discharge and follow up plan need to be made when the child leaves the hospital.
11. Good hand washing practices and good ward hygiene improve outcomes for admitted newborns and children.
12. Children should be seen separately from adults and have a separate area at all emergency departments.
13. Always consider taking all necessary samples before starting antibiotherapy (LP, cultures….), but do not delay antibiotic administration is severely ill children.

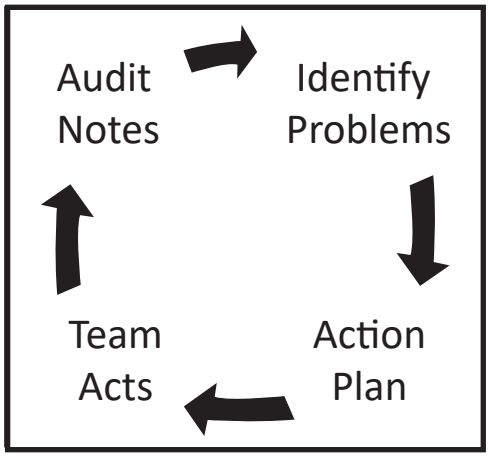
SPECIFIC POLICIES

1. All children admitted to hospital and all new-borns requiring medical treatment – even if born in hospital – should have their own inpatient number and set of medical records. Admission should ideally be recorded using a standardized paediatric or newborn admission record.
2. Medical records are a legal document and entries should be clear, accurate and signed with a date and time of the entry recorded.
3. All paediatric admissions should be assessed for the risk of HIV infection and once suspected be offered HIV testing using current national HIV prevention and treatment guidelines.
4. All newborn admissions aged < 14 days should receive Vitamin K unless there is evidence that it has already been given.
5. Routine immunization status should be checked and those with missed vaccines must be oriented to the Health Center for immunization at the earliest next immunization day, after discharge.

ADMISSION AND ASSESSMENT

1. All admitted children must have anthropometric measures (weight, height and head circumference) recorded, weight should be used for calculation of fluids / feeds and drug doses.
2. Length / Height and MUAC should be measured with weight for height (WHZ) and height for age (HAZ) plotted and used to establish nutritional status.
3. Respiratory rates must be counted for 1 minute.
4. Conscious level should be assessed on all children admitted using the AVPU scale where:
   - A = Alert and responsive
   - V = responds to Voice or Verbal instructions, e.g. turns head to mother's call. These children may still be lethargic or unable to drink / breastfeed (prostrate).
   - P = responds to Pain appropriately. In a child older than 9 months, a painful stimulus such as rubbing your knuckles on the child's sternum should result in the child pushing the hand causing the pain away. In a child 9 months and younger, they do not reliably locate a painful stimulus. If these children bend the arms towards the pain and make a vigorous, appropriate cry, they respond to pain. Children in this category must be lethargic or unable to sit up or drink / breastfeed (prostrate).
   - U = Unconscious, cannot push a hand causing pain away or fail to make a response at all.
5. Children with AVPU <A should have their blood glucose checked. If this is not possible treatment for hypoglycaemia should be given. The sickest newborns/children on the ward should be near the nursing station and prioritized for re-assessment/observations.

CLINICAL AUDIT AND USE OF THE PROTOCOLS



1. Clinical audit is aimed at self-improvement and is not about finding who to blame.
2. The aim is for hospitals to diagnose key problems in providing care - it is essential that identifying problems is linked to suggesting who needs to act, how and by when to implement solutions. Then follow up on whether progress is being achieved with new audits.
3. Identify new problems, start a new cycle of clinical audit and plan new actions etc, which forms a habit of continuous quality improvement clinical audits.
4. Hospitals should have an audit team comprising 6 to 12 members, led by a senior clinician and including nurses, administration, laboratory, nutrition staff etc. 1-2 people, usually medical officer and nurses should be selected on a rotating basis to perform the audit and report back to the audit team and department staff. All emergency cases including death cases should be audited.

Records of all deaths should be audited within 24 hours of death

- Use an audit tool to compare care given with recommendations in these protocols and other guidelines (e.g. for TB, HIV/AIDS) and the most up to date textbooks for less common conditions.
- Was care reasonable? Look for where improvements could be made in the system of care before and during referral, on arrival in hospital (care in the OPD / MCH, emergence services etc), on admission to the ward, or follow up on the ward and sign out between shifts.
- Look at assessments, interpretation of vital signs, diagnoses, investigations, treatments and whether what was planned was done and recorded. Check doses and whether drugs / fluids / feeds are correct and actually given and if clinical review and nursing observations were adequate – **if it is not written down it was not done!**
- Look at several cases for each meeting and summarize the findings looking for the major things that are common and need improving. Then record the summaries for reporting with highlight of recommendation for improvement.

HAND HYGIENE

1. Good hand hygiene saves lives
2. Gloves can easily become contaminated too – they do not protect patients
3. Alcohol hand-rubs (or alcohol with glycerin) are also recommended.
    - If hands are visibly dirty, they must be cleaned first with soap and water before drying and using alcohol hand-rub
    - The alcohol hand-rub must be allowed to dry off to be effective
    - If alcohol hand-rub is not available, then hands should be washed with simple soaps and water and air-dried or dried with disposable paper towels
4. Hand hygiene should be performed:
    - After contact with any body fluids
    - Before and after touching a patient and most importantly before and after handling cannula, giving drugs or performing a procedure. Suction)
    - Before and after touching potentially contaminated surfaces (e.g. cot sides, dirty mattresses, stethoscopes)
    - Patients and caregivers should wash hands carefully after visits to the bathrooms or contact with body fluids
    - Recipients for alcohol and soap should be regularly maintained according to infection control guidelines
    - Instruments (e.g. stethoscope) should also be cleaned with appropriate anti-septic solution.

Figure 1: Use of Alcohol Hand Rub / Gel

Figure 2: *Appropriate Hand-Washing with Soap and Water*

PAEDIATRIC EMERGENCY DRUGS DOSAGE AND INITIAL IV FLUIDS

Diazepam and Glucose (See algorithm page 23)

Weight (kg)	Diazepam				Glucose *2.5mls/kg of 10% glucose over 2 - 3 minutes*	
	Iv		Per rectum*		Iv	
	Dose, 0.3mg/kg	ml of 10mg/2ml solution	Dose, 0.5mg/kg	ml of 10mg/2ml solution	Total Volume of 10% Glucose	To make 10% glucose
3.00	1.0	0.20	1.5	0.3	7.5	**50% Glucose and water for injection:**
4.00	1.2	0.25	2.0	0.4	10	**10 ml syringe:**
5.00	1.5	0.30	2.5	0.5	12.5	✓ 2 ml 50% Glucose
6.00	1.8	0.35	3.0	0.6	15	✓ 8 ml Water
7.00	2.1	0.40	3.5	0.7	17.5	**20 ml syringe:**
8.00	2.4	0.50	4.0	0.8	20	✓ 4 ml 50% Glucose
9.00	2.7	0.55	4.5	0.9	22.5	✓ 16 ml Water
10.00	3.0	0.60	5.0	1.0	25	
11.00	3.3	0.65	5.5	1.1	27.5	
12.00	3.6	0.70	6.0	1.2	30	**50% Glucose and 5% Glucose:**
13.00	3.9	0.80	6.5	1.3	32.5	
14.00	4.2	0.85	7.0	1.4	35	**10 ml syringe:**
15.00	4.5	0.90	7.5	1.5	37.5	✓ 1 ml 50% Glucose
16.00	4.8	0.95	8.0	1.6	40	✓ 9 ml 5% Glucose
17.00	5.1	1.00	8.5	1.7	42.5	**20 ml syringe:**
18.00	5.4	1.10	9.0	1.8	45	✓ 2 ml 50% Glucose
19.00	5.7	1.15	9.5	1.9	47.5	

**(The whole syringe barrel of a 1ml or 2ml syringe should be inserted gently so that PR Diazepam is given at a depth of approx. 4 - 5cm)*

Other Anticonvuls	**Phenobarbital Loading dose, 15mg/kg** ***(use 20mg/kg for neonates)***	**Phenobarbital maintenance, 5mg/kg daily** ***(Based on a 30mg tablet)***		**Phenytoin, loading dose, 15mg/kg**	**Phenytoin, maintenance 5mg/kg daily**
	iv / oral	**iv–mg**	**oral – tabs**	**iv / oral / ng**	**iv / oral / ng**
2.0	30	10	-	***Tablets may be crushed and put down NGT if required.***	
2.5	37.5	12.5			
3.0	45	15	½ tab	45	15
4.0	60	20		60	20
5.0	75	25		75	25
6.0	90	30	1 tab	90	30
7.0	105	35		105	35
8.0	120	40		120	40
9.0	135	45	1½ tab	135	45
10.0	150	50		150	50
11.0	165	55		165	55
12.0	180	60	2 tabs	180	60
13.0	195	65		195	65
14.0	210	70		210	70
15.0	225	75	2½ tab	225	75
16.0	240	80		240	80
17.0	255	85		255	85
18.0	270	90	3 tabs	270	90
19.0	285	95		285	95
20.0	300	100		300	100

Intravenous / intramuscular antibiotic doses – Ages 7 Days and Older

Weight (kg)	**BenzylPenicillin (= Peni G)** iv / im	**Ampicillin or Flucloxacillin** iv / im	**Cefotaxime** iv / im	**Gentamicin** im or iv over 3-5 min.	**Ceftriaxone** iv/im	**Metronidazole** iv
	50,000iu/kg/dose	**50mg/kg/dose ***	**50mg/kg/dose Double dose (100 mg/kg) if meningitis or severe sepsis**	**7.5 mg/kg/dose**	**Neonates >7 days and children: 50mg/kg /dose****	**7.5mg/kg/dose**
	6-hourly	**8-hourly**	**< 1 week give 12-hourly, > 1 week give 8-hourly**	**24-hourly**	**24-hourly Meningitis/ V. Severe Sepsis give 12-hourly**	**< 1 month give 12-hourly, ≥ 1m give 8-hourly**
3.0	150,000	150	150	20	150	20
4.0	200,000	200	200	30	200	30
5.0	250,000	250	250	35	250	35
6.0	300,000	300	300	45	300	45
7.0	350,000	350	350	50	350	50
8.0	400,000	400	400	60	400	60
9.0	450,000	450	450	65	450	65
10.0	500,000	500	500	75	500	75
11.0	550,000	550	550	80	550	80
12.0	600,000	600	600	90	600	90
13.0	650,000	650	650	95	650	95
14.0	700,000	700	700	105	700	105
15.0	750,000	750	750	110	750	110
16.0	800,000	800	800	120	800	120
17.0	850,000	850	850	125	850	125
18.0	900,000	900	900	135	900	135
19.0	950,000	950	950	140	950	140
20.0	1,000,000	1000	1000	150	1000	150

NB. Double Ampicillin doses to 100 mg/kg if treating Meningitis

*** Not recommended if jaundiced***

INITIAL MAINTENANCE FLUIDS/ FEEDS

Normal Renal Function.

- All children with normal urine output and renal function should have potasium in their maintenance fluids. When treating hypokaelemia give 1-2 mmol / kg / day of potassium preferably using oral route.
- Feeding should start as soon as safe and infants may rapidly increase to 150mls/kg/day of feeds as tolerated.
- To make dextrose 5% with Ringers Lactate, add 50mls 50% dextrose to 450mls Ringer's Lactate for maintenance fluid.

Weight, kg	Volume in 24 hours	Rate in ml /	Drip rate* - adult iv set, 20 drops = 1ml	Drip rate* - paediatric burette 60 drops = 1ml	3hourly bolus feed volume
3	300	13	4	13	40
4	400	17	6	17	50
5	500	21	7	21	60
6	600	25	8	25	75
7	700	29	10	29	90
8	800	33	11	33	100
9	900	38	13	38	110
10	1000	42	14	42	125
11	1050	44	15	44	130
12	1100	46	15	46	140
13	1150	48	16	48	140
14	1200	50	17	50	150
15	1250	52	17	52	150
16	1300	54	18	54	160
17	1350	56	19	56	160
18	1400	58	19	58	175
19	1450	60	20	60	175
20	1500	63	21	63	185
21	1525	64	21	64	185
22	1550	65	22	65	185
23	1575	66	22	66	185
24	1600	67	22	67	200
25	1625	68	23	68	200

**** Drip rate in drops per minute***

PAEDIATRIC ADMISSION RECORDS, ESSENTIAL CLINICAL SYMPTOMS AND SIGNS

The aim of understanding paediatric admission records (PAR) and essential clinical symptoms and signs is to:

- Identify minimum, essential elements of history and examination required to aid management of common diseases
- Define key symptoms of common and serious diseases
- Define and demonstrate key clinical signs of common and serious diseases
- Improve communication between professionals and standardise care.

Understanding of common symptoms and signs is essential in caring for the sick children. They are the basis for identifying life threatening conditions that need urgent intervention.

The signs and symptoms will:

- Differentiate one illness from the other
- Help assessment of nature and severity of illness
- Guide basic treatment in the majority of admitted children.
- Be used to monitor the progress of the disease condition and response to treatment
- Determine the prognosis of a particular disease.
- Improve health worker's ability to communicate with each other about the condition of a patient

Always be on the lookout for additional important signs

The duration of symptoms may be a pointer to a particular disease. For example, cough for more than two weeks may entail asking history of TB contact. This is due to the fact that prolonged cough is a pointer to TB rather than acute pneumonia.

Note: Refer to PAR in paediatric patient files for demonstration

Essential Clinical Symptoms and Signs

Some of the common symptoms and signs in children are:

- ***Airway***:
  - ✓ Abnormal airway sounds:
    - Stridor
    - Wheezing
    - Grunting
  - ✓ drooling or inability to handle secretion
- ***Breathing adequacy***
  - Respiratory Rate – formally counted for 1 minute!
  - Cyanosis
  - Oxygen saturation < 90%
  - Head nodding
  - Grunting (infants - expiratory)
  - Chest indrawing
  - Acidotic / deep breathing
  - Wheeze / crackles
- ***Circulation*:**
  - Cold extremities
  - Pallor
  - signs of dehydration: weak pulses, increased capillary refill time, decreased skin turgor, sunken eyes etc.
- ***Disability***: the AVPU Scale is used
  - A = Alert, V = Responds to a voice, P = Responds appropriately to pain, U = Unresponsive / Unconscious
- ***General/Nutrition signs***
  - Marked Jaundice
  - Severe wasting
  - Oedema

Check for High Risk Vital signs:

. Temp <36° or >39°
. SpO2 < 92%
. AVPU other than A:

RR	**< 1 year**	**1-4 years**	**5-12 years**
High	50	40	30
Low	25	20	10
HR	**< 1 year**	**1-4 years**	**5-12 years**
High	180	160	140
Low	< 90	< 80	< 70

All these signs should be looked for to make differential diagnoses and appropriate intervention

TRIAGE OF SICK CHILDREN

Triage is the sorting of children into priority groups according to their medical needs when they first arrive at a health facility in order to place them in one of the following categories:

- Those with **EMERGENCY SIGNS** who require immediate emergency treatment.
- Those with **PRIORITY SIGNS** who should be given priority in the queue so they can be rapidly assessed and treated without delay.
- Those who have no emergency or priority signs and are **NON-URGENT** cases. These children can wait their turn in the queue for assessment and treatment
- Follow the ABCD steps:
    - Airway
    - Breathing
    - Circulation/Coma/Convulsion
    - Dehydration.
- **Airway:** Abnormal airway sounds, stridor, wheezing, grunting, unusual posture e.g. sniffing position, inability to speak, drooling or inability to handle secretion.
- **Breathing:** Cyanosis, dusky skin, tachypnea, bradypnoea, or periods of apnea, chest retractions, use of accessory muscles, nasal flaring, grunting, or audible wheezes across the assessment room.
- **Circulation**: Altered skin signs; pale, mottling, flushing or uncontrolled bleeding.
- **Disability (neuro.)**: Decreased level of consciousness or interaction with environment, inability to recognize family members, unusual irritability, response to pain or stimuli, flaccid or hyperactive muscle tone.

Table 1: ABCD for Triage (Assessment should be in the order of Airway, Breathing, Circulation and Disability. And if there is any problem found, then intervention should be initiated as shown in the table below).

Airway and breathing ❖ Obstructed breathing ❖ Severe stridor ❖ Central Cyanosis ❖ Severe respiratory distress ❖ Weak / absent breathing	IF ANY SIGN IS PRESENT	❖ Immediate transfer to emergency ❖ Start Life support procedures ❖ Give oxygen ❖ Keep warm ❖ Weigh if possible
Circulation Cold Hands with any of: ❖ Capillary refill > 3 seconds ❖ Weak + fast pulse ❖ Slow (<60bpm) or absent pulse ❖ Active bleeding ❖ **Check for severe malnutrition**	IF ANY SIGN IS PRESENT	❖ Immediate transfer to emergency ❖ Start Life support procedures ❖ Give oxygen ❖ Stop any bleeding ❖ Keep warm ❖ Weigh if possible ❖ If no severe malnutrition: Give IV fluids rapidly via venous or intra-osseous lines ❖ If severe malnutrition: Give IV glucose, proceed with full assessment and treatment.
Coma / convulsing / confusion: AVPU = 'P or U' or Convulsions	IF AVPU<A	❖ Immediate transfer to emergency ❖ Manage the airway ❖ If convulsing, give diazepam rectally (If the IV line is installed use it instead of Rectal) ❖ Position the unconscious child ❖ Give IV glucose
Severe Dehydration (only in a child with diarrhoea and/or vomiting ❖ Diarrhoea plus any two of these signs: Lethargy. Sunken eyes, very slow skin pinch, unable to drink or drinks poorly ❖ **Check for severe malnutrition**	IF ANY SIGN IS PRESENT	❖ Immediate transfer to emergency ❖ Make sure the child is warm. ❖ If no severe malnutrition: Insert an IV line and begin giving fluids rapidly following diarrhoea treatment plan C ❖ If severe malnutrition: Rehydrate orally. ❖ Proceed immediately to full assessment and treatment
Priority signs ❖ Tiny - Sick infant aged < 2 months ❖ Temperature – very high > 39.50C or Hypothermia(<35°C) in Severe Acute Malnutrition. ❖ Trauma – major trauma ❖ Pain – child in severe pain ❖ Poisoning – mother reports poisoning	IF ANY SIGN IS PRESENT	❖ These children need prompt assessment: s**hould be in front of the queu, seen in 15 minutes and frequently reassessed while waiting.** ❖ Weigh them ❖ Do baseline observations. ❖ A child with trauma or other surgical problems, should get surgical help or follow surgical guidelines

❖ Restless / Irritable / Floppy ❖ Respiratory distress ❖ Referral – has an urgent referral letter ❖ Malnutrition - Visible severe wasting ❖ Oedema of both feet ❖ Burns – severe burns		
NON-URGENT:	IF NONE OF THE ABOVE SIGNS	**Proceed with assessment and further treatment according to the child's priority**

ABCD FOR INFANT / CHILD BASIC LIFE SUPPORT

Figure 3: Cardio-respiratory collapse

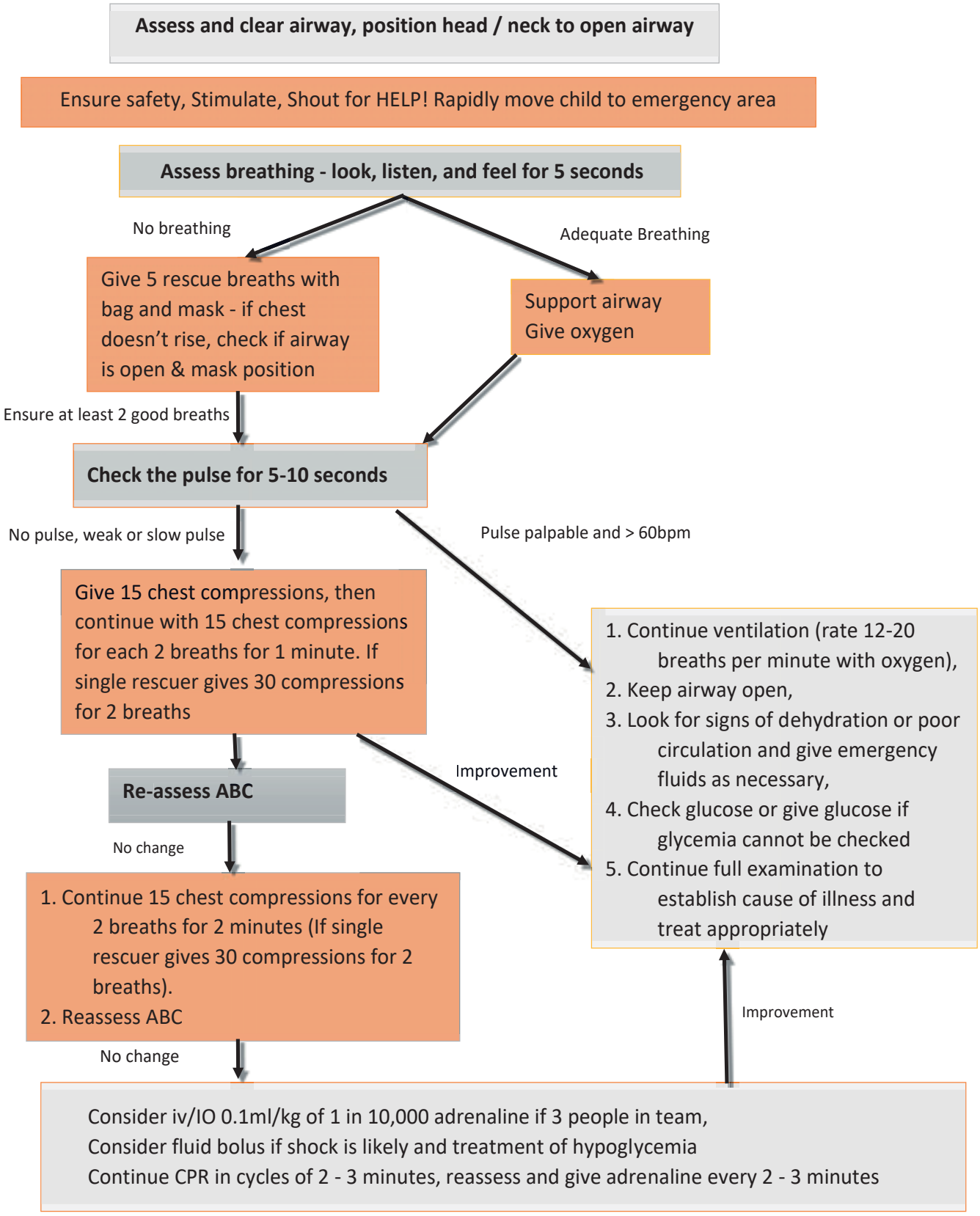
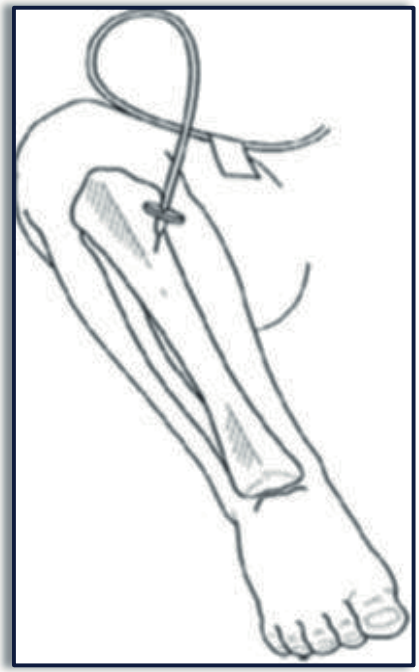


Table 2: *Management of the infant / child with signs of life (without trauma)*

Observe	Safe Stimulate – ***if not Alert*** Shout for Help – ***if not Alert*** Setting for further evaluation	Eye contact / movements Shout unless obviously alert ***If not Alert*** place on resuscitation table ***If alert*** it may be most appropriate to continue evaluation while child is with parent
A	Assess for obstruction by listening for stridor / airway noises. Look in the mouth **if not alert** Position – ***if not Alert*** (appropriate for age)	Position only if not alert and placed on resuscitation bed. Suction (up to where you can see) if indicated **(not in alert child)** Guedel airway only if minimal response to stimulation.
B	Assess adequacy of breathing • Cyanosis? • Check oxygen saturation • Grunting? • Head nodding? • Rapid or very slow breathing? • Indrawing? • Deep / Acidotic breathing ***If signs of respiratory distress listen for wheeze***	**Decide:** • Is there a need for oxygen? • Is there a need for immediate bronchodilators? • Consider early CPAP if available.
C	Assess adequacy of circulation • Large pulse – very fast or very slow? • Coldness of hands and line of demarcation? • Capillary refill? • Peripheral pulse – weak or not palpable? • Check for severe pallor ***If signs of very poor circulation*** • Check for severe pallor • Check for severe malnutrition • Check for severe dehydration	**Decide:** • Does this child have hypovolemic shock due to diarrhea/dehydration? If yes, give a rapid bolus of Ringers Lactate and progress to Plan C fluids for diarrhea/dehydration (If no severe malnutrition) • If there is respiratory distress and circulatory compromise with severe pallor or Hb<5g/dl organize immediate transfusion • If there is circulatory compromise but no shock does the child need Step 1 fluids for severe dehydration? (If no severe malnutrition)
D	Assess AVPU **Check glucose at bedside**	**Decide:** If blood glucose <2.5mmol/l or AVPU<A, give glucose 10%, 2.5mls/kg bolus.

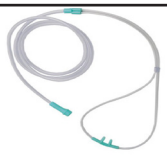
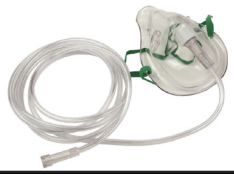
USE OF INTRA-OSSEOUS LINES

- Use IO or bone marrow needle 15-18G if available or 16-21G hypodermic needle if not available
- Clean after identifying landmarks then use sterile gloves and sterilize site
- **Site** – The insertion point is in the midline on the media flat surface of the anterior tibia, 1-3cm (2 finger breath) below the tibia tuberosity on the flat part of the bone
- **Stop** advancing needle when there is a 'sudden give' – then aspirate with 5mls needle.
- Slowly inject 3mls N/Saline looking for any leakage under the skin – if OK attach iv fluid giving set and apply dressings and strap down
- Give fluids as needed – a 20mls or 50mls syringe will be needed for boluses
- Watch for leg / calf muscle swelling
- Replace IO access with iv within 8 hours.
- Contraindicated if fracture or skin infection on site.



Oxygen use and Administration

Table 3: *Oxygen use and administration*

Oxygen Administration Device	**Flow rate and inspired O_2 concentration**
Nasal prongs 	**Neonate** - 1-3L/min **Infant / Child** - 1 - 3 L/min **This will provide O_2 concentration** - approx. 30-35%
Simple face masks 	**Neonate/Infant / Child** - 5-6 L/min **This will provide O_2 concentration** - approx 40-60%
Oxygen face mask with reservoir bag 	**Neonate / Infant / Child** - 10 - 15 L/min **This will provide O_2 concentration** - approx. 80 - 90%

Summary of WHO revised recommendations on shock management

Children **who have shock**, ie, who have all the following signs: cold extremities and a weak and fast pulse and capillary refill >3 s, should receive intravenous fluids and consideration for other treatment as follows:

- Give high-flow oxygen

- 10–20 mL/kg of isotonic crystalloid fluids over 30–60 min

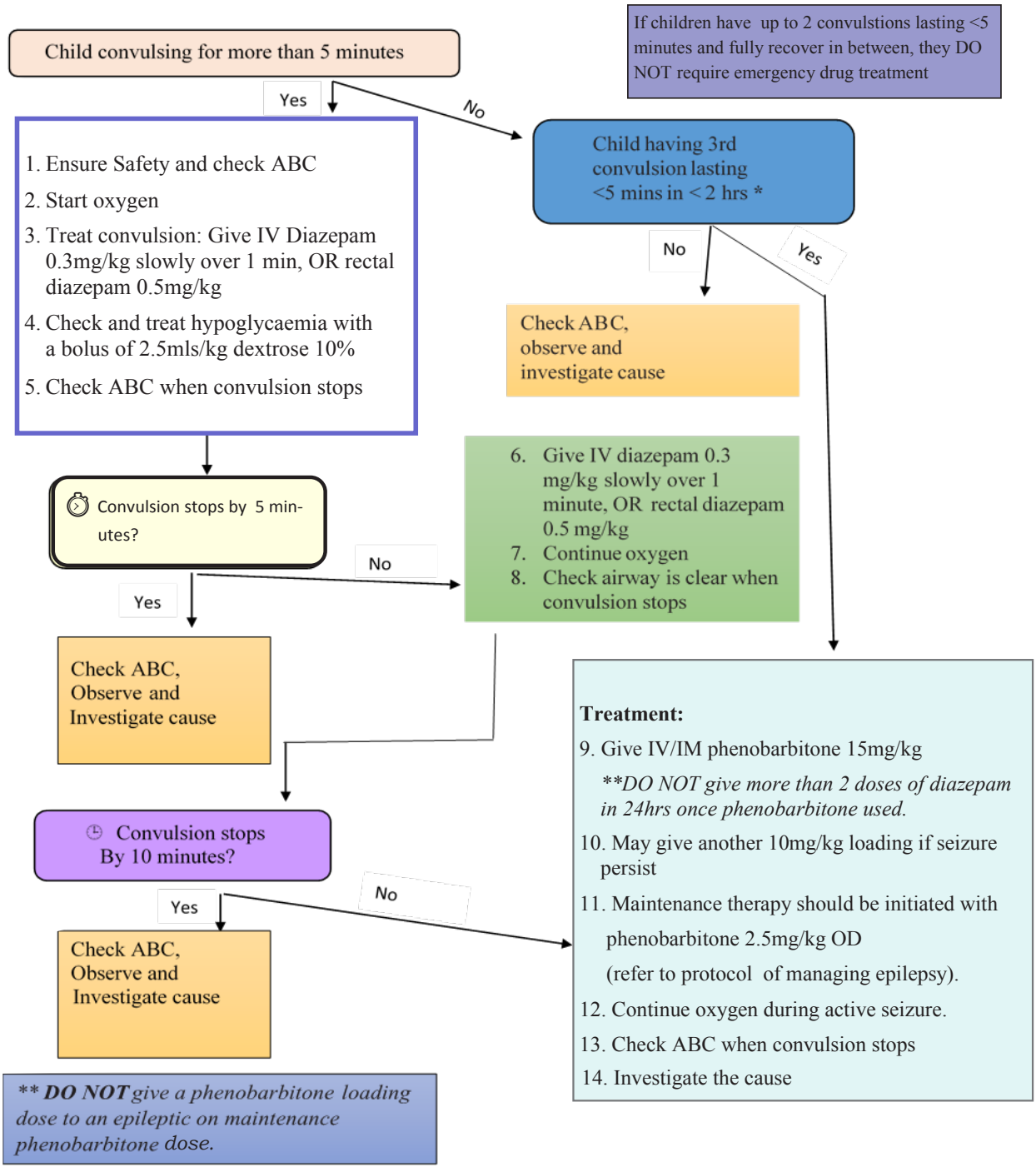
- Monitor the effect of fluid, fully assess to look for an underlying cause of shock If the child is still in shock, then consider a further infusion of 10 mL/kg over 30 min, and at the same time assess the need for other emergency treatments.

- Children with severe acute malnutrition who are in shock should receive 10–15 mL/kg of intravenous fluids over the first hour. Children who improve after the initial infusion should receive only oral or nasogastric maintenance fluids. **Any child who does not improve after 1 h should be given a blood transfusion (10 mL/kg bw slowly over at least 3 h)**

TREATMENT OF CONVULSIONS

Convulsions in the first 1 month of life should be treated with Phenobarbital 20mg/kg as loading dose; if no response, a further 10mg/kg can be given after 20-30 minutes up to a maximum of 40mg/kg/day. (watch for apnea and always have your resuscitation trolley ready). If seizure persist despite maximum dose of phenobarbital give a loading dose of phenytoin at 15kg/kg (senior review advised if available). Check glucose, electrolytes, calcium, FBC, malaria smear and where possible arterial blood gases.

Figure 4: *Treatment of Convulsions for Age >1 month*



ACUTE GASTROENTERITIS WITHOUT SEVERE MALNUTRITION

(For management of children with diarrhoea and acute severe malnutrition, refer to page 39 and 40)

Antibiotics are NOT indicated unless there is dysentery or persistent diarrhea and proven amoebiasis or giardiasis. Diarrhea > 14 days may be complicated by intolerance of ORS – worsening diarrhea – if seen change to IV regimens. All cases to receive Zinc.

Figure 5: Acute gastroenteritis without severe malnutrition

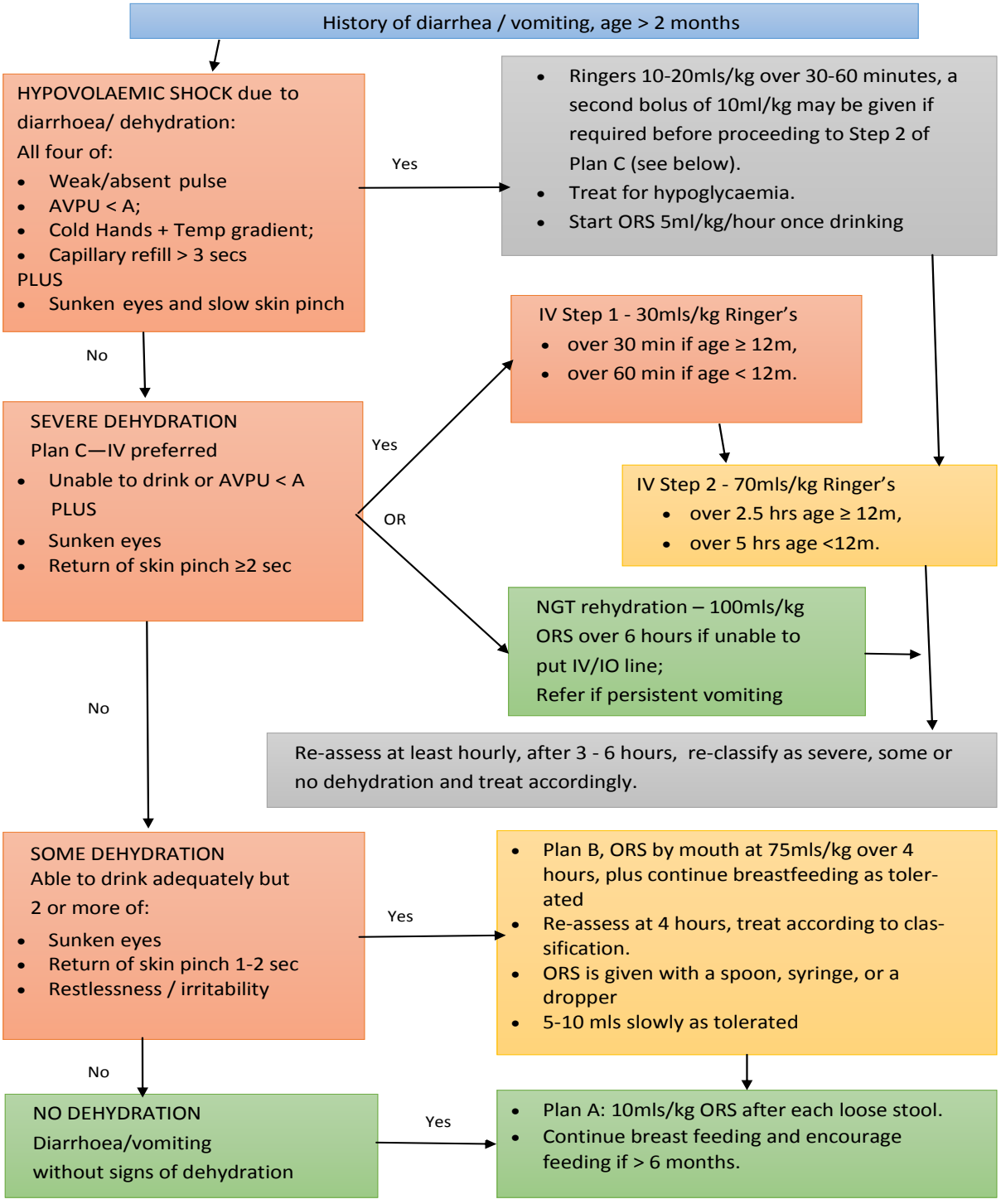


Table 4: *Urgent Fluid management – Child WITHOUT severe malnutrition.*

Weight kg	**Shock, 20mls/kg Ringer's or Saline Immediately**	**Plan C – Step 1 30mls/kg Ringer's**	**Plan C – Step 2 70mls/kg** Ringer's or NG ORS			**Plan B - 75mls/kg** Oral / NGT ORS
		Age <12m, 1 hour **Age ≥1yr,** ½ hour	**Age <12m,** over 5 hours **Age ≥ 1yr,** over 2½ hours	**Drops/min****	**Drops/min****	
2.00	40	**50**	**150**	*10*	***** Assumes 'adult' IV giving sets where 20drops=1ml***	**150**
2.50	50	**75**	**200**	*13*		**150**
3.00	60	**100**	**200**	*13*		**200**
4.00	80	**100**	**300**	*20*		**300**
5.00	100	**150**	**400**	*27*	*55*	**350**
6.00	120	**150**	**400**	*27*	*55*	**450**
7.00	140	**200**	**500**	*33*	*66*	**500**
8.00	160	**250**	**500**	*33*	*66*	**600**
9.00	180	**250**	**600**	*40*	*80*	**650**
10.00	200	**300**	**700**	*50*	*100*	**750**
11.00	220	**300**	**800**	*55*	*110*	**800**
12.00	240	**350**	**800**	*55*	*110*	**900**
13.00	260	**400**	**900**	*60*	*120*	**950**
14.00	280	**400**	**1000**	*66*	*135*	**1000**
15.00	300	**450**	**1000**	*66*	*135*	**1100**
16.00	320	**500**	**1100**	*75*	*150*	**1200**
17.00	340	**500**	**1200**	*80*	*160*	**1300**
18.00	360	**550**	**1200**	*80*	*160*	**1300**
19.00	380	**550**	**1300**	*90*	*180*	**1400**
20.00	400	**600**	**1400**	*95*	*190*	**1500**

**Consider Immediate blood transfusion if severe pallor or Hb<5g/dl on admission*

MALARIA TREATMENT

MALARIA TREATMENT

If a high-quality blood slide **is negative**, then only children with severe disease or those with severe anaemia should get presumptive treatment. *Rapid test should be confirmed.*

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Figure 6: *Malaria treatment*

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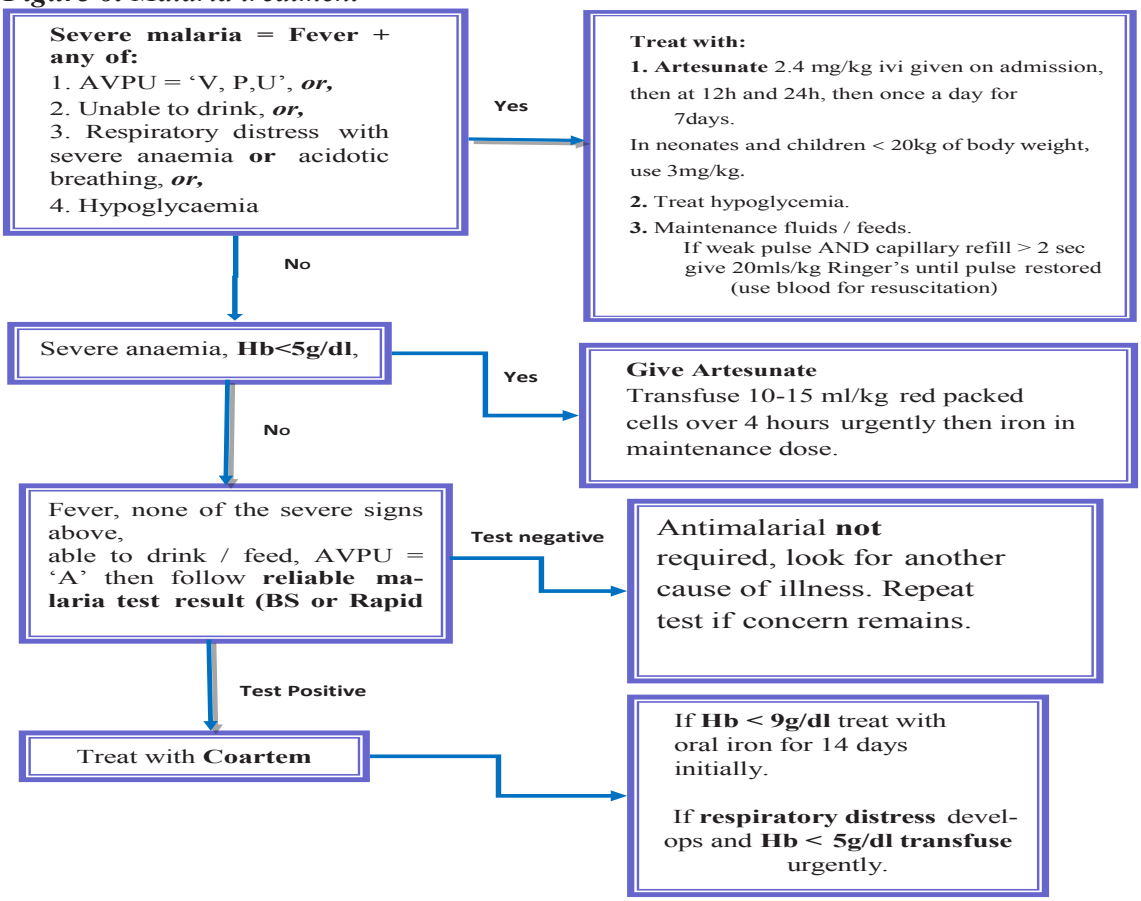


Treatment failure:

1) Consider other causes of illness / co-morbidity
2) A child on oral antimalarials who develops signs of severe malaria (Unable to sit or drink, AVPU=U or P and / or respiratory distress) at any stage should be changed to **artesunate**.
3) If a child on oral antimalarials has fever **and a positive blood slide** after 3 days (72 hours) then check compliance with therapy and if treatment failure proceed to **second line treatment**.

** *Please check the iv or tablet preparation you are using they may vary.*

Artesunate

Artesunate typically comes as a powder together with a 1ml vial of 5% bicarbonate that then needs to be further diluted with either normal saline or 5% dextrose – the amount to use depends on whether the drug is to be given iv or im (see table).

- ***DO NOT*** use water for injection to prepare artesunate for injection
- ***DO NOT*** give artesunate if the solution in the syringe is cloudy
- ***DO NOT*** give artesunate as a slow iv drip (infusion)
- ***YOU MUST*** use artesunate ***within 1 hour*** after it is prepared for injection

Table 5: Artesunate/ IV preparation

Preparing IV / IM Artesunate	IV	IM
Artesunate powder (mg)	60mg	**60mg**
Sodium Bicarbonate (mls, 5%)	1ml	**1ml**
Normal Saline or 5% Dextrose (mls)	5mls	**2mls**
Artesunate concentration mg/ml	**10mg/ml**	**20mg/ml**

Malaria Treatment Doses

- ***Artesunate*** is given IV / IM for a minimum of 24 hours
- ***As soon as*** the child can eat drink (after 24 hours for artesunate) then change to a ***full course*** of artemisinin combination therapy (ACT), the 1st line oral anti-malarial Artemether Lumefantrine

Table 6: *Weight based artesunate doses*

Wt kg	Artesunate, 3 mg/kg		
	IV mls of 60mg in 6mls	Dose in mg	IM mls of 60mg in 3mls
3.0	0.9	9	0.45
4.0	1.2	12	0.6
5.0	1.5	15	0.8
6.0	1.8	18	0.9
7.0	2.1	21	1.1
8.0	2.4	24	1.2
9.0	2.7	27	1.4
10.0	3.0	30	1.5
11.0	3.3	33	1.6
12.0	3.6	36	1.8
13.0	3.9	39	1.9
14.0	4.2	42	2.1
15.0	4.5	45	2.3
16.0	4.8	48	2.4
17.0	5.1	51	2.6
18.0	5.4	54	2.7
19.0	5.7	57	2.9
20.0	6.0	60	3.0

Artemether (20mg) + Lumefantrine (120mg) - Give with food
Stat, +8hrs, twice on Day 2 and Day 3

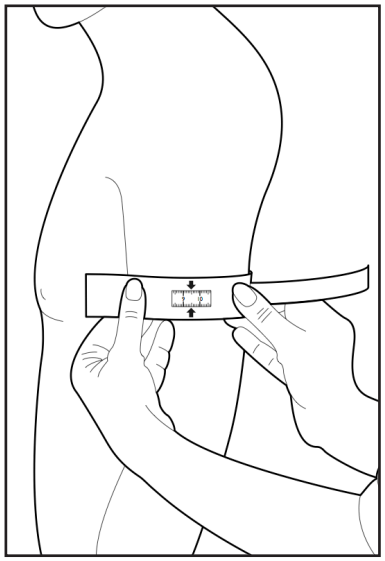
Weight	Age	Dose
<5kg	-	1/2 tablet
5 – 15 kg	3 – 35mth	1 tablet
15 – 24 kg	3 - 7 yrs	2 tablets
25 – 34 kg	9 - 11 yrs	3 tablets

Dihydroartemisinin-piperaquine, daily for 3 days

Age	Dose
3 – 35mth	1 paed tab
3 - 5 yrs	2 paed tabs
6 - 11 yrs	1 adult tab

Malaria and other parasitic diseases division, 2024

MEASURING NUTRITIONAL STATUS AND MANAGEMENT OF COMPLICATED SEVERE ACUTE MALNUTRITION (SAM)



Anthropometry (body measurement) quantifies malnutrition. In children, measurement of mid- upper arm circumference (MUAC) is the simplest. Weight and height measurements can be useful to detect wasting, stunting and individual monitoring over time e.g. growth velocity.

Mid upper arm circumference (MUAC)

MUAC is measured using a tape around the left upper arm. MUAC is quicker in sick patients so use MUAC in acute management.

Weight, Height and Age (plot to the table in the appendix)

- ***Weight for height (W/H):*** Measure length (Lying) if aged <2 years to give weight for length. Low W/H (or W/L) = wasting and indicates acute malnutrition.
- ***Weight for age (W/A):*** Low W/A does not distinguish acute from chronic malnutrition. W/A is thus **not used** for diagnosis of acute malnutrition, but plotted over time, e.g. using growth chart on child vaccination card if available.

In the diagnosis of acute malnutrition, we use W/H ***expressed as Z scores***. Z- can be obtained from simple tables (page 77-80).

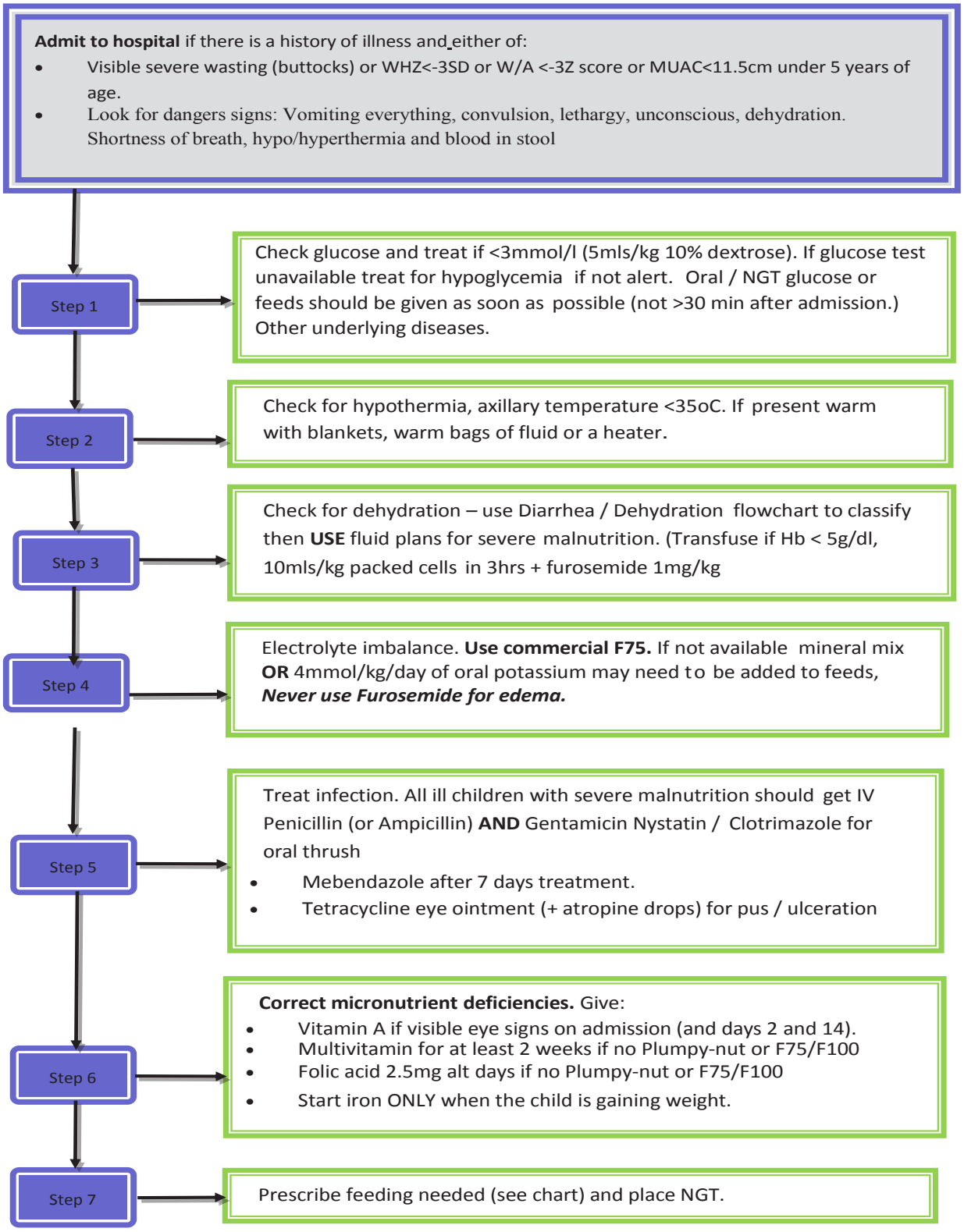
Visible Severe Wasting (VSW) it tends to identify only severest cases of SAM. It is better to use MUAC. **Kwashiorkor = severe malnutrition at any age**

Classifying Malnutrition ***(for WHZ values see pp 77 to 80)***

Table 7: *Determination of severity of SAM using MUAC and WHZ*

Acute Malnutrition - Severity	MUAC cm	WHZ
None	>13.5	>-1
At Risk	12.5 to 13.4	-2 to -1
Moderate	11.5 to 12.4	-3 to -2
Severe	**<11.5**	**<-3**
	Kwashiorkor	

Figure 7: *Symptomatic severe malnutrition. (Age 6 – 59 months).*



Steps 8, 9 & 10: Ensure appetite and weight are monitored and start catch-up feeding **with Plumpy-nut** (usually day 3 – 7). Provide a caring and stimulating environment for the child and start educating the family so they help in the acute treatment and are ready for discharge.

Figure 8: Fluid management in severe malnutrition with diarrhoea.

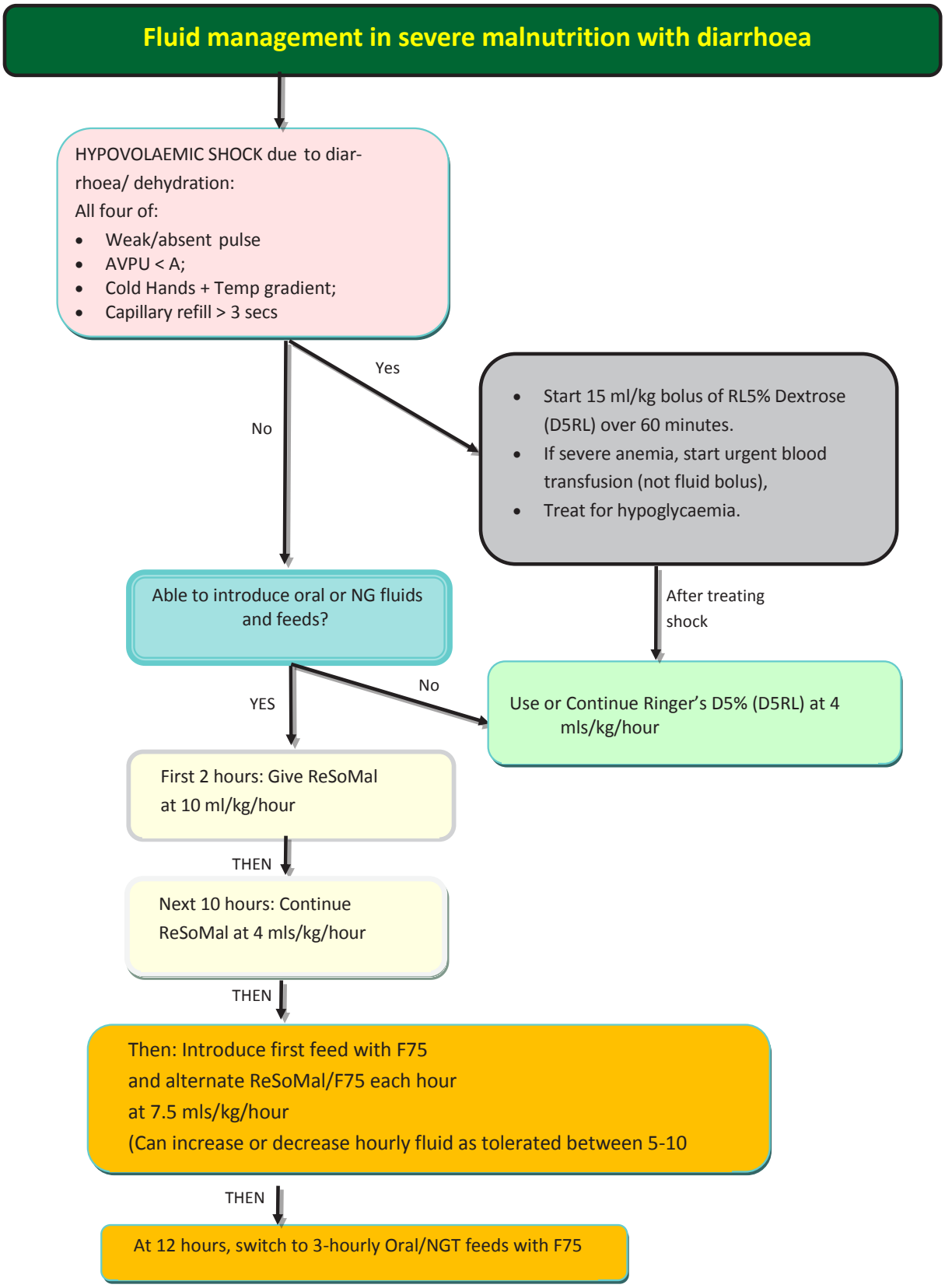


Table 8: *Weight based fluid management in SAM*

Weight	Shock		Oral / NGT ReSoMal	Emergency Maintenance
	15mls/kg		10mls/kg/hour	4mls/kg/hour
	Ringer's Lactate (RL) in 5% Dextrose		ReSoMal Oral / NGT **10mls/kg/hour** for up to 10 hours	RL/D 5% Dextrose iv Hourly until transfusion
	Iv			
	Shock = over 60 minutes	**Drops/min if 20 drops/ml giving set**		
4.00	80	*13*	40	15
5.00	100	*17*	50	20
6.00	120	*20*	60	25
7.00	140	*23*	70	30
8.00	160	*27*	80	30
9.00	180	*30*	90	35
10.00	200	*33*	100	40
11.00	220	*37*	110	44
12.00	240	*40*	120	46
13.00	260	*43*	130	48
14.00	280	*47*	140	50
15.00	300	*50*	150	52

	Dried Skimmed Milk	Vegetable Oil	Sugar	Water
F 75*	25g	27g	100g	Make up to 1000mls
F 100*	80g	60g	50g	Make up to 1000mls

* *Ideally add electrolyte / mineral solution, and* ***at least*** *add potassium* (3-4mmol/kg/day) and magensium (0.4-0.6 mmol/kg/day).

Symptomatic severe malnutrition in infants < 6 months.

1. Give the same general medical care as infants with severe acute malnutrition older than 6 months
2. Prioritize establishing, or re-establishing, effective exclusive breastfeeding by the mother
3. Can be discharged from all care when they:
    - Are breastfeeding effectively or feeding well with replacement feeds
    - Have adequate weight gain
    - Have a weight-for-length ≥–2 Z-scores of the WHO Child Growth Standards median.

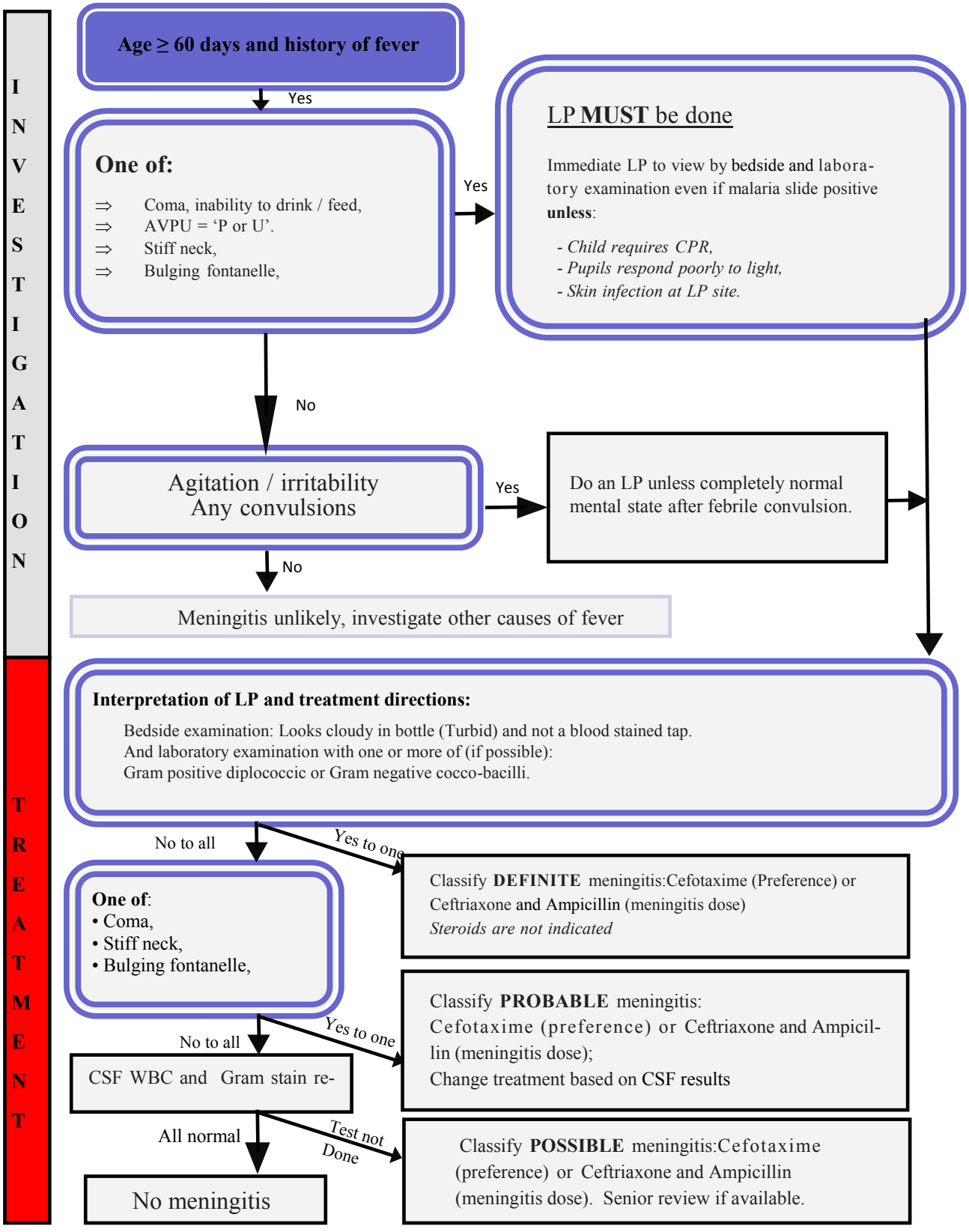
4. If aged <6 months use EBM or term formula or use diluted F100 (to each 100mls F100 add 35mls clean boiled water)
5. If respiratory distress or edema get worse or the jugular veins are engorged reduce feeding volumes.
6. When appetite returns (and edema much improved) **change from F75 to Plumpy-nut**, if Plumpy-nut not available change to F100 for the first 2 days use 130-150mls/kg of F100. Start 100mls/kg for patient with kwashiorkor with generalized oedema.
7. When using Plumpy-nut allow the child to nibble very frequently and encourage the child to drink liberally. Additional solid foods can be introduced slowly in the first days but entire plumpy must be taken as priority. Plumpy-nut can be mixed into porridge or other foods

Table 9: *Weight based therapeutic milk and RUTF volumes*

	F75 – acute feeding				F100 if no RUTF		RUTF Transition Phase	RUTF Rehabilitation Phase
	No or moderate oedema (130mls/kg/day)		Severe oedema, even face (100mls/kg/day)		F100 @ 150mls/kg/day Rehabilitation Phase			
	Total Feeds/ 24 hours	3 hourly feed volume	Total Feeds/ 24 hours	3 hourly feed volume	Total Feeds/ 24 hours	3 hourly feed volume	Packets per 24hours	Packets per 24hours
4.0	520	65	400	50	600	75	1.5	2.0
4.5	585	75	450	60	675	85		
5.0	650	80	500	65	750	95	2.1	2.5
5.5	715	90	550	70	825	105		
6.0	780	100	600	75	900	115		
6.5	845	105	650	85	975	125		
7.0	910	115	700	90	1050	135	2.5	3.0
7.5	975	120	750	95	1125	140		
8.0	1040	130	800	100	1200	150		
8.5	1105	140	850	110	1275	160	2.8	3.5
9.0	1170	145	900	115	1350	170		
9.5	1235	155	950	120	1425	180	3.1	4.0
10.0	1300	160	1000	125	1500	190		
10.5	1365	170	1050	135	1575	200	3.6	4.0
11.0	1430	180	1100	140	1650	210		
11.5	1495	185	1150	145	1725	215		
12.0	1560	195	1200	150	1800	225	4.0	5.0

MENINGITIS

Figure 9: *Management of meningitis*

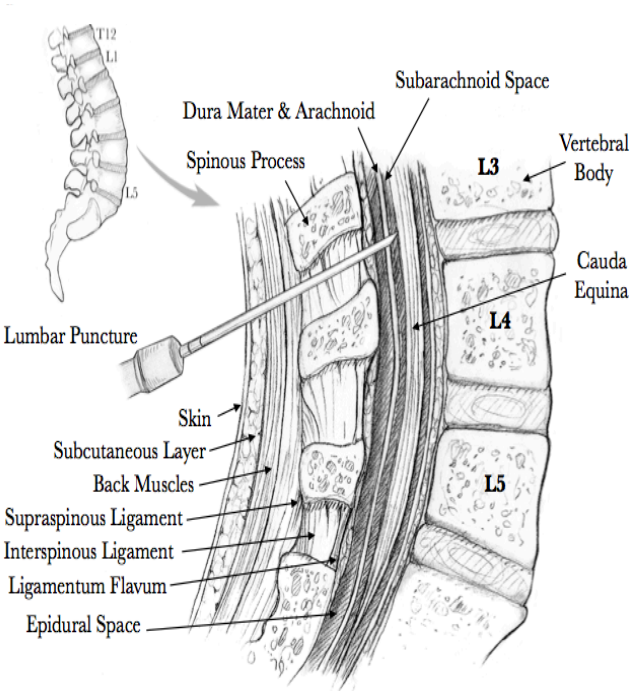


Lumbar Puncture Procedure

Before the Procedure

1. Verify that no contraindications exist
2. Explain the procedure to the care giver and answer all questions
3. Prepare the necessary CSF tubes for laboratory investigation
4. Wash hands, open the lumbar puncture tray without compromising sterility and consider any extra suppli es (i.e., spinal needles or extra tubes)

During the Procedure



1. Position the patient either in lateral decubitus or sitting upright leaning forward while providing necessary support or restrain
2. Locate the L3/L4 space by locating the superior iliac crests and placing your thumbs midline to the spine.
3. Aseptically clean the skin using chlorhexidine or povidone-iodine skin prep.
4. Put on sterile gloves, facemask, and protective equipment
5. Inject local anaesthesia about 3-5mL of 1% lidocaine (preservative free) to the area and provide appropriate analgesia.
6. Insert the spinal needle directed at a slight cephalad angle (imagine aiming towards the umbilicus), then advance until a feeling of a "pop" sensation, remove needle insert (obturator) and CSF should begin to drip out and take samples.
7. Reinsert the needle insert (obturator) and withdraw the spinal needle, immediately apply pressure and an adhesive dressing over the insertion site

After the Procedure

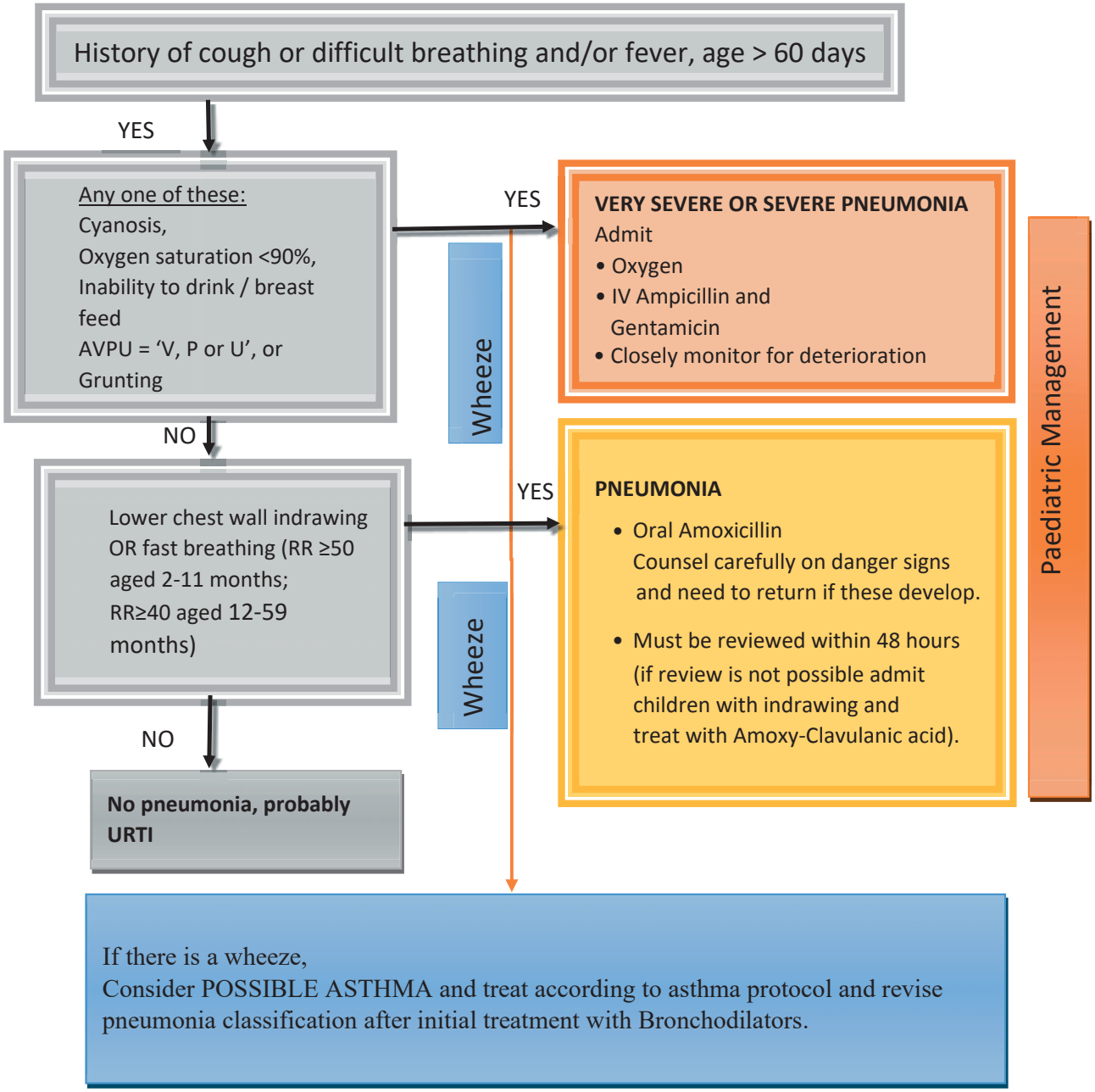
1. The patient may preferably lie flat or position or any position they desire to do so (no evidence post LP reduces headache).
2. Monitor closely for any signs of complication

Carolyne M et al. Diagnostic lumbar puncture. Ulster Med J. 2014.

PNEUMONIA

Figure 10: Pneumonia protocol for children aged 2 - 59 months.

- ***For HIV exposed / infected children*** *(refer to page 58)*



WHO revised ETAT+ Guidelines, 2020

Pulse oximetry is recommended to determine the presence of hypoxaemia in all children with ETAT emergency signs.

- When the child has only some degree of respiratory distress, oxygen supplementation is recommended at SpO2 < 90%.

- Children presenting with other ETAT emergency signs with or without respiratory distress should receive oxygen therapy if their SpO2 is < 94%.

Pneumonia treatment failure definitions

Table 10: Pneumonia treatment failure definitions

Treatment failure definition	Action
Any time. Progression of pneumonia to severe (development of cyanosis or inability to drink in a child with pneumonia without these signs on first contact.	**Admit child** ❖ Change treatment from amoxicillin to Ampicillin and gentamicin to cover for Gram negative pneumonia
Obvious cavitation on CXR	❖ Treat with cloxacillin and gentamicin iv for Staph. Aureus and Gram-negative pneumonia. ❖ **Investigate for TB**
48 hours	
Child with Severe pneumonia getting worse: reassess thoroughly, get chest X ray if not already done (looking for empyema /effusion, Cavitation etc).	❖ Switch to Ceftriaxone / Cefotaxime unless suspect Staphylococcal pneumonia then use Cloxacillin and Gentamycin ❖ Suspect PJP especially if <12 months and immediately test for HIV. ❖ While waiting for HIV results, start treatment for Pneumocystis Jerovecci pneumonia (PJP).
Severe pneumonia without improvement in at least one of: ❖ Respiratory rate, ❖ Severity of indrawing, ❖ Fever, ❖ Eating / drinking	❖ Admit child ❖ Change treatment from amoxicillin to Ampicillin and gentamicin
5 Days (or earlier if continue to worsen)	**Consider transfer to higher level hospital**
At least three of: ❖ Fever, temp >38 ^{0}C ❖ Respiratory rate >60 bpm ❖ Still cyanosed or saturation <90% and no better than admission. ❖ Chest in drawing persistent ❖ Worsening CXR	Re-evaluate and consider; ❖ If still on amoxicillin, admit the child and change to Ampicillin and Gentamycin ❖ If on Ampicillin and gentamicin change to ceftriaxone or Cefotaxime. ❖ Suspect PJP, an HIV test must be done - treat for Pneumocystis if HIV positive.
After 1 week	
Persistent fever and respiratory distress.	❖ Consider TB, perform mantoux and follow TB treatment guidelines

Figure 11: Management of possible Asthma

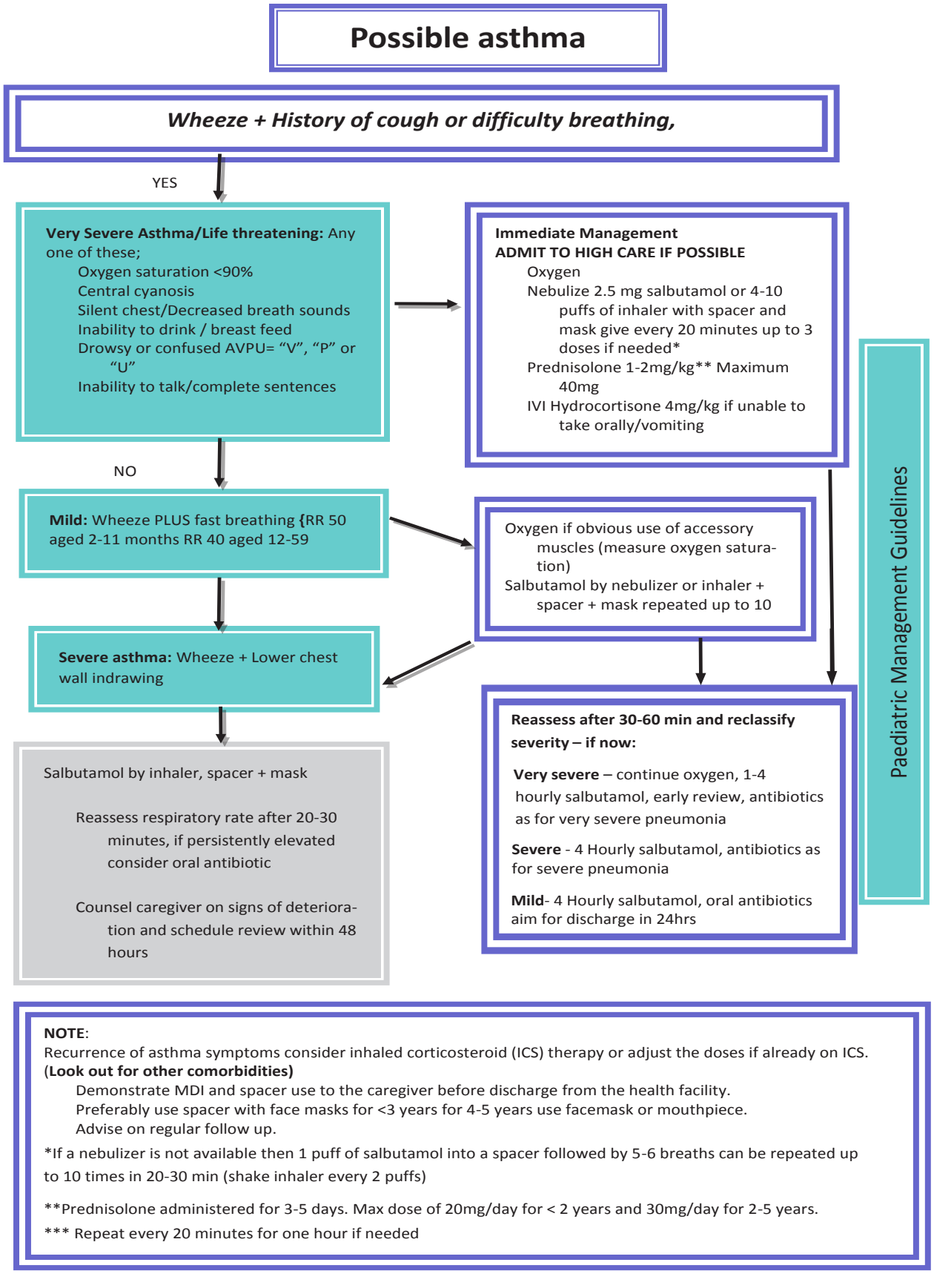
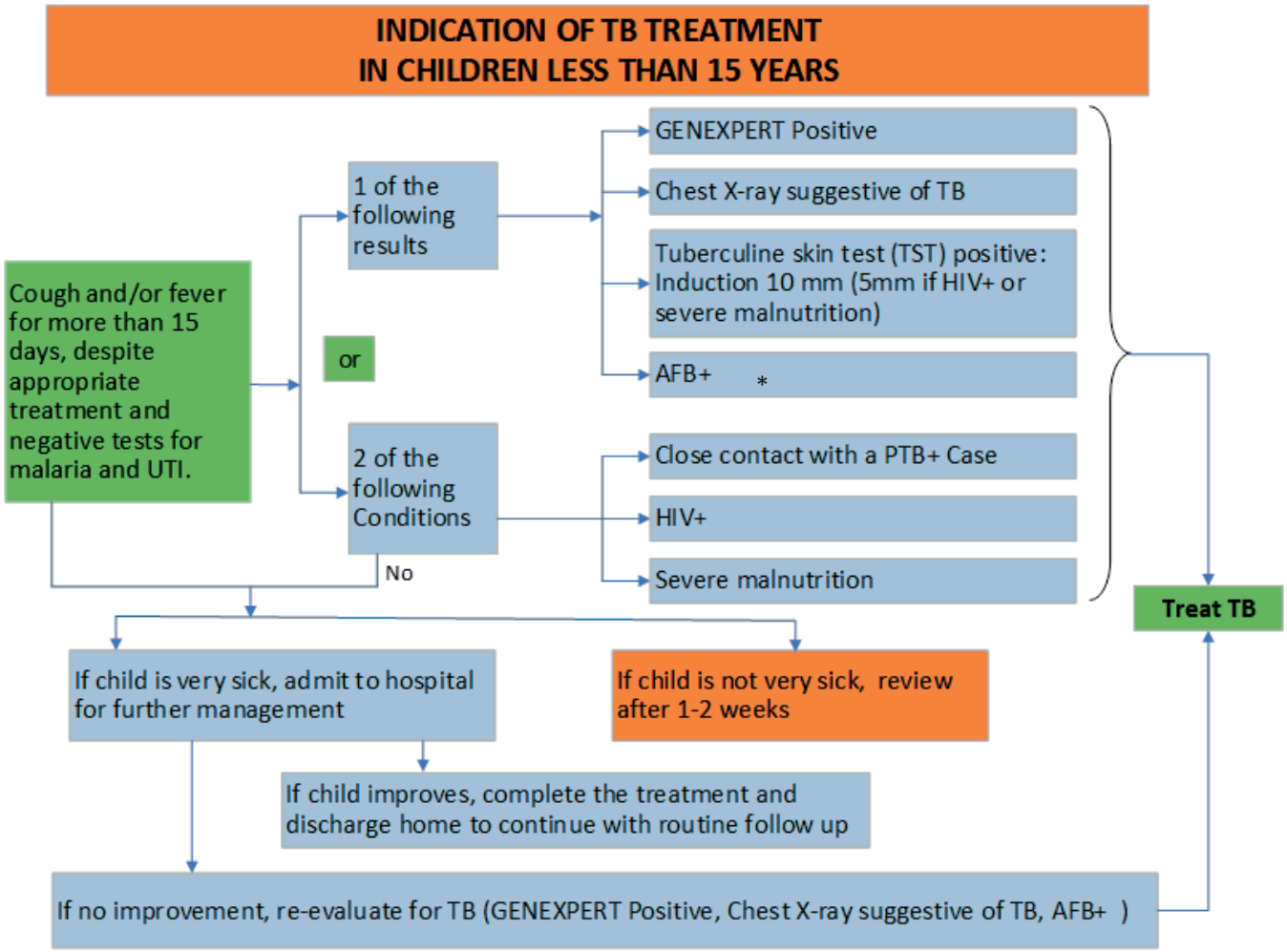


***Figure 12**: Indication of TB treatment in children less than 15 years*



**Positive for Acid Fast Bacilli*

How tn obtain samples for TB testing in children

1. Voluntary coughing for elder children
2. Respiratory physiology
3. Sputum induction for non-coughing childrcn
4. Gastric lavage/gastric aspiration for non-coughing children
5. Fine needle aspiration (lymphnodes)
6. Surgical biopsy

I. TREATMENT OF ADULTS and children ≥ 25 kg: 2 (RHZE) / 4 (RH)

Indicated for all new and previously treated cases who are susceptible to rifampicin and for clinically diagnosed, pulmonary and extrapulmonary TB.

Phase	Months / No doses	Drug	25-39 kg	40-54 kg	≥ 55 kg
Intensive	2 months (56 doses)	($R_{150}H_{75}Z_{400}E_{275}$)	2 Tab	3 Tab	4 Tab
Continuation	4 months (112 doses)	($R_{150}H_{75}$)	2 Tab	3 Tab	4 Tab

II. TREATMENT OF CHILDREN: 2 ($R_{75}H_{50}Z_{150}$) E100 / 4 (RH)

Indicated for all children weighing < 25 kg (new cases and previously treated).

Phase	Months / No doses	Drug	4-7 kg	8-11 kg	12-15 kg	16-24 kg	≥ 25kg
Intensive	2 months (56 doses)	($R_{75}H_{50}Z_{150}$)	1 Tab	2 Tab	3 Tab	4 Tab	Use the adult dosage and tablets
		E_{100}	1 Tab	2 Tab	3 Tab	4 Tab	
Continuation	4 months (112 doses)	($R_{75}H_{50}$)	1 Tab	2 Tab	3 Tab	4 Tab	

Infant with weight below 4 kg: calculate the dose according to the table below.

DOSAGE		
Drug	**Children <25 kg**	**Adults and children ≥ 25 kg**
Rifampicin (R)	15 mg/kg (10 to 20 mg/kg), max 600 mg/day	10 mg/kg (8 to 12 mg/kg), max 600 mg/day
INH (H)	10 mg/kg (7 to 15 mg/kg), max 300 mg/day	5 mg/kg (4 to 6 mg/kg), max 300 mg/day
Pyrazinamide (Z)	35 mg/kg (30 to 40 mg/kg)	25 mg/kg (20 to 30 mg/kg)
Ethambutol (E)	20 mg/kg (15 to 25 mg/kg)	15 mg/kg (15 to 20 mg/kg)

III. TB MENINGITIS AND OSTEOARTICULAR TB (new and retreatment): total duration **12 months**:

Ministry of Health, Tuberculosis Handbook, 2020 Edition

- Adults and children ≥ 25 kg: 2 (RHZE) / 10 (RH)
- Children < 25 kg: 2 (RHZ)E / 10 (RH)

Table 11: *TB treatment regimens and duration*

TB disease category	Recommended regimen	
	Intensive phase	Continuation phase
All forms of TB	2 months RHZE	4 months RH
TB meningitis, Bone and joint	2 months RHZE	10 months RH

- Steroid therapy should be given for; TB meningitis, PTB with respiratory distress, PTB with airway obstruction by hilar lymph nodes, severe military TB or pericardial effusion.
- Give Prednisone at 2 mg/kg (max 60mg/day) once daily for 4 weeks, taper down over 2 weeks (1 mg/kg for 7 days, then 0.5 mg/kg for 7 days).

Table 12: *Anti/TB drug doses*

Drug	Recommendations Average daily dose in mg/kg	Range in mg/kg	Maximum Dose
Isoniazid	10	10 – 15	300 mg
Rifampicin	15	10 – 20	600 mg
Pyrazinamide	35	30 – 40	1.5 g
Ethambutol	20	15 – 25	1.6 g

Table 13: Pyridoxine* doses

Weight (kg)	Number of tablets of pyridoxine (50mg)
5-7	Quarter tablet daily
8-14	Half tablet daily
15 and above	One full tablet daily

**Give throughout the whole course of treatment*

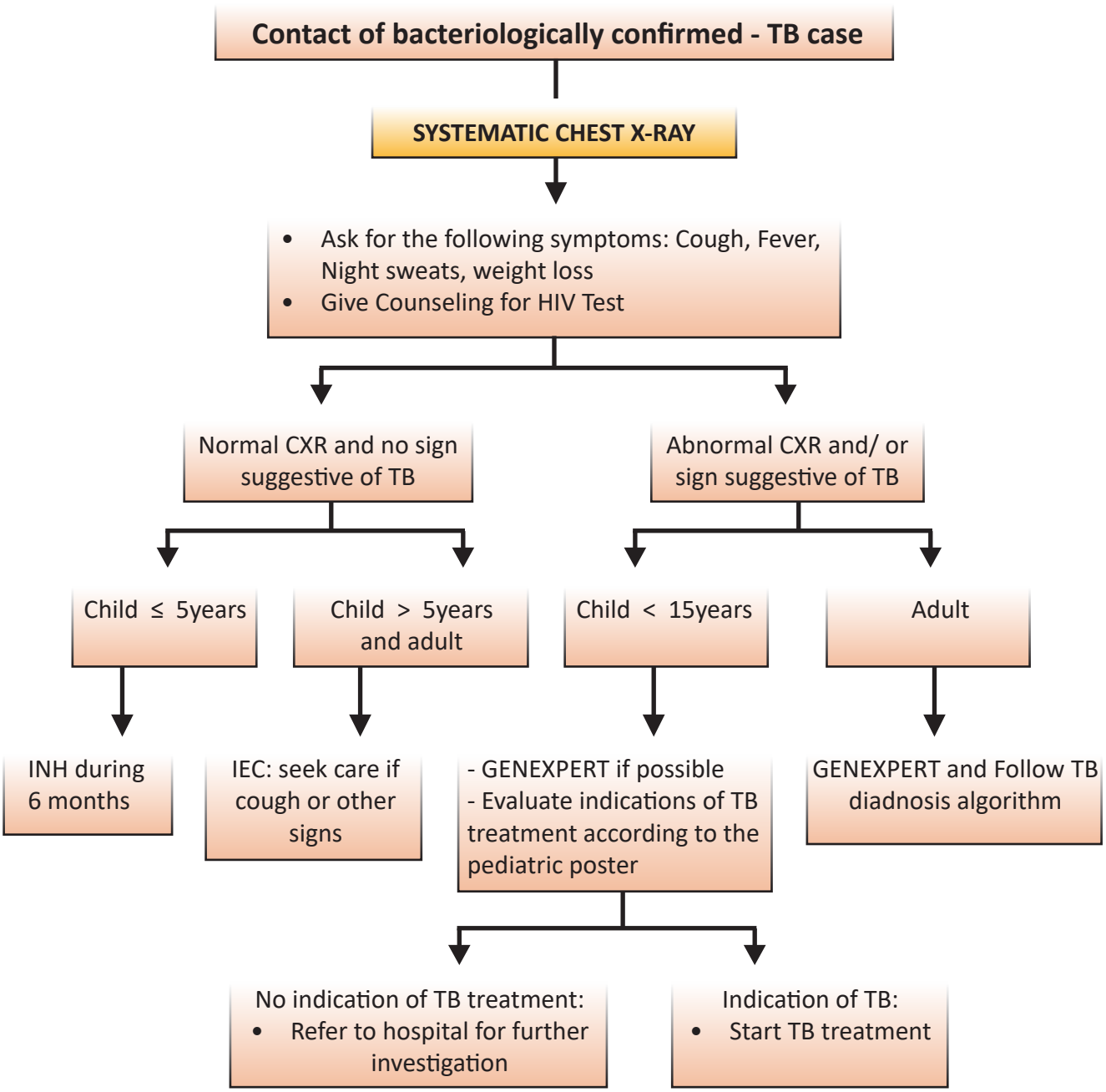
Isoniazid Preventative Therapy (IPT)

Isoniazid Preventive Therapy (IPT) at 10mg/kg/day for 6 months is recommended after carefully ruling out active disease to;

- All children under 5 exposed to smear positive TB index case
- All HIV-positive children exposed to smear positive TB index case.

Management of TB contact in children

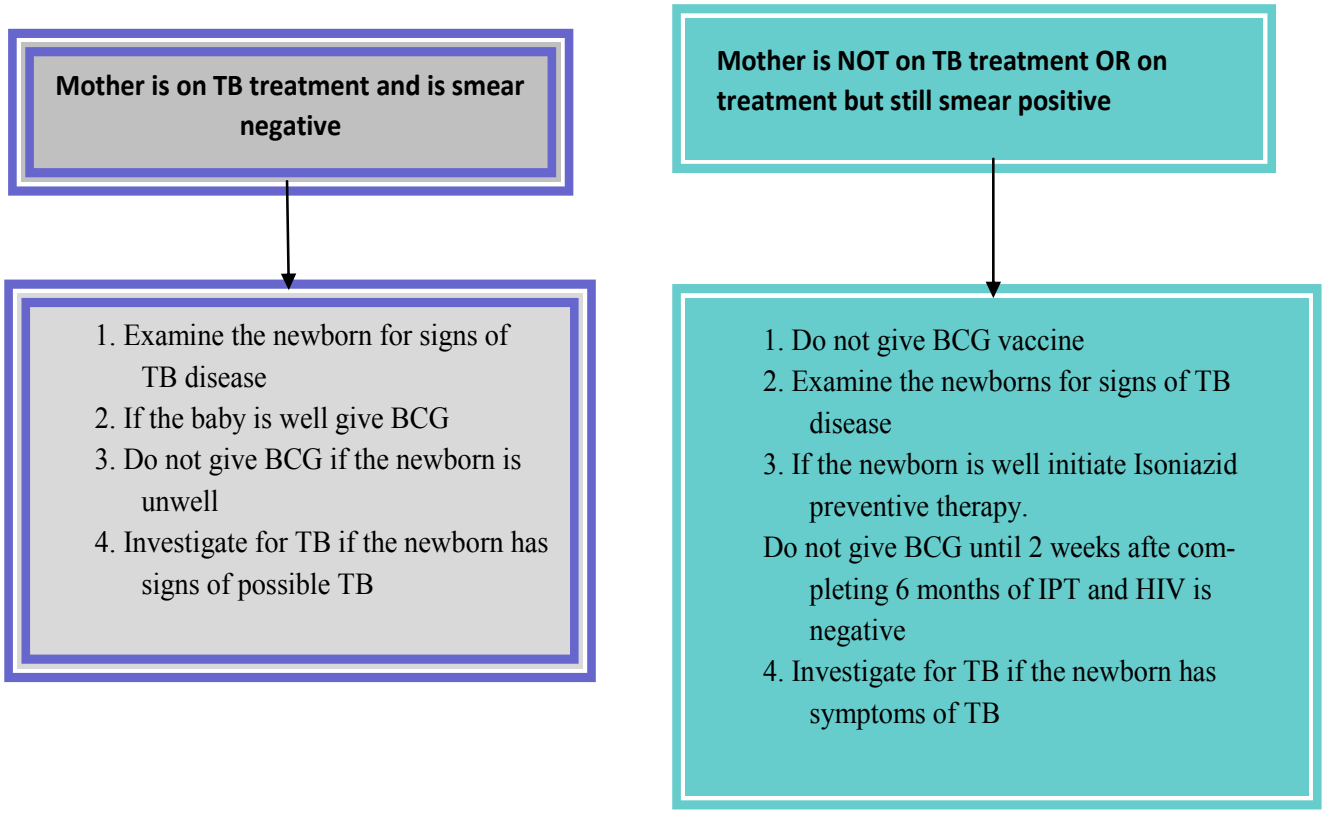
Figure 13: *TB contact tracing in children*



Ministry of Health, Hand-Book of tuberculosis,6th edition 2017.

Management of newborns of PTB mothers

Figure 14: *Management of newborns to PTB mothers*



HIV PROVIDER INITIATED TESTING, COUNSELLING AND TREATMENT

- The current, 2020 edition of National guidelines for prevention and management of HIV recommend a risk assessment based PITC for **ALL SICK CHILDREN** presenting to health facilities with unknown H I V status.
- PITC is best done on admission when other investigations are ordered. All clinicians should be able to assess risk for HIV in children, perform PITC and discuss a positive / negative result.

Below is a quick guide to PITC

- As much as possible find a quiet place to discuss the child's admission diagnosis, tests and treatment plans.
- After careful history / examination, determine if the sick child has risk of HIV infection, plan for all investigations and then inform caretaker what tests are needed and that HIV is common in Rwanda.
- That in this situation it is normal to do an HIV test on a child because:
  - You came to hospital wanting to know what the problem was and find the best treatment for it.
  - Knowing the HIV test result gives doctors the best understanding of the illness and how to treat it.
  - The treatment that is given to the child will change if the child has HIV.
  - If the child has HIV s/he will need additional treatment for a long time and the earlier this is started the better.
- That the HIV test will be done with their approval and not secretly.
- That the result will be given to them and that telling other family / friends is their decision.
- That the result will be known only by doctors / nurses caring for the child as they need this knowledge to provide the most appropriate care.
- Give the parent / guardian the opportunity to ask questions.

The person asking permission for HIV testing should then write in the medical record that permission was given / refused.

Testing and treatment of infant and children

- Infant exposed to HIV infection includes PCR/DBS at 6 to 8 weeks and serological tests at 9, 18 and 24 months. A positive diagnosis using serological test should be confirmed using PCR.
- Children aged 2 up to 10 years should be tested using HIV rapid test algorithm upon consent of parents or legal guardians.
- Any child who tests HIV positive must be initiated on ART immediately or as soon as possible.
- All HIV exposed or infected children should have regular growth monitoring to enable early detection of growth retardation and undertake appropriate management.

Feeding of HIV exposed infant.

- If breast fed encourages exclusive breast feeding until 6 months. If an alternative to breast feeding is affordable, feasible, accessible, safe and sustainable (AFASS) discuss this option before delivery.
- Do not abruptly stop breast feeding at 6 months, just add complementary feeds and continue prophylaxis until 1 week after breast feeding stops.
- Refer child and mother/caregivers to an HIV support clinic.
- All HIV exposed / infected infants should start CTX prophylaxis from age 6 wks.

Managing the HIV exposed/Infected infant

Any child < 18 months with a positive rapid test is HIV exposed and is treated as though infected until definitive testing rules out HIV infection.

Table 14: *Managing HIV exposed*

	Scenario	**Infant ARV Prophylaxis**	**Duration of infant ARV prophylaxis**
1	Infant born to a known HIV positive mother (before or during labor)	Nevirapine and Zidovudine	• Immediately initiate NVP and AZT prophylaxis for 6 weeks • Do HIV PCR test at six weeks, serology tests at 9, 18 and 24 months. Always confirm serology test with PCR test; • Initiate treatment if the infant is confirmed positive.
2	Infant born to a mother diagnosed for HIV after delivery and who are high risk for acquiring HIV	Nevirapine and Zidovudine	• Immediately initiate NVP and AZT prophylaxis • Do HIV PCR test at six weeks, serology tests at 9, 18 and 24 months. Always confirm serology test with PCR test • If results positive, initiate ART treatment • If results negative, continue NVP prophylaxis up to 12 weeks

Ministry of health. National guidelines for prevention and management of HIV, edition 2020.

Table 15: *PMTCT Nevirapine and Zidovudine Prophylaxis*

AGE	NEVIRAPINE DOSING
0 - 6 weeks	10 mg (*1ml*) once daily (*Birth weight ≤ 2,500 grams)* 15 mg (*1.5ml*) once daily (*Birth weight > 2,500 grams)*
6 - 14 wks	20 mg (2mls) once daily
14 wks - 6 months	25 mg (2.5mls) once daily

AGE	AZT PROPHYLACTIC DOSING
≥35 Weeks Gestation at Birth	Birth to Age 4 Weeks: • ZDV 4 mg/kg per dose orally twice daily Age >4 Weeks: • ZDV 12 mg/kg per dose orally twice daily
≥30 to <35 weeks gestation at birth	Birth to Age 2 Weeks: • ZDV 2 mg/kg per dose orally twice daily Age 2 Weeks to 4–6 Weeks: • ZDV 3 mg/kg per dose orally twice daily
<30weeks of gestation at birth	Birth to Age 4–6 Weeks: • ZDV 2 mg/kg per dose orally twice daily

Pneumonia:

- All HIV exposed / infected children admitted with signs of severe / very severe pneumonia are treated with iv Ampicillin and gentamicin first line, Ceftriaxone reserved as second line therapy
- High dose cotrimoxazole if aged <12months *(see below)- for treatment of Pneumocystis Jerovecci pneumonia* (steroids are not recommended for PJP).

Treatment and prevention of Pneumocystis Jerovecci pneumonia.

- Provide Co-trimoxazole (CTZ) starting 4-6 weeks after birth (refer national guideline)

Table 16: *Co-trimoxazole dose for treatment of pneumocystis Jerovecci pneumonia*

CO	CTX syrup 240mg/5mls	CTX Tabs 120mg/tab	CTX Tabs 480mg/tab	Frequency
1 - 4 kg	2.5 mls	1 tab	1/4	***24 hourly*** for prophylaxis, ***8 hourly*** for 3 wks for PJP treatment
5 - 8 kg	5 mls	2 tabs	1/2	
9 - 16 kg	10 mls	-	1	
17 - 50 kg		-	2	

Diarrhea

- All HIV exposed / infected children admitted with acute diarrhea are treated in the same way as HIV uninfected children with fluids and zinc. For persistent diarrhea (≥14days) low-lactose or lactose free milk is recommended ***if the child is ≥ 6 months of age***

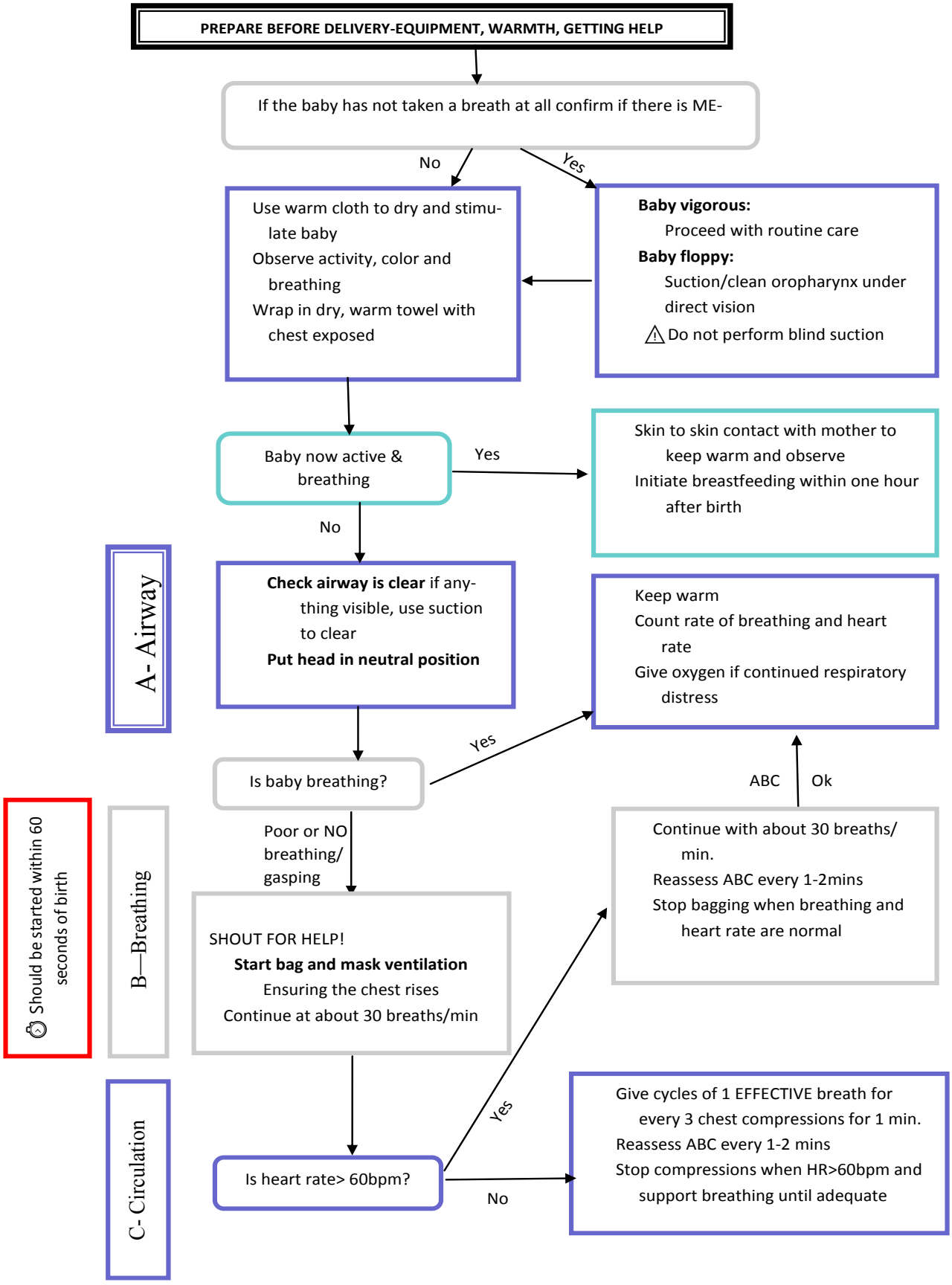
Meningitis

- Request CSF examination for Cryptococcus as well as traditional microscopy and culture for bacteria.

HAART: - See national guidelines for details.

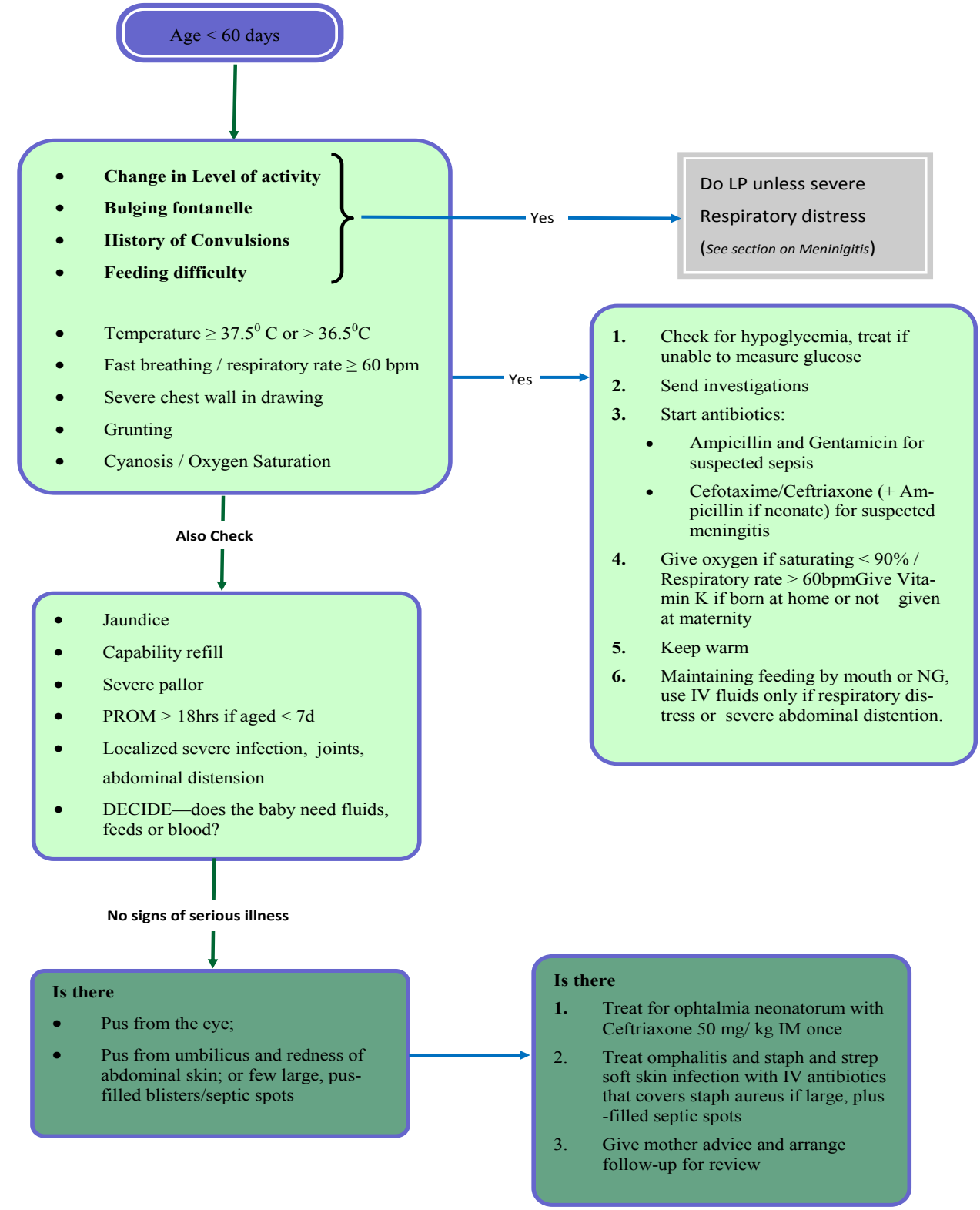
TB: – See national guidelines for TB treatment in an HIV exposed / positive child.

Figure 15: *Newborn resuscitation*



NEONATAL SEPSIS

***Figure 16**: Neonatal sepsis*



NB: Ceftriaxone may induce hyperbilirubinemia that it should not be used in premature babies and neonates with jaundice

***Table 17**: Duration of treatment for neonatal* sepsis

Problem	Days of treatment
Skin infection with signs of generalized illness such as poor feeding	• IV antibiotics could be stopped after 72 hours if the neonate is feeding well without fever, has no other signs **and** LP, if done, is normal. • Oral antibiotics should be continued for a further 5 days.
Clinical or radiological pneumonia.	• IV antibiotics should be continued for a minimum of 5 days or until completely well for 48 hrs. • For positive LP see below.
Severe Neonatal Sepsis	• The neonate should have had a LP. • IV antibiotics should be continued for a minimum of 7 days or until completely well if the LP done, is normal.
Neonatal meningitis or severe sepsis and no LP performed	• IV antibiotics should be continued for a minimum of 14 days. • If Gram negative meningitis is suspected treatment should be IV for 3 weeks.

Antibiotic treatment of newborns at risk for infection

- ✓ Empiric antibiotics (Ampicillin and Gentamicin standard dose) should be given as soon as possible after birth to all newborns (term and preterms) with any one of the following risk factors:
  - Prolonged Rupture of Membranes (PROM) > 18 hours
  - A mother with fever (Temperature > 38^0C)
  - Suspected or confirmed chorioamnionitis
  - Mother being treated for sepsis at any time during labour or in the last 24hours before and after birth.
- ✓ Treatment should be given for 48-72 hours and stopped if the baby has remained entirely well during this period and baseline septic work-up is normal
- ✓ Initiate laboratory investigations immediately but DO NOT withhold antibiotics.
- ✓ If there are no risk factors, then DO NOT initiate antibiotic treatment.
- ✓ A well-baby born preterm < 37 weeks or Low birth weight with no other risk factors for infection does not require routine antibiotic treatment.

NEONATAL JAUNDICE

- ✓ Assess for jaundice in bright, natural light if possible, check the eyes, blanched skin on nose and the sole of the foot
- ✓ Always measure serum bilirubin if age < 24 hours or if clinically moderate or severe - Any jaundice if aged <24hours needs further investigation and treatment
- ✓ Refer early if jaundice in those aged <24hours and facility cannot provide phototherapy and exchange transfusion
- ✓ See next page for guidance on bilirubin levels
- ✓ ***If bilirubin measure unavailable or result not back in one hour, start*** phototherapy:
  - In a well-baby with jaundice easily visible on the sole of the foot
  - In a preterm baby with ANY visible jaundice
  - In a baby with easily visible jaundice and inability to feed or other signs of neurological impairment ***and consider immediate exchange transfusion***

Stop phototherapy – when bilirubin 50 micromol/L lower than phototherapy threshold (see next page) for the baby's age on day of testing

Phototherapy and Supportive Care - Checklist

1. ***Shield the eyes with eye patches.*** - Remove periodically such as during feeds
2. ***Keep the baby naked***
3. ***Place the baby close to the light source:*** – 45cm distance is often recommended but the closer the baby is to the light, the better effect so closer distances are OK if the baby is not overheating, especially if need rapid effect. May use white cloth to reflect light back onto the baby making sure these do not cause overheating.
4. ***Do not place anything on the phototherapy devices***– lights and baby need to keep cool so do not block air vents / flow or light. Also keep device clean – dust can carry bacteria and reduce light
5. ***Promote frequent breastfeeding as phototherapy increases total fluid requirements.*** Unless dehydrated, NGT ***supplements or intravenous fluids are unnecessary***. Phototherapy use can be interrupted for feeds; allow maternal bonding if jaundice not severe.
6. ***Periodically change position supine to prone***- Expose the maximum surface area of baby to phototherapy; may reposition after each feed.
7. ***Monitor temperature*** every 4 hours and weight every 24 hours
8. ***Periodic (12 to 24 hours) plasma/serum bilirubin test***. Visual testing for jaundice or transcutaneous bilirubin is unreliable.
9. ***Make sure that each light source is working*** and emitting light. Fluorescent

tube lights should be replaced if:

a. More than 6 months in use (or usage time >2000 hours)

b. Tube ends have blackened

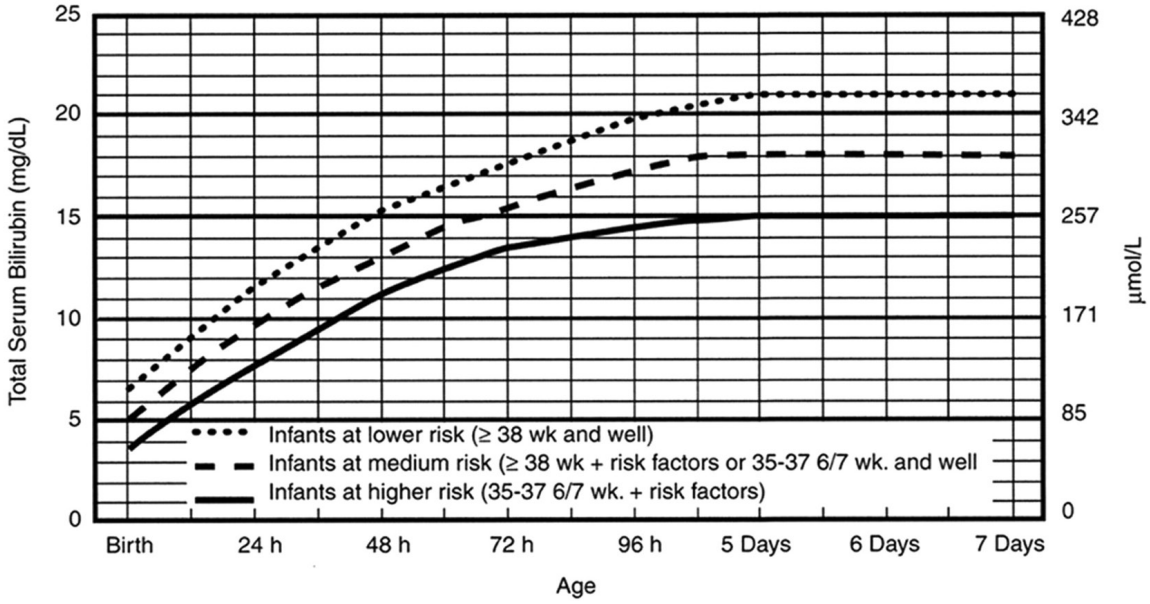
c. Lights flicker.

Threshold for phototherapy treatment

Table 18: *Threshold for phototherapy treatment*

Days of Life (DOL)	**< 35 weeks gestation, Or with sepsis, hemolysis, poor feeding, current weight ≤2 Kg**	**≥ 35 weeks gestation, healthy (no risk factors, > 2 kg)**
DOL0	Any visible jaundice*	
DOL1	170 µmol/L = 10mg/dL	260 µmol/L = 15 mg/dL
DOL≥ 2	250 µmol/L = 15 mg/dL	310 µmol/L = 18 mg/dL

Graph 1: Threshold for phototherapy



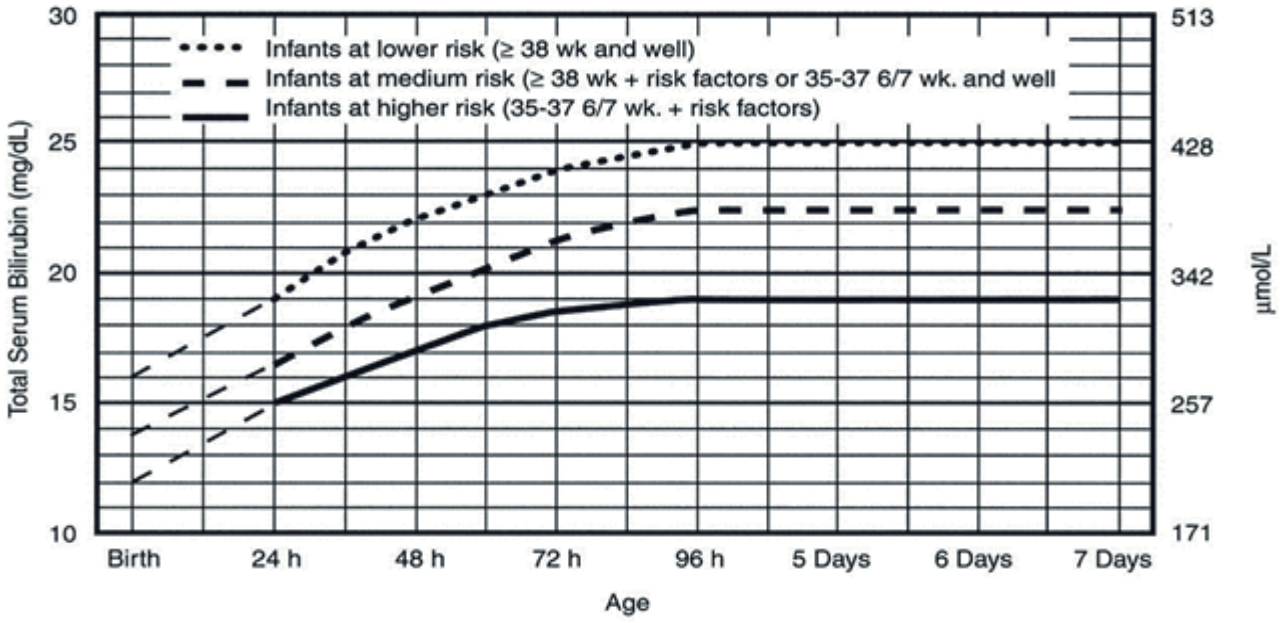
- Use total bilirubin. Do not subtract direct (conjugated) bilirubin.
- Risk factors = isoimmune hemolytic disease, G6PD deficiency, asphyxia, significant lethargy, temperature instability, sepsis, acidosis, or albumin <3g/dL
- For well infants 35 - 37 6/7 wk, can adjust TSB levels for intervention around the medium risk line. It is an option to intervene at lower TSB levels for infants closer to 35 wks and at higher TSB levels for those closer to 37 6/7 wks.
- It is an option to provide conventional phototherapy in hospital or at home at TSB levels 2 - 3 mg/dL below those shown, but home phototherapy should not be used in any infant with risk factors.

Exchange transfusion

- Exchange transfusion is a treatment for extreme hyperbilirubinemia or if phototherapy fails to control the rising bilirubin levels.
- For newborns who initially present with serum bilirubin concentrations at or above the exchange transfusion levels, immediate intensive phototherapy and hydration should produce a sharp decline bilirubin within 4 to 6 hours potentially avoiding the need.
- However, if there is not a good response or the response is slow, consider likelihood of requiring exchange and start transfer preparation where it can be urgently performed.
- If bilirubin levels exceed the thresholds below, consider referral in anticipation for possible exchange transfusion. Never discontinue phototherapy when planning or conducting an exchange transfusion

Table 19: *Exchange Transfusion Thresholds*

Days of Life	< 35 weeks gestation, sepsis, hemolysis, poor feeding (≤2 Kg)	≥ 35 weeks gestation, healthy (no risk factors, > 2 kg)
DOL 0	220 µmol/L = 10 mg/dL	260 µmol/L = 15 mg/dL
DOL1	260 µmol/L = 15 mg/dL	425 µmol/L = 25 mg/dL
DOL ≥ 2	340 µmol/L = 20 mg/dL	425 µmol/L = 25 mg/dL



- The dashed lines for the first 24 hours indicate uncertainty due to a wide range of clinical circumstances and a range of responses to phototherapy.
- Immediate exchange transfusion is recommended if infant shows signs of acute bilirubin encephalopathy (hypertonia, arching, retrocollis, opisthotonos, fever, high pitched cry) or if TSB is ≥5 mg/dL (85 µmol/L) above these lines.
- Risk factors - isoimmune hemolytic disease, G6PD deficiency, asphyxia, significant lethargy, temperature instability, sepsis, acidosis.
- Measure serum albumin and calculate B/A ratio (See legend)
- Use total bilirubin. Do not subtract direct reacting or conjugated bilirubin
- If infant is well and 35-37 6/7 wk (median risk) can individualize TSB levels for exchange based on actual gestational age.

Treatment of jaundice in gestational age < 37 Weeks

- ✓ **Any jaundice within 24 hours is of concern** and should prompt rapid treatment and a careful look for underlying causes
- ✓ Initiate phototherapy earlier than for full term neonates – consult a gestational age specific chart
- ✓ **Exchange transfusion if baby has gestational age < 37 wks and Age is 72 hours or more if:** Bilirubin in micromol/litre ≥ gestational age × 10
- ✓ The table below is a quick guide (can print copies for use if files), more detailed information can be found at: http://guidance.nice.org.uk/CG98/treatmentthresholdgraph/xls/English

Table 20: *Treatment threshold for phototherapy in < 37 weeks*

		Estimated Gestational Age				
Age in hours		28 weeks	30 weeks	32 weeks	34 weeks	36 weeks
		All values in micromol/L				
Start Phototherapy	12 hrs	Any value above normal range				
	24 hrs	80	90	100	110	110
	36 hrs	110	120	130	140	150
	48 hrs	140	150	160	170	180
	60 hrs	160	170	190	200	220
	72 hrs +	180	200	220	240	260
Exchange Transfusion	12 hrs	120	120	120	120	120
	24 hrs	150	150	160	160	170
	36 hrs	180	180	200	210	220
	48 hrs	210	220	240	250	260
	60 hrs	240	260	280	290	310
	72 hrs +	280	300	320	340	360

NEWBORN CARE

Note for all newborns:

Delivery preparation

- Ensure clean and safe delivery environment respecting infection, prevention and control practices
- Be prepared for potential resuscitation for every delivery
- Prevent Hypothermia

Immediate newborn care

- Practice delayed cord clamping to prevent early infant anaemia where possible.
- Place the newborn on the mother's chest to provide skin-to-skin contact
- Dry the newborn with a warm towel on mother's chest
- Stimulate and suction only if visible secretions and determine if resuscitation is required (refer to chapter on Newborn resuscitation).

Care within One hour after delivery

Physical examination

- Conduct newborn physical examination (head to toe)
- Measure head circumference, length and weight and chart on percentile charts

Vitamin K

- Administer to all newborns to prevent hemorrhagic disease of the newborn (give 1 mg IM for full term and 0.5 mg IM for preterm newborns/newborns < 1.5 kg)

Antibiotic eye ointment

- Administer Tetracycline 1% eye ointment to all newborns to prevent eye infections

Thermoregulation

- Well term newborns should be wrapped in dry cloth, wear a hat, and keep face visible
- Delay giving bath up to 24 hours
- Show mother how to avoid and recognize hypothermia after delivery.

Breastfeeding

- Breastfeed the newborn as soon as possible after birth (within an hour)
- Well newborns must be breastfed every 2-3 hours or on demand. Do not allow the Newborn to sleep for more than 3 hours without feeding.

Umbilical cord care

- Keeping the cord dry promotes early detachment of the umbilical stump
- Always wash hands before handling umbilical cord
- Ensure aseptic care in the clamping and cutting of the umbilical cord, keep the cord Clean and dry; do not apply anything.

CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP)

(For maximum benefit sart as soon as symptoms are identified)

Figure 17: *CPAP use in respiratory distress and preterm infants*

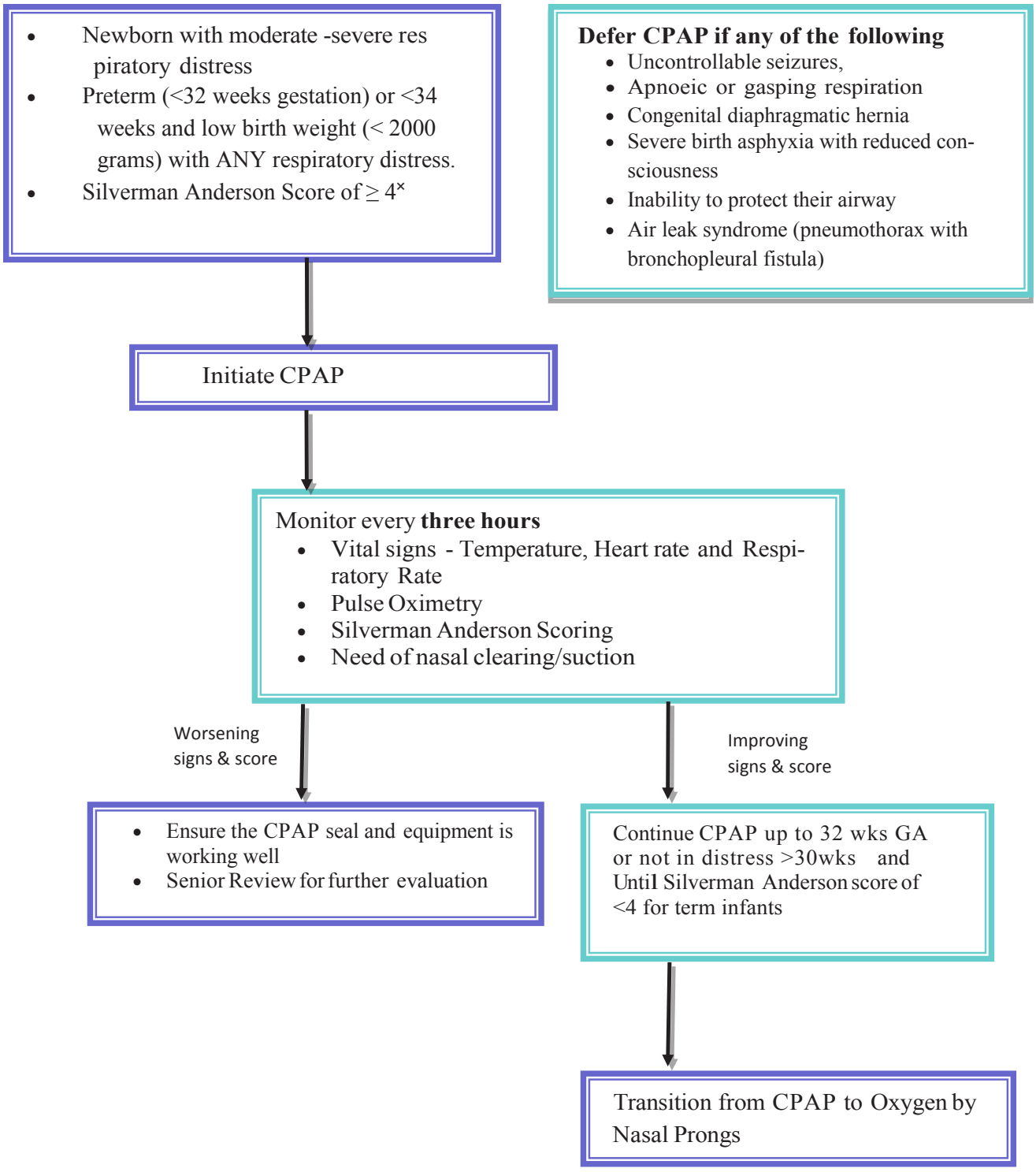


Table 21: *Silverman-Anderson score*

*Score of > 6 initiate CPAP as you prepare for transfer for mechanical ventilation

Silverman- Anderson* Score			
Feature	**Score 0**	**Score 1**	**Score 2**
Chest Movement	Equal	Respiratory Lag	See saw Respiration
Intercostal Retraction	None	Minimal	Marked
Xiphoid Retraction	None	Minimal	Marked
Nasal Flaring	None	Minimal	Marked
Expiratory Grunt	None	Audible with	Audible

(*For instruction on how to set up CPAP, refer to CPAP training/equipment manuals*)

NEWBORN FEEDING AND FLUID REQUIREMENTS

Table 22: *Newborn Feeding / Fluid requirements for infants born < 1.5kg.*

Newborn < 1.5kg: Total daily Feeding / Fluid requirements.	**Age**	**Total Daily Fluid / Milk Vol.**
Day 1 - Sick baby start with 24hours IV 10%D – **If safe** then start immediate NGT feeding with colostrum **From Day 2** unless baby very unwell start NGT feeds - Begin with 5mls 3hourly. Increase feed by the same amount **every day** and reduce IV fluids to keep within the total daily volume until IVF stopped – see table below For IVF **from Day 2,** D10% should be mixed with electrolytes 1/4 Ringer Lactate to make ¼ RL/D10%. ***Please ensure sterility of iv fluids when mixing / adding*** Always use EBM for NGT feeds unless contra-indicated It may be possible to increase volumes further to as much as 200mls/kg/day but seek expert advice.	Day 0	80 mls/kg/day
	Day 1	100 mls/kg/day
	Day 2	120 mls/kg/day
	Day 3	140 mls/kg/day
	Day 4	150 mls/kg/day
	Day 5+	160 mls/kg/day

Birth Weight < 1 kg (ELBW) (Estimated as 0.9 kg for calculation)						
DOL	IV Fluid	Total Fluid: IV+PO ml/kg/day	IV		Enteral	
			ml/kg/24hrs	ml/hr	ml/kg/24hrs	ml/3hrs
0	G10%	80	65	3	15	2
1	G10%*	100	60	2	40	5
2	G10%*	120	50	2	70	8
3	G10%*	140	40 (or stop)	2	100	11
4	G10%*	160	30 (or stop)	2	130	15
5	G10%*	180	stop	0	180	20
6	G10%*	180	stop	0	180	20
*If newborn is NPO after DOL0, D10% should be mixed with electrolytes (1/4 Ringer Lactate)						

Birth Weight 1 – 1.5 kg (VLBW) (Estimated as 1.25 kg for calculation)						
DOL	IV Fluid	Total Fluid: IV+PO ml/kg/day	IV		Enteral	
			ml/kg/24hrs	ml/hr	ml/kg/24hrs	ml/3hrs
0	G10%	80	65	3	15	3
1	G10%*	100	60	3	40	6
2	G10%*	120	50	3	70	11
3	G10%*	140	50 (or stop)	3	90	14
4	G10%*	160	50 (or stop)	0	110	17
5	G10%*	180	stop	0	180	28
6	G10%*	180	stop	0	180	28
*If newborn is NPO after DOL0, D10% will be replaced with ¼ RL/D10%.						

Table 23: *Newborn Feeding / Fluid requirements for infants born ≥1.5kg*

Newborn ≥ 1.5kg: Total daily Feeding / Fluid requirements	**Age**	**Total Daily Fluid / Milk Vol.**
✓ **Well baby** - Immediate breast milk feeding. For first feed give 5mls and increase by this amount each feed until full daily volume reached. ✓ **Day 1 - Sick baby** start with 24hrs IV ¼ RL/D10%. ✓ **From Day 2** unless baby very unwell start EBM NGT feeds. Increase feed by the same amount **every day** and reduce IV fluids to keep within the total daily volume until IVF stopped ✓ Always feed with EBM unless contra-indicated ✓ If signs of poor perfusion or fluid overload please ask for senior opinion on whether to give a bolus, step-up or step-down daily fluids.	**Day 0**	60 mls/kg/day
	Day 1	80 mls/kg/day
	Day 2	100 mls/kg/day
	Day 3	120 mls/kg/day
	Day 4	140 mls/kg/day
	Day 5	160 mls/kg/day
	Day 6	160 mls/kg/day

Birth Weight 1.5 – 2 kg (LBW)

(Estimated as 1.75 kg for calculation)

DOL	IV Fluid	Total Fluid: IV+PO ml/kg/day	IV		Enteral	
			ml/kg/24hrs	ml/hr	ml/kg/24hrs	ml/3hrs
0	D10%	60-80	45	3	15	3
1	D10%*	90	50	4	40	8
2	D10%*	120	50	4	70	15
3	D10%*	140	50 (or stop)	4	90	20
4	D10%*	165	35 (or stop)	3	130	28
5	n/a	165	0	0	165	36
6	n/a	165-180	0	0	165-180	36-39

*If newborn is NPO after DOL0, D10% will be replaced with ¼ RL/D10%.

Birth Weight 2– 2 .5kg (LBW)

(Estimated as 2.25 kg for calculation)

DOL	IV Fluid	Total Fluid: IV+PO ml/kg/day	IV		Enteral	
			ml/kg/24hrs	ml/hr for a 2.25 kg newborn	ml/kg/24hrs	ml/3hrs for a 2.25 kg newborn
0	G10%	60	45	4	15	4
1	G10%*	90	50	5	40	11
2	G10%*	120	50	5	70	20
3	G10%*	140	50 (or stop)	5	90	25
4	G10%*	165	35 (or stop)	3	130	37
5	n/a	165	0	0	165	46
6	n/a	165-180	0	0	165-180	46-50

*If newborn is NPO after DOL0, D10% will be replaced with ¼ RL/D10%.

Table 24: *Newborn Feeding / Fluid requirements in term infant*

Newborn Feeding / Fluid requirements: TERM BABY	Age	Total Daily Fluid / Milk Vol.
✓ **Well baby** - immediate breast milk feeding. For first feed give 10mls and increase by this amount each feed until full daily volume reached. ✓ **From Day 1** if baby very unwell begin with IVF and initiate feeds cautiously as tolerated. Increase feed by the same amount **every day** and reduce IV fluids to keep within the total daily volume until IVF stopped. ✓ For IVF, **Day 1** use D10% dextrose and from **Day 2** use ¼RL/D10%. ✓ ***Please ensure sterility of IV fluids when mixing / adding*** ✓ Always use EBM for NGT feeds unless contra-indicated If signs of poor perfusion or fluid overload please ask for senior opinion on whether to give a bolus, step-up or step-down daily fluids.	Day 0	60 ml/kg/day
	Day 1	80 ml/kg/day
	Day 2	100 ml/kg/day
	Day 3	120 ml/kg/day
	Day 4	140 ml/kg/day
	Day 5	160 ml/kg/day
	Day 6	180 ml/kg/day

Birth Weight 2.5 – 3 kg unable to breastfeed).

(Estimated as 2.75 kg for calculation)

DOL	IV Fluid	Total Fluid: IV+PO ml/kg/day	IV		Enteral	
			ml/kg/24hrs	ml/hr	ml/kg/24hrs	ml/3hrs
0	G10%	60	45	5	15	5
1	G10%*	90	50	6	40	14
2	G10%*	120	50	6	70	24
3	G10%*	150	50 (or stop)	6	100	34
4	G10%*	160	35 (or stop)	4	125	43
5	n/a	160	0	0	160	55
6	n/a	160-180	0	0	160-180	55-62

*If newborn is NPO after DOL0, G10% should be mixed with electrolytes (1/4 Ringer Lactate)

Birth Weight > 3 kg unable to breastfeed (Estimated as 3.5 kg for calculation)						
DOL	IV Fluid	Total Fluid: IV+PO ml/kg/day	IV		Enteral	
			ml/kg/24hrs	ml/hr	ml/kg/24hrs	ml/3hrs
0	G10%	60	45	7	15	7
1	G10%*	90	50	7	40	18
2	G10%*	120	50	7	70	30
3	G10%*	140	50 (or stop)	7	100	44
4	G10%*	160	35 (or stop)	5	125	55
5	n/a	160	0	0	160	70
6	n/a	160-180	0	0	160-180	70-80
*If newborn is NPO after DOL0, G10% should be mixed with electrolytes (1/4 Ringer Lactate)						

APPENDIX

Appendix 1: *Intravenous / intramuscular antibiotics aged < 7 days, adapt dose if necessary*

Weight kg	Penicillin **(50,000iu/kg)**	Ampicillin* / Cloxacillin **(50mg/kg)**	Gentamicin **(3mg/kg <2kg, 5mg/kg ≥ 2kg)**	Cefotaxime **(50mg/kg)**	Ceftriaxone **(50mg/kg)**	Metronidazole **(7.5mg/kg)**	Acyclovir **(20mg/kg)**
	iv / im	**iv / im**	**iv / im**	**im**	**iv / im**	**iv**	**iv**
	12 hrly	**12 hrly**	**24 hrly**	**12 hrly**	**24 hrly**	**12 hrly**	**8 hrly**
1.00	50,000	50	3	50	50	7.5	20
1.25	75,000	60	4	60	60	10	25
1.50	75,000	75	5	75	75	12.5	30
1.75	100,000	85	6	75	75	12.5	35
2.00	100,000	100	10	100	100	15	40
2.50	150,000	125	12.5	125	125	20	50
3.00	150,000	150	15	150	150	22.5	60
4.00	200,000	200	20	200	200	30	80

Ophthalmia Neonatorum: Swollen red eyelids with pus should be treated with a single dose of:

- ✓ Kanamycin or Spectinomycin 25mg/kg (max 75mg) im, or,
- ✓ Ceftriaxone 50mg/kg im

Warning:

- ✓ **Gentamicin** – Please check the dose is **correct for weight and age in DAYS**
- ✓ **Gentamicin** used OD should **be given im or as a slow IV push** – over 2-3 min.
- ✓ If a baby is not obviously passing urine after more than 24 hours consider stopping gentamicin.
- ✓ **Penicillin** dosing is **twice daily** in babies aged < 7 days
- ✓ **Chloramphenicol should not be used** in babies aged < 7 days.
- ✓ **Ceftriaxone** is not recommended in obviously jaundiced newborns – Cefotaxime is a safer cephalosporin in the first 7 days of life
- ✓ **Ampicillin *150 mg/kg/d if meningitis, 12hrly**
- ✓ **Acyclovir** 20 mg/kg 12 hrly if weight < 2 kg; 14d if localized herpes, 21d if general

Appendix 2: *Essential Drugs and their Doses*

Essential Drugs	Dose
Adrenaline 1 in 10,000	Give 0.1ml/kg IV in resuscitation. To make this strength dilute 1 ml of 1 in 1000 adrenaline in 9 mls water for injection to make 10mls Severe viral croup 2ml of 1:1000 nebulized
Albendazole	**Age < 2yrs**, 200mg stat, **Age ≥ 2yrs**, 400mg stat
Amikacin	15mg/kg once daily. Slow IV over 3-5 min If serious gram - ve infection / resistance to gentamicin higher doses may be used with monitoring
Aminophylline- iv ONLY used in inpatients!	**Newborn** Loading dose 6mg/kg IV over 1 hour, **Maintenance (IV or oral)**: Age 0-7 days - 2.5mg/kg 12hourly, Age 7-28 days: 4mg/kg 12hourly. **Asthma:** 6mg/kg IV first dose over 30 mins (failure to respond to standard bronchodilators)
Amoxicillin	Use 25mg/kg/dose for simple infections and 50mg/kg for pneumonia
Ampicillin	**Neonate:** 50mg/kg/dose 12 hourly IV or IM if aged ≤ 7 days and 8 hourly if older 50mg/kg/dose (Max 500mg) 8 hourly IV/ IM.
Artemether- Lumefantrine	2.4 mg/kg i.v given on admission, then at 12hr and 24hrs, then once a day for 7days.
Azithromycin	10mg/kg max 500mg PO daily for 3-5 days
Beclomethasone	Age < 2yrs 50-100 micrograms 12hourly, ≥ 2yrs 100-200 micrograms 12hourly
Benzyl Penicillin (X-pen)	**Age ≤ 6days:** 50,000 iu/kg/dose 12 hourly IV or IM **Age 7 days and over:** 50,000 iu/kg/dose 6 hourly IV/IM
Caffeine	**Loading dose** oral/NGT: 20 mg/kg (or IV over 30 min). **Maintenance dose**: 5 mg/kg daily oral (or IV over 30 min).
Cefotaxime	Preferred to Ceftriaxone for treatment of neonatal meningitis if aged ≤ 7 days: **Pre-term:** 50mg/kg 12 hourly; **Term aged ≤ 7 days:** 50mg/kg 8 hourly
Ceftriaxone	50mg/kg/day and 100mg/kg/day in meningitis.
Ciprofloxacin – Oral	Dysentery dosing: 10mg/kg/dose q12hrly.
Clotrimazole 1%	Apply mouth paint / cream daily

<table>
<tr><td>Dexamethasone</td><td>For severe croup: 0.6mg/kg stat</td></tr>
<tr><td>Cloxacillin</td><td>≥1 month and ≤20kg: 50-100mg/kg/day in 4 divided doses.
≥ 20kg: 250 to 500mg q6hrly.</td></tr>
<tr><td>Co-trimoxazole

(4mg/kg Trimethoprim & 20mg/kg sulphamethoxazole)</td><td>
<table>
<tr><th>Weight</th><th>240mg/5ml syrup
12hourly</th><th>480mg tabs
12hourly</th></tr>
<tr><td>2 - 3kg</td><td>2.5mls</td><td>¼</td></tr>
<tr><td>4 - 10kg</td><td>5mls</td><td>½</td></tr>
<tr><td>11 - 15 kg</td><td>7.5ls</td><td>½</td></tr>
<tr><td>16 - 20 kg</td><td>10mls</td><td>1</td></tr>
</table>
</td></tr>
<tr><td>Diazepam – iv/rectal</td><td>IV: 0.3mg/kg, Rectal: 0.5mg/kg</td></tr>
<tr><td>Digoxin oral</td><td>5 mics/kg 12 hourly; No loading dose</td></tr>
<tr><td>Furosemide</td><td>0.5 to1mg/kg up to 6 hourly</td></tr>
<tr><td>Gentamicin</td><td>5;7.5 mg/kg/24 hr IM or slow IV</td></tr>
<tr><td>Ibuprofen</td><td>5 - 10 mg/kg 8 hourly</td></tr>
<tr><td>Iron</td><td>6 mg/kg/day (elemental iron) for treatment; 2mg/kg/day (elemental iron) in prophylaxis</td></tr>
<tr><td>Lorazpam</td><td>0.1mg/kg IV over 30-60 seconds Max dose 4mg</td></tr>
<tr><td>Mebendazole</td><td>(Age > 1yr) 100mg 12 hourly for 3 days or 500mg stat</td></tr>
<tr><td>Metronidazole</td><td>IV or Oral: 7.5mg/kg/dose 8hrly</td></tr>
<tr><td>Morphine (100,000 IU/ml)</td><td>Neonate: 0.05 - 0.2 mg/kg/dose IM, SC, slow IV every 4hr
Infant and Child: PO 0.2 - 0.5 mg/kg/dose every 4 - 6 hr as needed
IM IV/SC 0.1 - 0.2 mg/kg/dose every 2-4 hrs as needed Max 15 mg/dose</td></tr>
<tr><td>Paracetamol</td><td>10-15mg /kg 6 to 8 hourly</td></tr>
<tr><td>Pethidine, IM</td><td>0.5 to 1mg / kg every 4- 6 hours</td></tr>
<tr><td>Phenobarbital</td><td>Loading with 15mg/kg (if NOT on maintenance phenobarbital) followed by 2.5mg - 5mg/kg daily</td></tr>
<tr><td>Phenytoin</td><td>Age 1month - 12 yrs (IV, oral): 15 mg/kg at a rate not exceeding 1 mg/kg/minute as a loading dose; Maintenance dose of 2.5 - 5 mg/kg twice daily (max. 150mg twice daily) Similar dosing can be used in neonates</td></tr>
<tr><td>Potassium</td><td>Oral: 1 - 2 mmol/kg/day divided into 6hrly
IV: 0.25-0.5mmol/kg dose STAT, may repeat the dose (monitor levels closely)</td></tr>
<tr><td>Quinine</td><td>Loading dose 20mg/kg diluted in 5-10 ml/kg of 5% dextrose over 4 hours
8 hourly till patient can take oral medications</td></tr>
<tr><td>Pethidine, IM</td><td>0.5 to 1mg / kg every 4- 6 hours</td></tr>
</table>

<table>
<tr><td>Phenobarbitone</td><td>Loading dose; 20mg/kg, maintenance 2.5-5mg/kg/day,</td></tr>
<tr><td>Salbutamol</td><td>Nebulized 2.5mg/dose as required
Inhaled (100 micrograms per puff) 2 puffs via spacer repeated as required acutely</td></tr>
<tr><td>Use inhaled steroid for persistent asthma</td><td>Oral 1mg/dose 6-8hourly aged 2-11 months, 2mg/dose 6-8hourly aged 1 - 4 yrs (1 week only)</td></tr>
<tr><td>Vitamin A
Once on admission, not to be repeated within 1 month. For malnutrition with eye Disease repeat on day 2 and Day 14</td><td><table><tr><th>Age</th><th>Dosage Oral</th></tr><tr><td>< 6 months</td><td>50,000 u stat</td></tr><tr><td>6-12 months</td><td>100,000 u stat</td></tr><tr><td>>12 Months</td><td>200,000 u stat</td></tr></table></td></tr>
<tr><td>Vitamin D – Rickets
Low dose regimens daily for 8-12wks or high dose stat Calcium 50mg/kg/day for first week of treatment.</td><td><table><tr><th>Age</th><th>Dosage</th></tr><tr><td>< 6 months</td><td>3,000 u = 75 micrograms</td></tr><tr><td>>6 months</td><td>6,000 u = 150 micrograms</td></tr><tr><td>> 6 months stat Regimen</td><td>300,000 u = 7,500 Micrograms or 7.5 mg Stat</td></tr></table></td></tr>
<tr><td>Vitamin D – Maintenance
After treatment course</td><td><table><tr><th>Age</th><th>Dosage Oral</th></tr><tr><td>< 6 months</td><td>200 - 400 u (5 – 10 µg)</td></tr><tr><td>>6 months</td><td>400 - 800 u (10 – 20 µg)</td></tr></table></td></tr>
<tr><td>Vitamin K</td><td>Newborns: 1mg stat im (for preterm, 0.4mg/kg for a maximum dose of 1mg im stat), For liver disease: 0.3 mg/kg stat, max 10mg</td></tr>
<tr><td>Zinc Sulphate</td><td>> 6 mths 20mg (1 tablet), ≤ 6mths 10mg (½ tablet) once a day, 10 days</td></tr>
</table>

Appendix 3: Weight for Length (Height) Charts for children

Weight for Length (Height) Charts for children aged 0 – 23 months

Length (cm)	Boys				Girls			
	–3SD	–2SD	–1SD		–3SD	–2SD	–1 SD	
45	1.9	2	2.2	For children who have a weight for height that is not ≤ -1 then classify as ' normal'. For more precise WHZ scores please use Weight for Height Charts.	1.9	2.1	2.3	For children who have a weight for height that is not ≤ -1 then classify as ' normal'. For more precise WHZ scores please use Weight for Height Charts.
46	2	2.2	2.4		2	2.2	2.4	
47	2.1	2.3	2.5		2.2	2.4	2.6	
48	2.3	2.5	2.7		2.3	2.5	2.7	
49	2.4	2.6	2.9		2.4	2.6	2.9	
50	2.6	2.8	3		2.6	2.8	3.1	
51	2.7	3	3.2		2.8	3	3.3	
52	2.9	3.2	3.5		2.9	3.2	3.5	
53	3.1	3.4	3.7		3.1	3.4	3.7	
54	3.3	3.6	3.9		3.3	3.6	3.9	
55	3.6	3.8	4.2		3.5	3.8	4.2	
56	3.8	4.1	4.4		3.7	4	4.4	
57	4	4.3	4.7		3.9	4.3	4.6	
58	4.3	4.6	5		4.1	4.5	4.9	
59	4.5	4.8	5.3		4.3	4.7	5.1	
60	4.7	5.1	5.5		4.5	4.9	5.4	
61	4.9	5.3	5.8		4.7	5.1	5.6	
62	5.1	5.6	6		4.9	5.3	5.8	
63	5.3	5.8	6.2		5.1	5.5	6	
64	5.5	6	6.5		5.3	5.7	6.3	
65	5.7	6.2	6.7		5.5	5.9	6.5	
66	5.9	6.4	6.9		5.6	6.1	6.7	
67	6.1	6.6	7.1		5.8	6.3	6.9	
68	6.3	6.8	7.3		6	6.5	7.1	
69	6.5	7	7.6		6.1	6.7	7.3	
70	6.6	7.2	7.8		6.3	6.9	7.5	
71	6.8	7.4	8		6.5	7	7.7	
72	7	7.6	8.2		6.6	7.2	7.8	
73	7.2	7.7	8.4		6.8	7.4	8	
74	7.3	7.9	8.6		6.9	7.5	8.2	
75	7.5	8.1	8.8		7.1	7.7	8.4	
76	7.6	8.3	8.9		7.2	7.8	8.5	
77	7.8	8.4	9.1		7.4	8	8.7	

Weight for Length (Height) Charts for children aged 0 – 23 months

Length	Boys				Girls			
(cm)	–3SD	–2SD	–1SD		–3SD	–2SD	–1 SD	
78	7.9	8.6	9.3	For children who have a weight for height that is not ≤ -1 then classify as ' normal' . For more precise WHZ scores please use Weight for Height Charts.	7.5	8.2	8.9	For children who have a weight for height that is not ≤ -1 then classify as ' normal' . For more precise WHZ scores please use Weight for Height Charts.
79	8.1	8.7	9.5		7.7	8.3	9.1	
80	8.2	8.9	9.6		7.8	8.5	9.2	
81	8.4	9.1	9.8		8	8.7	9.4	
82	8.5	9.2	10		8.1	8.8	9.6	
83	8.7	9.4	10.2		8.3	9	9.8	
84	8.9	9.6	10.4		8.5	9.2	10.1	
85	9.1	9.8	10.6		8.7	9.4	10.3	
86	9.3	10	10.8		8.9	9.7	10.5	
87	9.5	10.2	11.1		9.1	9.9	10.7	
88	9.7	10.5	11.3		9.3	10.1	11	
89	9.9	10.7	11.5		9.5	10.3	11.2	
90	10.1	10.9	11.8		9.7	10.5	11.4	
91	10.3	11.1	12		9.9	10.7	11.7	
92	10.5	11.3	12.2		10.1	10.9	11.9	
93	10.7	11.5	12.4		10.2	11.1	12.1	
94	10.8	11.7	12.6		10.4	11.3	12.3	
95	11	11.9	12.8		10.6	11.5	12.6	
96	11.2	12.1	13.1		10.8	11.7	12.8	
97	11.4	12.3	13.3		11	12	13	
98	11.6	12.5	13.5		11.2	12.2	13.3	
99	11.8	12.7	13.7		11.4	12.4	13.5	
100	12	12.9	14		11.6	12.6	13.7	
101	12.2	13.2	14.2		11.8	12.8	14	
102	12.4	13.4	14.5		12	13.1	14.3	
103	12.6	13.6	14.8		12.3	13.3	14.5	
104	12.8	13.9	15		12.5	13.6	14.8	
105	13	14.1	15.3		12.7	13.8	15.1	
106	13.3	14.4	15.6		13	14.1	15.4	
107	13.5	14.6	15.9		13.2	14.4	15.7	
108	13.7	14.9	16.2		13.5	14.7	16	
109	14	15.1	16.5		13.7	15	16.4	
110	14.2	15.4	16.8		14	15.3	16.7	

Weight for Length (Height) Charts for children aged 2- 5 years

Length (cm)	Boys				Girls			
	–3SD	–2SD	–1 SD		–3 SD	–2 SD	–1 SD	
66	6.1	6.5	7.1	For children who have a weight for height that is not ≤ -1 then classify as ' normal' . For more precise WHZ scores please use Weight for Height Charts.	5.8	6.3	6.8	For children who have a weight for height that is not ≤ -1 then classify as ' normal' . For more precise WHZ scores please use Weight for Height Charts.
67	6.2	6.7	7.3		5.9	6.4	7	
68	6.4	6.9	7.5		6.1	6.6	7.2	
69	6.6	7.1	7.7		6.3	6.8	7.4	
70	6.8	7.3	7.9		6.4	7	7.6	
71	6.9	7.5	8.1		6.6	7.1	7.8	
72	7.1	7.7	8.3		6.7	7.3	8	
73	7.3	7.9	8.5		6.9	7.5	8.1	
74	7.4	8	8.7		7	7.6	8.3	
75	7.6	8.2	8.9		7.2	7.8	8.5	
76	7.7	8.4	9.1		7.3	8	8.7	
77	7.9	8.5	9.2		7.5	8.1	8.8	
78	8	8.7	9.4		7.6	8.3	9	
79	8.2	8.8	9.6		7.8	8.4	9.2	
80	8.3	9	9.7		7.9	8.6	9.4	
81	8.5	9.2	9.9		8.1	8.8	9.6	
82	8.7	9.3	10.1		8.3	9	9.8	
83	8.8	9.5	10.3		8.5	9.2	10	
84	9	9.7	10.5		8.6	9.4	10.2	
85	9.2	10	10.8		8.8	9.6	10.4	
86	9.4	10.2	11		9	9.8	10.7	
87	9.6	10.4	11.2		9.2	10	10.9	
88	9.8	10.6	11.5		9.4	10.2	11.1	
89	10	10.8	11.7		9.6	10.4	11.4	
90	10.2	11	11.9		9.8	10.6	11.6	
91	10.4	11.2	12.1		10	10.9	11.8	
92	10.6	11.4	12.3		10.2	11.1	12	
93	10.8	11.6	12.6		10.4	11.3	12.3	
94	11	11.8	12.8		10.6	11.5	12.5	
95	11.1	12	13		10.8	11.7	12.7	
96	11.3	12.2	13.2		10.9	11.9	12.9	
97	11.5	12.4	13.4		11.1	12.1	13.2	
98	11.7	12.6	13.7		11.3	12.3	13.4	
99	11.9	12.9	13.9		11.5	12.5	13.7	

Weight for Length (Height) Charts for children aged 2- 5 years

Length	Boys				Girls			
(cm)	−3SD	−2SD	−1 SD	For children who have a weight for height that is not ≤ -1 then classify as ' normal' . For more precise WHZ scores please use Weight for Height	−3SD	−2 SD	−1 SD	For children who have a weight for height that is not ≤ -1 then classify as ' normal' . For more precise WHZ scores please use Weight for Height
100	12.1	13.1	14.2		11.7	12.8	13.9	
101	12.3	13.3	14.4		12	13	14.2	
102	12.5	13.6	14.7		12.2	13.3	14.5	
103	12.8	13.8	14.9		12.4	13.5	14.7	
104	13	14	15.2		12.6	13.8	15	
105	13.2	14.3	15.5		12.9	14	15.3	
106	13.4	14.5	15.8		13.1	14.3	15.6	
107	13.7	14.8	16.1		13.4	14.6	15.9	
108	13.9	15.1	16.4		13.7	14.9	16.3	
109	14.1	15.3	16.7		13.9	15.2	16.6	
110	14.4	15.6	17		14.2	15.5	17	
111	14.6	15.9	17.3		14.5	15.8	17.3	
112	14.9	16.2	17.6		14.8	16.2	17.7	
113	15.2	16.5	18		15.1	16.5	18	
114	15.4	16.8	18.3		15.4	16.8	18.4	
115	15.7	17.1	18.6		15.7	17.2	18.8	
116	16	17.4	19		16	17.5	19.2	
117	16.2	17.7	19.3		16.3	17.8	19.6	
118	16.5	18	19.7		16.6	18.2	19.9	
119	16.8	18.3	20		16.9	18.5	20.3	
120	17.1	18.6	20.4		17.3	18.9	20.7	

Appendix 4: Emergency estimation of weight

All babies and children admitted to hospital should be weighed and the weight recorded in the medial record and in the Maternal Child Health Booklet.

Estimate the weight from the age only if immediate life support is required or the patient is in shock – then check weight as soon as stabilized.

All other children should have weight measured.

All babies and children admitted to hospital should be weighed and the weight recorded in the medial record and in the Maternal Child Health Booklet.

Estimate the weight from the age only if immediate life support is required or the patient is in shock – then check weight as soon as stabilized.

All other children should have weight measured.

Child looks well nourished, average size for age	
Age	**Estimated Weight (kg)**
1 – 3 weeks	3.0
4 - 7 weeks	4.0
2 - 3 months	5.0
4 - 6 months	7.0
7 to 9 months	9.0
10 to 12 months	10.0
1 to 2 yrs	11.0
2 to 3 yrs	13.0
3 to 4 yrs	15.0
4 to 5 yrs	17.0

Child looks obviously underweight – find age but step back 2 weight/height categories and use the weight appropriate for this younger age- group.

Eg. Child thin and age 10 months, use the weight for a 4-6months well-nourished child.

If there is severe malnutrition this chart will be inaccurate.

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