

# Emergency Triage Assessment and Treatment (ETAT+)

## National Guidelines Book

**2020**



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## List of Acronyms

|                        |                                                                   |
|------------------------|-------------------------------------------------------------------|
| <b>ABCD</b>            | Airway, Breathing, Circulation and Disability                     |
| <b>ACT</b>             | Artemisinin-based Combination Therapy                             |
| <b>BD</b>              | Twice a Day                                                       |
| <b>BLS</b>             | Basic Life Support                                                |
| <b>BVM</b>             | Bag Valve Mask                                                    |
| <b>CH</b>              | Child Health                                                      |
| <b>CPAP</b>            | Continuous Positive Airway Pressure                               |
| <b>CPR</b>             | Cardio Pulmonary Resuscitation                                    |
| <b>CRT</b>             | Capillary Refill Time                                             |
| <b>D10%</b>            | Dextrose 10% solution                                             |
| <b>ENT</b>             | Ear Nose Throat                                                   |
| <b>EPI</b>             | Expanded Program on Immunization                                  |
| <b>ETAT+</b>           | Emergency Triage Assessment and Treatment Plus                    |
| <b>Hb</b>              | Haemoglobin                                                       |
| <b>HIE</b>             | Hypoxic Ischaemic Encephalopathy                                  |
| <b>HIV</b>             | Human Immunodeficiency Virus                                      |
| <b>HOD</b>             | Head of Department                                                |
| <b>IM</b>              | Intra Muscular                                                    |
| <b>IMAM</b>            | Integrated Management of Acute Malnutrition                       |
| <b>IMNCI</b>           | Integrated Management of Neonatal and Childhood Illnesses         |
| <b>IO</b>              | Intra Osseous                                                     |
| <b>ISBAR</b>           | Identification, Situation, Background, Assessment, Recommendation |
| <b>IV</b>              | Intra Venous                                                      |
| <b>KMC</b>             | Kangaroo Mother Care                                              |
| <b>M&amp;E</b>         | Monitoring and Evaluation                                         |
| <b>MOHS</b>            | Ministry of Health and Sanitation                                 |
| <b>MUAC</b>            | Mid Upper Arm Circumference                                       |
| <b>NG</b>              | Naso Gastric                                                      |
| <b>NPO</b>             | Nil Per Os (nothing by mouth)                                     |
| <b>NS</b>              | Normal Saline (IV Fluid)                                          |
| <b>O<sub>2</sub></b>   | Oxygen                                                            |
| <b>OD</b>              | Once a Day                                                        |
| <b>ODCH</b>            | Ola During Children's Hospital                                    |
| <b>ORS</b>             | Oral Rehydration Solution                                         |
| <b>OTP</b>             | Outpatient Therapeutic Program                                    |
| <b>PR</b>              | Per Rectum                                                        |
| <b>QID</b>             | Four times a Day                                                  |
| <b>RBC</b>             | Red Blood Cell                                                    |
| <b>RCPCH</b>           | Royal College of Paediatrics and Child Health                     |
| <b>RDT</b>             | Rapid Diagnostic Test                                             |
| <b>ReSoMal</b>         | Rehydration Solution for Malnutrition                             |
| <b>RL</b>              | Ringer's Lactate (IV Fluid)                                       |
| <b>SAM</b>             | Severe Acute Malnutrition                                         |
| <b>SCBU</b>            | Special Care Baby Unit                                            |
| <b>SD</b>              | Standard Deviation                                                |
| <b>SpO<sub>2</sub></b> | Oxygen Saturation (peripheral capillary)                          |
| <b>TB</b>              | Tuberculosis                                                      |
| <b>TFC / IPF</b>       | Therapeutic Feeding Centre / In-Patient Facility                  |
| <b>TID</b>             | Thrice a Day                                                      |
| <b>UNICEF</b>          | United Nations Children's Fund                                    |
| <b>USLTHC</b>          | University of Sierra Leone Teaching Hospital Complex              |
| <b>WFH</b>             | Weight for Height (or Length)                                     |
| <b>WHO</b>             | World Health Organization                                         |

## Glossary of Terms

|                                                   |                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Acute abdomen</b>                              | Refers to a sudden, severe abdominal pain. It is in many cases a medical emergency, requiring urgent and specific diagnosis.                                                                                                                                                                                                                          |
| <b>Anaemia</b>                                    | The condition of having a lower-than-normal number of red blood cells or quantity of haemoglobin.                                                                                                                                                                                                                                                     |
| <b>Anaphylaxis</b>                                | Severe allergic reaction (for example to antibiotics, blood product, nuts)                                                                                                                                                                                                                                                                            |
| <b>Apathy</b>                                     | Lack of feeling, emotion, interest, or concern about something. It is a state of indifference, or the suppression of emotions such as concern, excitement, motivation, or passion.                                                                                                                                                                    |
| <b>APGAR score</b>                                | A measure of the physical condition of a newborn infant. It is obtained by adding points (2, 1, or 0) for heart rate, respiratory effort, muscle tone, response to stimulation, and skin coloration; a score of ten represents the best possible condition.                                                                                           |
| <b>Apnoea</b>                                     | Is the cessation of breathing                                                                                                                                                                                                                                                                                                                         |
| <b>Bitot spots</b>                                | Small, circumscribed, lustreless, greyish-white, foamy, greasy, triangular deposits on the bulbar conjunctiva adjacent to the cornea; occurs in vitamin A deficiency.                                                                                                                                                                                 |
| <b>Cerebral malaria</b>                           | Severe malaria with altered consciousness ( <i>see malaria</i> )                                                                                                                                                                                                                                                                                      |
| <b>Circulation</b>                                | The transport of oxygenated blood with glucose to all body tissues.                                                                                                                                                                                                                                                                                   |
| <b>Continuous Positive Airway Pressure (CPAP)</b> | – A procedure of giving positive pressure to keep the alveoli open, making it easier to breathe in and out. CPAP reduces respiratory distress and improves oxygenation.                                                                                                                                                                               |
| <b>Convulsion</b>                                 | A disorganised electrical activity in the brain that causes stiffness of the muscles or abnormal jerky movement of limbs, face or eyes. Convulsions that last longer than a few minutes can cause irreversible damage to the brain.                                                                                                                   |
| <b>Coma</b>                                       | A state where the patient's level of consciousness is so low that they cannot respond to stimulation. Children with an AVPU of P or U are in coma.                                                                                                                                                                                                    |
| <b>Cyanosis</b>                                   | A physical sign causing bluish discoloration of the skin and mucous membranes. It is caused by a lack of oxygen in the blood. Cyanosis is associated with cold temperatures, heart failure, lung diseases and smothering. It is seen in infants at birth as a result of heart defects, respiratory distress syndrome, or lung and breathing problems. |
| <b>Febrile convulsion</b>                         | Convulsion associated with fever.                                                                                                                                                                                                                                                                                                                     |
| <b>Grunting</b>                                   | A short, explosive, moaning or crying sound heard on expiration.                                                                                                                                                                                                                                                                                      |
| <b>Haemoglobinuria</b>                            | The presence of free haemoglobin in the urine, which may make the urine look dark. Normally, there is no haemoglobin in the urine. Haemoglobinuria is a sign of a number of abnormal conditions, such as bleeding and paroxysmal nocturnal haemoglobinuria.                                                                                           |
| <b>Haemolysis</b>                                 | The breaking down of red blood cells with liberation of haemoglobin                                                                                                                                                                                                                                                                                   |
| <b>Heimlich manoeuvre</b>                         | – Also called Abdominal thrusts, a first-aid procedure for dislodging an obstruction from a person's windpipe in which a sudden strong pressure is applied on their abdomen, between the navel and the ribcage.                                                                                                                                       |
| <b>Hepatosplenomegaly</b>                         | – A disorder where both the liver and spleen swell beyond their normal size, due to one of a number of causes. The name of this condition (hepatosplenomegaly) comes from the two words that comprise it: <i>hepatomegaly</i> – swelling or enlargement of the liver, <i>splenomegaly</i> – swelling or enlargement of the spleen                     |
| <b>Hypoglycaemia</b>                              | A condition in which your blood sugar (glucose level) is lower than normal.                                                                                                                                                                                                                                                                           |
| <b>Hypothermia</b>                                | A medical emergency that occurs when your body loses heat faster that it can produce heat, causing a dangerously low body temperature.                                                                                                                                                                                                                |
| <b>Hypoxic Ischaemic Encephalopathy (HIE)</b>     | – A type of brain dysfunction that occurs when the brain doesn't receive enough oxygen or blood flow for a period of time. <i>Hypoxic</i> means not enough oxygen; <i>ischaemic</i> means not enough blood flow; and <i>encephalopathy</i>                                                                                                            |

means brain disorder. If the blood or oxygen supply to the brain has been interrupted, the rest of the body may have also been “starved” of oxygen. This may cause damage to other organs, including the heart, liver, kidneys and bowels.

**Kangaroo mother care (KMC)** – An intervention of keeping baby skin to skin with mother (or available caregiver) at all times; providing safe and stable environment in which the baby can grow and develop; for most small babies this will be at least equivalent to caring for a baby in an incubator, and in many cases will be better.

**Kwashiorkor** Also known as “oedematous malnutrition” because of its association with oedema (fluid retention), is a nutritional disorder most often seen in regions experiencing famine. It is a form of malnutrition caused by lack of protein in the diet.

**Lethargy** A condition marked by drowsiness and an unusual lack of energy and mental alertness. It can be caused by many things, including illness, injury, or drugs.

**Pallor** An unusual paleness of the skin

**Malaria** A life-threatening disease caused by parasites that are transmitted to people through the bites of infected female *Anopheles* mosquitoes. Malaria is caused by *Plasmodium* parasites.

**Marasmus** Is a form of malnutrition. It happens when the intake of nutrients and energy is too low for a person’s needs. It leads to wasting, or the loss of body fat and muscle.

**Meconium** A newborn’s first faeces. This sticky, thick, dark green faeces is made up of cells, proteins, fats and intestinal secretions, like bile. Babies typically pass meconium in the first few hours and days after birth. But some babies pass meconium while still in the womb during late pregnancy.

**Oedema** Also known as fluid retention or swelling, is the build-up of fluid in the body’s tissue. Most commonly, the legs or arms are affected. Symptoms may include skin which feels tight, the area may feel heavy, and affected joints may be hard to move. Other symptoms depend on the underlying cause.

**Prostration** The state of being extremely weak or subservient

**Sepsis** An overwhelming and life-threatening response to infection that can lead to tissue damage, organ failure and death

**Septicaemia** A condition when bacteria enter the bloodstream, and can cause blood poisoning which triggers sepsis.

**Shock** A condition where there is not enough oxygen and glucose being delivered to the important organs

**Stridor** A high-pitched, whistling sound caused by disrupted airflow which is most often heard while taking in a breath. It may also be called musical breathing or extra thoracic airway obstruction. Airflow is usually disrupted by a blockage in the larynx (voice box) or trachea (windpipe).

**Triage** The process of identifying and separating stable patients and sick patients. The purpose of triage is to determine which group of patients needs to be treated first depending on the severity of their condition. Triage is the sorting of patients into Emergency, Priority and Non-urgent groups according to their needs.

**Wheezing** A high-pitched whistling sound made while you breathe. It’s heard most clearly when you exhale, but in severe cases, it can be heard when you inhale. It’s caused by narrowed airways or inflammation.

## Foreword

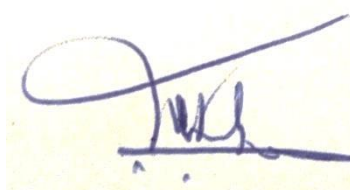
Sierra Leone has come a long way in its efforts to improve on child morbidity and mortality. A lot of progress has been made over the years and according to the DHS, the under 5 mortality in the country decreased from 156/1000 live births in 2015 to 122/1000 live births in 2019. Whilst this implies some progress, the under 5 Mortality rate is still one of the highest in the world. Robust strategies are therefore needed by the MOHS and its partners to improve on the situation.

This Revised manual has been updated from its previous edition drawing from the WHO ETAT guidelines with inputs from child health stakeholders including senior paediatricians and other child health practitioners to make it more relevant to the Sierra Leone context.

It provides important and practical guides on the management of children in hospitals even in the absence of paediatricians or senior medical officers. It ensures that the first responders are adequately equipped with the required knowledge and skills to properly assess a child and to provide appropriate life-saving and timely management to ensure that the child is stabilised as quickly as possible considering the fact that most childhood deaths happen in the first 24 hours of admission.

The Ministry of Health and Sanitation in collaboration with its partners intends to use this manual for the training and mentorship of health care workers working with children to ensure optimal emergency management of the child.

We therefore encourage all Medical Superintendents, Matrons and DMOs to embrace the use of this manual and to ensure that staff working in emergency outpatient services for children or paediatric and neonatal (SCBU) wards are trained using this manual and that these guidelines are used for the Emergency management of Children across all health facilities in the country.



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## Acknowledgements

These guidelines were developed, thanks to the unstinting efforts of a large team of people from many different agencies, who are committed to improving the care of children in hospital in Sierra Leone under the leadership and coordination of the Child Health and EPI Program of the MOHS.

Particular recognition is given to the RCPCH-Global Links who worked with the CH/EPI program to put together the team of reviewers consisting of paediatricians and other child health stakeholders. We are particularly appreciative of the paediatricians who despite their very busy schedules, actually dedicated their time to both the review and update of the document, as well as to attend the 2 days session for the validation and consolidation of the manual.

Other major contributors to the process of updating the document include the World Health Organisation who also made important technical inputs throughout the review process.

The ETAT+ working group of the Child Health/EPI program put in many hours of work to coordinate the process to produce the current guidelines that are most relevant to paediatric care in Sierra Leone.

The dedication in this process to saving children's lives is evidenced by the quality of this manual which we hope will be the basis for emergency management of children in hospitals across the country.

We would like to express our appreciation to the United Kingdom's Department for International Development for funding this project.

Lastly, we are also appreciative of the strategic guidance and moral support provided from the Ministry of Health and Sanitation particularly from the Chief Medical Officer, Rev. Doctor TT Samba, the Deputy CMO, Dr. Bash Taqi and the Chief Nursing and Midwifery Officer, Matron Mary Fullah.



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## Table of Contents

|                                                                                |           |
|--------------------------------------------------------------------------------|-----------|
| <b>List of Contributors and Reviewers.....</b>                                 | <b>4</b>  |
| <b>List of Acronyms.....</b>                                                   | <b>5</b>  |
| <b>Glossary of Terms.....</b>                                                  | <b>6</b>  |
| <b>Foreword .....</b>                                                          | <b>8</b>  |
| <b>Acknowledgements.....</b>                                                   | <b>9</b>  |
| <b>1. Triage and the “ABCD” Concept .....</b>                                  | <b>12</b> |
| The ‘ABCD’ Concept.....                                                        | 13        |
| The Triage Process.....                                                        | 13        |
| Triage Summary Diagram.....                                                    | 14        |
| <b>2. Basic Life Support: Assessing and Managing the Collapsed Child .....</b> | <b>15</b> |
| Summary Diagram.....                                                           | 18        |
| <b>3. ABCD Approach to an Unwell Child with Signs of Life.....</b>             | <b>19</b> |
| Summary Diagram.....                                                           | 20        |
| <b>4. Airway.....</b>                                                          | <b>21</b> |
| Assessment of the Airway.....                                                  | 21        |
| Management of the Airway in an Unconscious Child .....                         | 21        |
| Management of the choking child (foreign body) .....                           | 23        |
| <b>5. Breathing .....</b>                                                      | <b>24</b> |
| Assessment of breathing: Signs of Respiratory Distress.....                    | 24        |
| Management of Breathing: Oxygen .....                                          | 24        |
| Continuous Positive Airway Pressure (CPAP).....                                | 25        |
| Summary Diagram.....                                                           | 26        |
| <b>6. Circulation .....</b>                                                    | <b>27</b> |
| Assessment for Shock.....                                                      | 27        |
| Assessment for anaemia.....                                                    | 28        |
| Assessment for severe acute malnutrition (SAM) .....                           | 28        |
| Assessment for severe dehydration .....                                        | 28        |
| Fluid management in children with shock without severe dehydration .....       | 29        |
| Fluid management in children with severe dehydration but not in shock .....    | 31        |
| Fluid management in children some dehydration but not in shock.....            | 32        |
| Maintenance Fluids and Feed .....                                              | 33        |
| Watery Diarrhoea.....                                                          | 34        |
| Intravenous & Intra osseous Access .....                                       | 34        |
| Anaemia Summary Flowchart .....                                                | 35        |
| <b>7. Disability (Coma and Convulsion) .....</b>                               | <b>36</b> |

|                                                                                                   |                  |
|---------------------------------------------------------------------------------------------------|------------------|
| Assessment of Disability .....                                                                    | 36               |
| Management of Disability .....                                                                    | 36               |
| Management of Convulsions in Children aged over 1 month .....                                     | 37               |
| Preparation and Administration of Phenobarbitone and Phenytoin.....                               | 39               |
| <b>8. Malaria .....</b>                                                                           | <b>40</b>        |
| <b>9. Sickle Cell Disease .....</b>                                                               | <b>43</b>        |
| Sickle Cell Emergencies and Management.....                                                       | 43               |
| <b>10. Severe Acute Malnutrition (SAM) .....</b>                                                  | <b>45</b>        |
| Diagnosing SAM .....                                                                              | 45               |
| Or Oedema of both feet .....                                                                      | 45               |
| Admission criteria for children with severe acute malnutrition for inpatient or outpatient care . | 45               |
| Management of SAM .....                                                                           | 46               |
| <b><i>Emergency Management of Severe Acute Malnutrition .....</i></b>                             | <b><i>47</i></b> |
| <b>11. Neonatal Care.....</b>                                                                     | <b>48</b>        |
| Newborn Resuscitation .....                                                                       | 48               |
| Summary Diagram of Newborn Resuscitation .....                                                    | 50               |
| <b><i>Summary diagram of presumed bacterial infection in newborn .....</i></b>                    | <b><i>52</i></b> |
| <b>12. Communication, Transfer &amp; Handover.....</b>                                            | <b>54</b>        |
| Handing over patients .....                                                                       | 54               |
| <b><i>Appendices .....</i></b>                                                                    | <b><i>55</i></b> |
| <b><i>Weight-for-length reference card .....</i></b>                                              | <b><i>56</i></b> |
| Common drug doses .....                                                                           | 57               |
| Common Neonatal drug doses.....                                                                   | 58               |
| <b><i>Bibliography .....</i></b>                                                                  | <b><i>59</i></b> |

# 1. Triage and the “ABCD” Concept

Triage is the process of identifying and separating stable patients and sick patients. The purpose of triage is to determine which group of patients needs to be treated first depending on the severity of their condition.

Patients who present with immediately life-threatening conditions are described as having **Emergency Signs** and should receive immediate treatment.

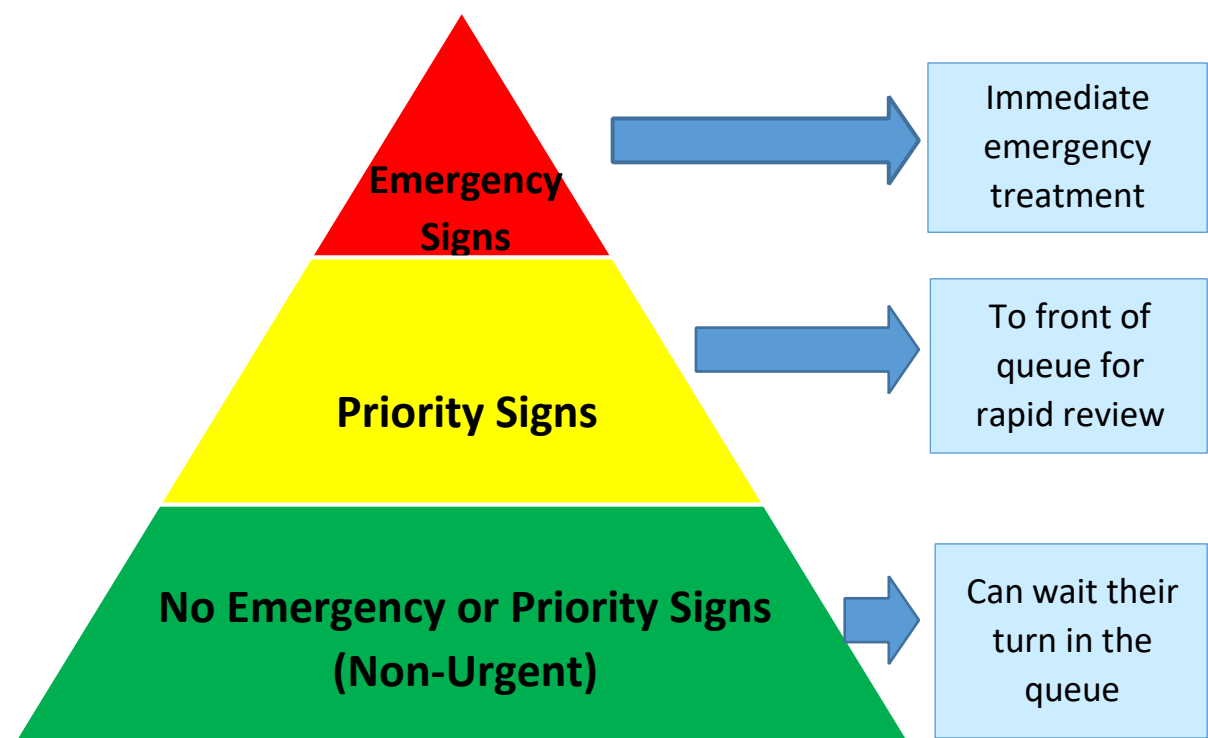
The next group of patients that need to be seen soon are described as having **Priority Signs**. Children or babies with priority signs need to be assessed and managed quickly because they have conditions or signs that without rapid management have the potential to deteriorate and develop into emergency signs.

Those who have no emergency or priority signs and therefore are **Non-Urgent** cases. These children can wait their turn in the queue for assessment and treatment. The majority of sick children will be non-urgent and will not require emergency treatment.

After these steps are completed, proceed with general assessment and further treatment according to the child’s priority.

At triage children should be divided into 3 groups:

- **Emergency Cases**
- **Priority Cases**
- **Non-Urgent (no emergency or priority signs)**



## The 'ABCD' Concept

Triage of patients involves looking for signs of serious illness or injury. These emergency signs relate to the **A**irway, **B**reathing, **C**irculation + Severe Dehydration, **D**isability including Coma and Convulsion and are easily remembered as 'ABCD'.

Each letter refers to an emergency sign which, when positive, should alert you to a patient who is seriously ill and needs immediate assessment and treatment

|          |                                                   |
|----------|---------------------------------------------------|
| <b>A</b> | <b>Airway</b>                                     |
| <b>B</b> | <b>Breathing</b>                                  |
| <b>C</b> | <b>Circulation (Including Severe Dehydration)</b> |
| <b>D</b> | <b>Disability (Coma and Convulsion)</b>           |

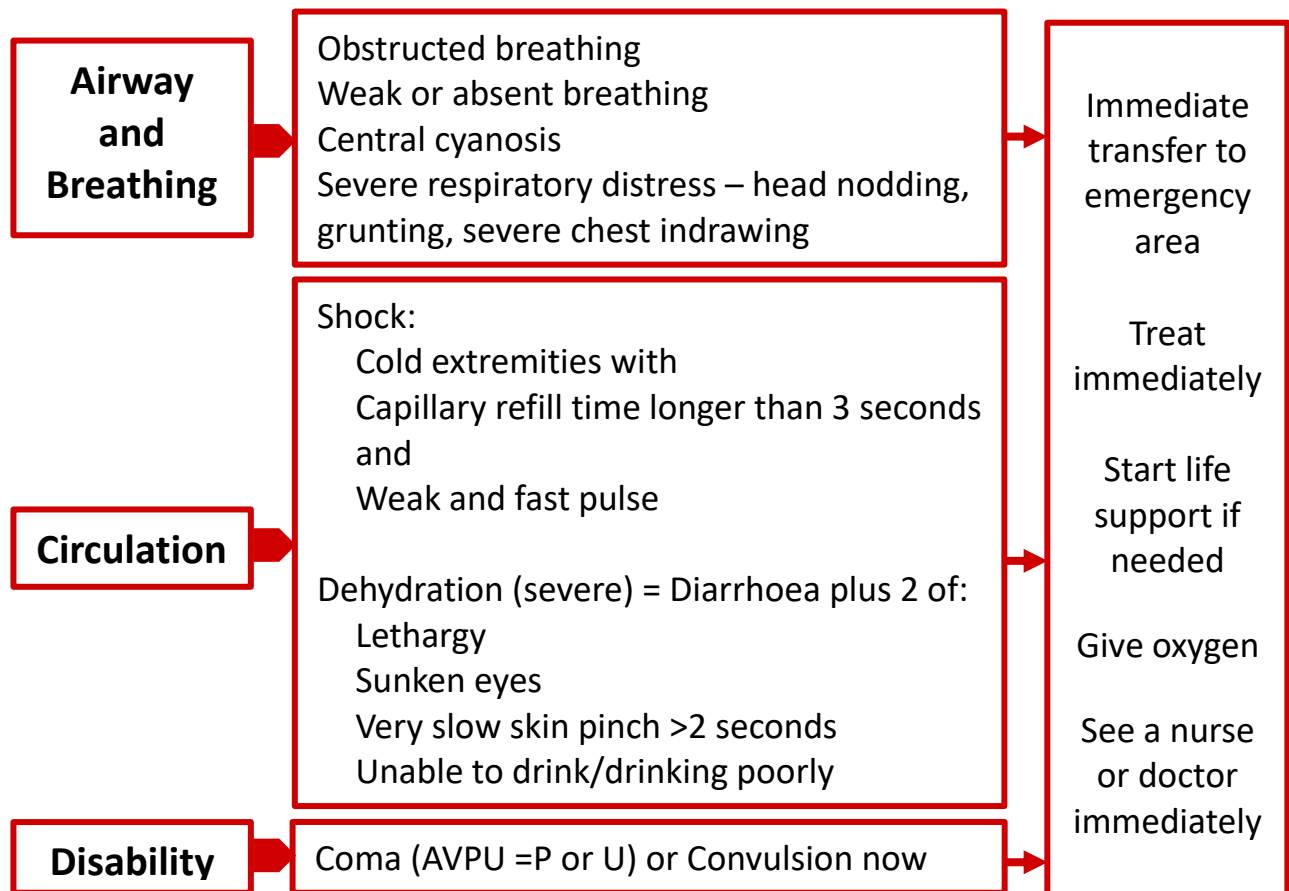
## The Triage Process

Triaging should not take much time. For a child who does not have emergency signs, it takes on average 20 seconds. The health worker should learn to assess several signs at the same time. Triage should be carried out as soon as a sick child arrives in the hospital, before any administrative procedure such as registration.

When triaging a patient, first look for emergency signs in the child (as described on the next page). If the child has any emergency signs then they should be immediately transferred to an emergency area and treated immediately. If the child does not have any emergency signs, then consider whether the child has any of the features of priority signs. A child with priority signs should be brought to the front of the queue and a clinician informed. If the child does not have any emergency or priority signs, then they are non-urgent and can remain in the queue. However, if the condition of the child changes while they are waiting in the queue then they should be re-triaged.

## Triage Summary Diagram

### Triage Emergency Signs



### Triage Priority Signs

|            |                                                                      |            |                                                                             |
|------------|----------------------------------------------------------------------|------------|-----------------------------------------------------------------------------|
| <b>3 T</b> | Trauma (major)<br>Tiny (<2 months)<br>Temperature (>39°C or <35.5°C) | <b>3 R</b> | Restless, irritable, lethargic<br>Respiratory distress<br>Referral (urgent) |
| <b>3 P</b> | Pallor (severe)<br>Pain (severe)<br>Poisoning                        | <b>MOB</b> | Malnutrition (severe visible wasting)<br>Oedema (both feet)<br>Burns        |

Patients with priority signs should be brought to the front of the queue and a clinician informed. They should see the nurse or doctor next.

## 2. Basic Life Support: Assessing and Managing the Collapsed Child

This protocol describes how to approach a collapsed child, and when and how to undertake cardiopulmonary resuscitation (CPR). This protocol should be followed in any child who is collapsed or unresponsive.

If the child is found to be breathing regularly and to have a heart rate above 60bpm, then the child should be assessed using the protocol for assessment of a sick child (see chapter 4).

The basic life support algorithm follows a **SSSS ABC** approach and stands for:

**SSSS**: Safety, Setting, Stimulate, Shout for help

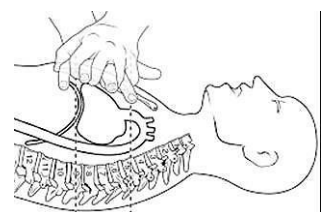
**A**: Airway

**B**: Breathing

**C**: Circulation

|                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Assess a collapsed child                   | <p><b><u>S</u>afety</b><br/>Personal Protective Equipment, safe environment</p> <p><b><u>S</u>timulate</b><br/>Call to the child; rub the sole of the foot; sternal rub;</p> <p><b><u>S</u>hout for help</b><br/>Get more hands to help you</p> <p><b><u>S</u>etting</b><br/>Is the child in the appropriate setting for resuscitation?</p>                                                                                                                                                                                                                                |
| Open the <b><u>A</u>irway</b>              | <p><b><u>L</u>ook into the mouth</b></p> <ul style="list-style-type: none"> <li>Is there a foreign body, vomit or secretions?</li> <li>Suction or remove if possible</li> </ul> <p><b><u>P</u>osition airway</b></p> <ul style="list-style-type: none"> <li>Neutral position for infants</li> <li>Sniffing position for children (over 1 year)</li> </ul> <p><b><u>O</u>pen the airway</b></p> <ul style="list-style-type: none"> <li>Head tilt, chin lift, or jaw thrust</li> </ul>  |
| Check for adequate <b><u>B</u>reathing</b> | <p>Once the airway has been positioned and cleared</p> <ul style="list-style-type: none"> <li><b><u>L</u>ook</b> for rise and fall of the chest</li> <li><b><u>L</u>isten</b> for breathing sounds</li> <li><b><u>F</u>eel</b> for breath on your face</li> </ul>                                                                                                                                                                                                                     |

|                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Give 5 rescue breaths                                                                                                                                                                                        | <p><b>If not breathing, start bag-valve-mask (BVM) ventilation</b></p> <ul style="list-style-type: none"> <li>▪ Deliver oxygen to the lungs and circulation</li> <li>▪ Ideally with a reservoir bag and oxygen</li> </ul> <p><b>BVM technique</b></p> <ul style="list-style-type: none"> <li>▪ Select appropriately sized mask</li> <li>▪ Make sure there is a good seal over nose and mouth</li> <li>▪ Gently squeeze the bag until you see the chest rise, 1 second in and 1 second out</li> <li>▪ Attach oxygen (if available)</li> </ul> <p><b>If you do not see the chest wall rise at least twice:</b></p> <ul style="list-style-type: none"> <li>▪ Reposition the head</li> <li>▪ Review the position and seal of the mask</li> <li>▪ If not successful, consider 2-person technique</li> <li>▪ Consider passing a nasogastric tube and aspirate if too much air in stomach after lots of bag valve mask ventilation</li> </ul> |                                                                                                                                                                                                              |
| Check for signs of life                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>▪ Re-assess airway and breathing <i>at the same time...</i></li> <li>▪ Feel and count a large central pulse (femoral or brachial)</li> </ul> <p>If no pulse or pulse less than 60bpm <b>and no breathing</b>, continue BVM and start chest compressions.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                              |
| Chest compressions                                                                                                                                                                                           | <p><b>If no signs of life, start chest compressions</b></p> <ul style="list-style-type: none"> <li>▪ Aim: to get blood flow to organs (heart, brain)</li> </ul> <p><b>Chest compressions - technique</b></p> <ul style="list-style-type: none"> <li>▪ Over lower third of the sternum</li> <li>▪ Ratio: 15:2 (15 compressions: 2 breaths)</li> <li>▪ Rate: 100 to 120bpm</li> <li>▪ Depth: one third of the chest</li> <li>▪ Equal time for compression and relaxation</li> <li>▪ Firm, flat surface, resus board</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                              |
|                                                                                                                                                                                                              | <table border="1"> <tr> <td data-bbox="475 1626 938 1937"> <p><b>Infant</b></p> <ul style="list-style-type: none"> <li>▪ Two-finger method for one rescuer</li> <li>▪ Hand encircling technique with thumbs for two rescuers - recommended as more effective</li> </ul> </td><td data-bbox="946 1626 1458 1937"> <p><b>Child</b></p> <ul style="list-style-type: none"> <li>• Two handed chest compressions</li> <li>• Heel of lower hand on the lower end of the sternum, second hand placed on top of the first. Elbows straight, shoulders over the hands</li> </ul> </td></tr> </table>                                                                                                                                                                                                                                                                                                                                            | <p><b>Infant</b></p> <ul style="list-style-type: none"> <li>▪ Two-finger method for one rescuer</li> <li>▪ Hand encircling technique with thumbs for two rescuers - recommended as more effective</li> </ul> |
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## **Cycles**

- 15 chest compressions to 2 breaths
- Every 2 minutes, check for the pulse or signs of life

## **Adrenaline**

- Drugs should not be used in resuscitation unless you have enough skilled help to gain IV or IO access and give the adrenaline.
- Ventilation and chest compressions are most important and must be continued throughout.
- Dose 0.1ml/kg (10mcg/kg)
- Concentration 1:10,000 (must be diluted from the 1:1000)
- Give adrenaline immediately and after every other cycle (every 3-4 minutes)

## **When to stop?**

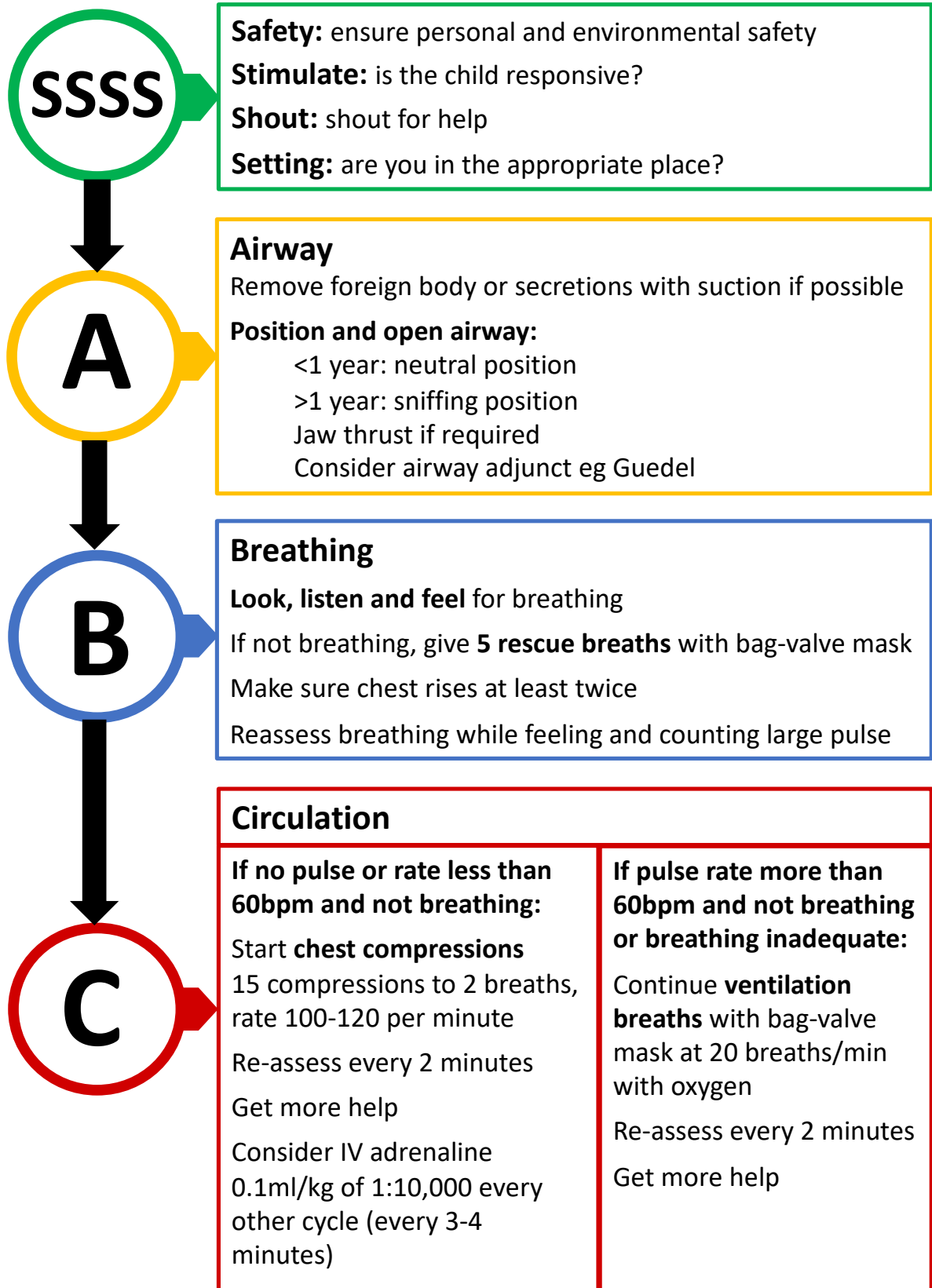
- If the patient shows signs of life
- If the patient, even after CPR, does not show signs of life and the team agrees that it is time to stop (20 minutes)

## **Documentation**

- Date
- Time
- Who was present?
- How many cycles?
- Which drugs given?
- Outcome (does the patient have a pulse or not?)
- Plan: if the patient is successfully resuscitated, to which ward should they go?
- Explain to the parents what has happened

## Summary Diagram

### Paediatric Basic Life Support (BLS)



### 3. ABCD Approach to an Unwell Child with Signs of Life

The ABCD approach should also be used to assess and manage seriously unwell children. Virtually all unwell children and babies show specific signs of illness before complete collapse. Most of these important signs fit into the four categories:

- **Airway**
- **Breathing**
- **Circulation** (including severe dehydration)
- **Disability** (coma, confusion and convulsion)

It is very important that staff recognise these signs to provide immediate care to the child and prevent their complete collapse. It is also important that staff know how to describe them so that they can flag up their concerns to other members of the team to generate a sense of urgency in getting help and giving treatment immediately. The words describing these signs help to direct specific treatment: for example, the difference between telling a colleague a child has 'noisy breathing', which is more vague, than the child has 'stridor', which highlights urgency and also directs the immediate treatment.

This ABCD order is important because it is the sequence of immediate to more delayed in terms of what could kill the patient. You must have an open (patent) Airway before you can Breathe, and you must Breathe air into the lungs before the oxygen can be transported to the tissues by the Circulation.

Before approaching the patient, it is important that you, the healthcare worker, are safe and in the best environment possible to help the patient. Therefore quickly consider the 4 S's before moving to the patient. The 4 S's are:

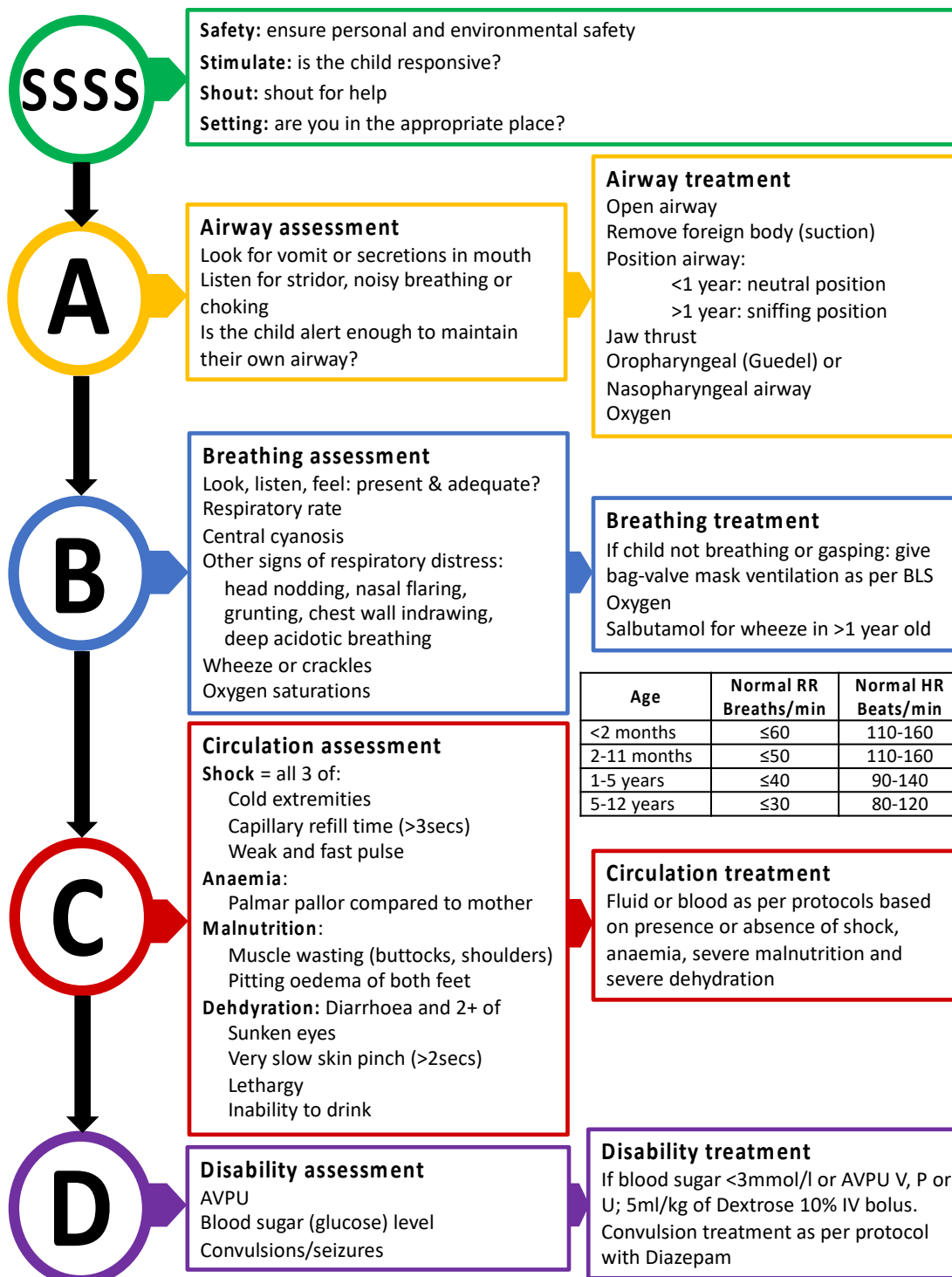
- **Safety** – check there are no sharps or dangerous equipment around then protect the patient by washing your hands or using disinfectant gel and protect yourself by applying PPE according to local policy.
- **Stimulate** – if the child is not fully alert, get the carer to call them by name or you try to stimulate a response.
- **Shout** – shout for more help or send a carer or bystander to go and get help.
- **Setting** – judge whether you are in the right setting or whether you can quickly and safely move the patient.

**At each stage (A or B or C or D), look for key signs in the patient that suggest there is a problem at this stage. If a problem is found, it must be treated before moving onto the next stage.** The airway must be assessed and, as far as possible, stabilised before you move onto assess the breathing. You do not have to make the airway perfect but you have to do something to help improve it

On the next page is a summary of the assessment and management of an unwell child. Over the next chapters, we will discuss in detail the assessment, management and common illnesses of each area.

## Summary Diagram

### ETAT Assessment of the Unwell Child



## 4. Airway

An open (also known as patent) airway is required to get oxygen into the lungs. Obstruction of the airway, either partial or complete obstruction, causes children to become rapidly unwell.

|          |                                                   |
|----------|---------------------------------------------------|
| <b>A</b> | <b>Airway</b>                                     |
| <b>B</b> | <b>Breathing</b>                                  |
| <b>C</b> | <b>Circulation (including severe Dehydration)</b> |
| <b>D</b> | <b>Disability (coma and convulsion)</b>           |

### Assessment of the Airway

**1. Is there anything in the mouth?**

- Vomit, secretions or foreign body or drooling

**2. Are there any noises when breathing?**

- Stridor – a harsh inspiratory noise indicating narrowing (partial obstruction) of the airway
- Noisy breathing – can be caused by vomit, secretions or foreign body
- Choking – continuous forceful coughing due to foreign body inhalation

**3. Is the child alert enough to maintain their own airway?**

In an unconscious child (AVPU score P or U), loss of muscle tone may lead to airway obstruction and loss of reflexes means that they cannot protect their airway from aspiration. Their airway may therefore need support.

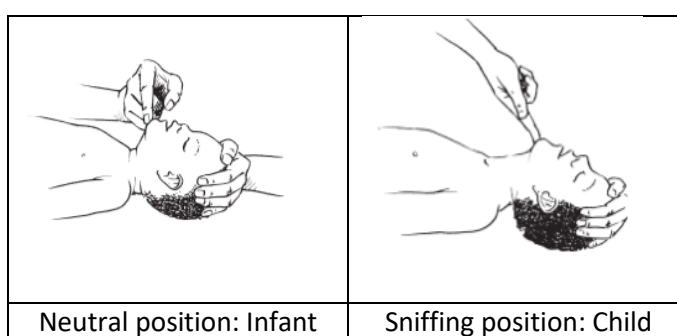
### Management of the Airway in an Unconscious Child

**Look in the mouth and suction**

- Suction what you can see but only as far as you can see with a torch or laryngoscope.

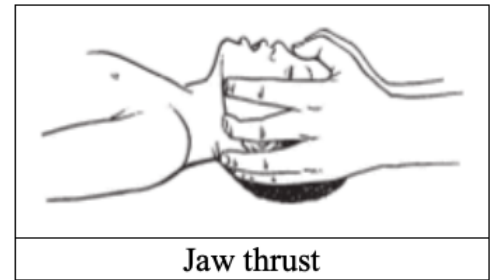
**Position the airway**

- In infants < 1-year-old, put the head in the neutral position (face parallel to the couch and nose pointing to the ceiling)
- In children >1-year-old, put the head in the sniffing position (head tilted slightly with the chin lifted to point to the ceiling)



## Jaw thrust

- Use your fingers to put pressure behind the angle of the jaw to move the jaw upwards. This also moves the tongue to help unblock the airway.
- A jaw thrust without head tilt may be used to open the airway in children with suspected neck trauma when you cannot tilt the head to put it in the sniffing position



## Airway adjuncts

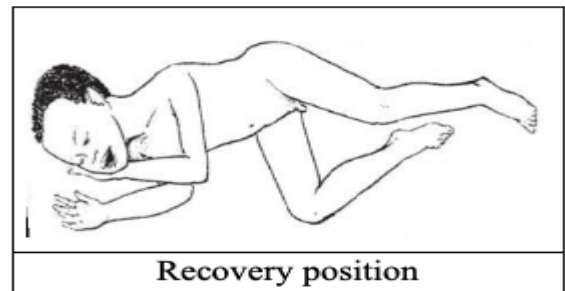
- Help to hold the tongue forward to keep the airway open in an unconscious child.
- A Guedel (also known as an oropharyngeal airway) or nasopharyngeal airway are the two main types.
- A Guedel airway is sized by measuring from the front of the incisors to the angle of the jaw. It can be used in short term airway management.
- A nasopharyngeal airway is often better tolerated than a Guedel airway. The correct size may be estimated by measuring from the nostril to the ear. Do not use if head trauma is suspected.

## Oxygen

Children with airway obstruction should be given oxygen, titrated to measuring oxygen saturations if possible.

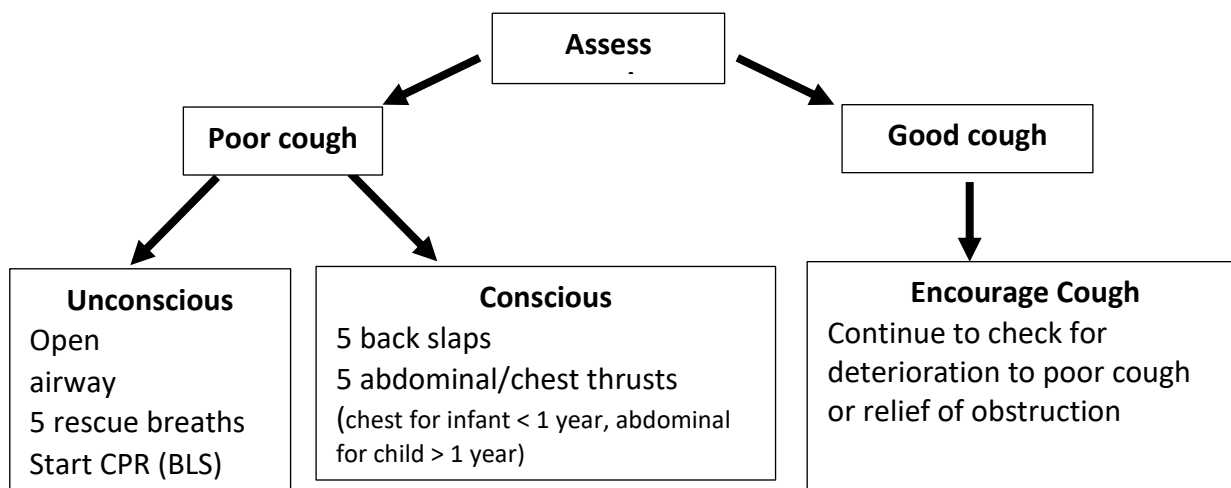
## Place in the recovery position

- Any unconscious child who is breathing and keeping the airway open should be placed in the **recovery position**. This position helps to reduce the risk of vomit entering the child's lungs. It should only be used in children who have not been subjected to trauma and neck trauma is not suspected.
- Turn the child on their side to reduce the risk of aspiration
- Keep the neck slightly extended and stabilise by placing the cheek on one hand
- Bend one leg to stabilise the body position



Consider an NG tube to aspirate stomach and prevent inhalation of stomach contents if vomiting or risk of aspiration.

# Management of the choking child (foreign body)



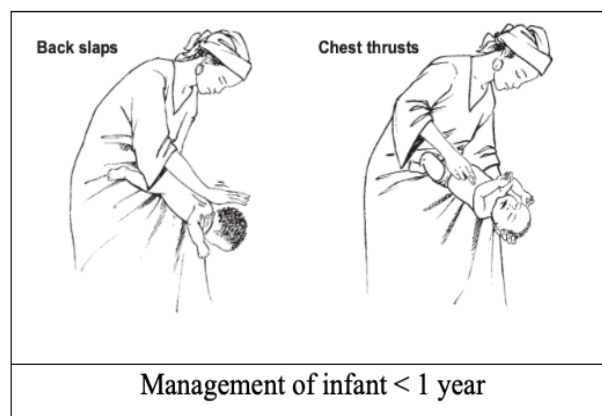
## Infant < 1 year

### Back blows

- Support baby's neck/jaw with one hand (but be careful not to squash the neck)
- Position baby head down with face lower than body
- Apply 5 back slaps between the shoulder blades with one hand

### Chest thrusts

- Turn baby over and support the neck
- Apply 5 chest thrusts using 2-3 fingers on lower sternum just below nipple line
- Compress around 1 inch deep



Repeat until object is removed or state of consciousness changes

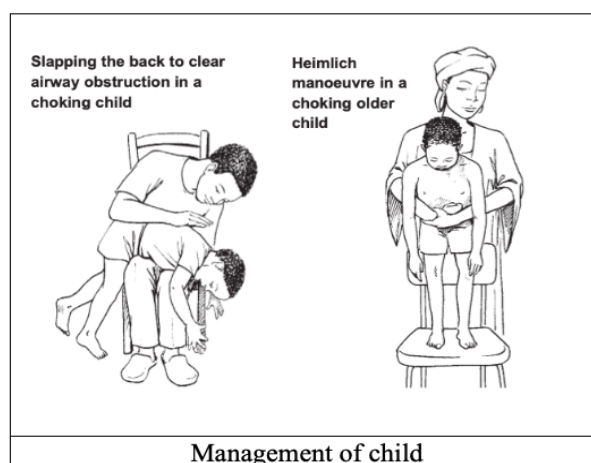
## Child > 1 year

### Back blows

- Support the child to lean forward
- Apply 5 back thrusts between the shoulder blades with the palm of one hand

### Abdominal thrusts (**Heimlich Manoeuvre**)

- Stand behind the child
- Put both arms around the upper body of the child
- Make sure they are bending forwards
- Clench your fist and place it between the belly button and the bottom of their breastbone
- Grasp your fist using your other hand and then pull sharply inwards and upwards.
- Repeat 5 times until object is removed or state of consciousness changes



## 5. Breathing

### Assessment of breathing: Signs of Respiratory Distress

1. Fast respiratory rate
2. Low oxygen saturations <90%
3. Cyanosis
4. Head nodding
5. Nasal flaring
6. Grunting on expiration
7. Tracheal tug
8. Severe chest wall in-drawing or recession
9. Deep acidotic breathing
10. Audible wheeze

|          |                                                   |
|----------|---------------------------------------------------|
| <b>A</b> | <b>Airway</b>                                     |
| <b>B</b> | <b>Breathing</b>                                  |
| <b>C</b> | <b>Circulation (including severe Dehydration)</b> |
| <b>D</b> | <b>Disability (coma and convulsion)</b>           |

11. Listen to the chest for air entry with wheeze or crackles with a stethoscope if trained

| Respiratory rate in children                           |               |                |
|--------------------------------------------------------|---------------|----------------|
| <i>Count rate over 1 minute when the child is calm</i> |               |                |
| Age                                                    | Normal        | Fast breathing |
| <2 months                                              | 40-59 breaths | ≥60 breaths    |
| 2-11 months                                            | 30-49 breaths | ≥50 breaths    |
| 1-5 years                                              | 20-39 breaths | ≥40 breaths    |
| 5-12 years                                             | 12-29 breaths | ≥30 breaths    |

### Management of Breathing: Oxygen

#### When to start oxygen therapy?

- Obstructed breathing
- Central cyanosis
- Severe respiratory distress
- Signs of shock
- Unconscious child
- SpO<sub>2</sub> <90%

**Pulse oximetry** to guide when to start or stop oxygen therapy:

- 90% and above: keep reassessing SpO<sub>2</sub> and respiratory rate
- Under 90%: give oxygen with nasal cannula/prongs or face mask and reservoir bag
- Under 90% **and** no improvement with oxygen: go back to A (assess airway) and consider starting Continuous Positive Airway Pressure (CPAP) Ventilation

#### Oxygen Delivery

| Delivery Method | Flow Required                                                       | % Oxygen Delivered | When to use                            |
|-----------------|---------------------------------------------------------------------|--------------------|----------------------------------------|
| Nasal prongs    | 0.5-1L/min: Neonate<br>1-2L/min: Infant<br>2-4L/min: Older children | Up to 40%          | SpO <sub>2</sub> < 90% on room air     |
| Face mask       | >4L/min                                                             | Up to 60%          | SpO <sub>2</sub> <90% on nasal cannula |
| Non-rebreather  | 10-15L/min                                                          | Over 80%           | SpO <sub>2</sub> <90% on face mask     |

The target oxygen saturation is 90% and above.

## Continuous Positive Airway Pressure (CPAP)

### What is CPAP?

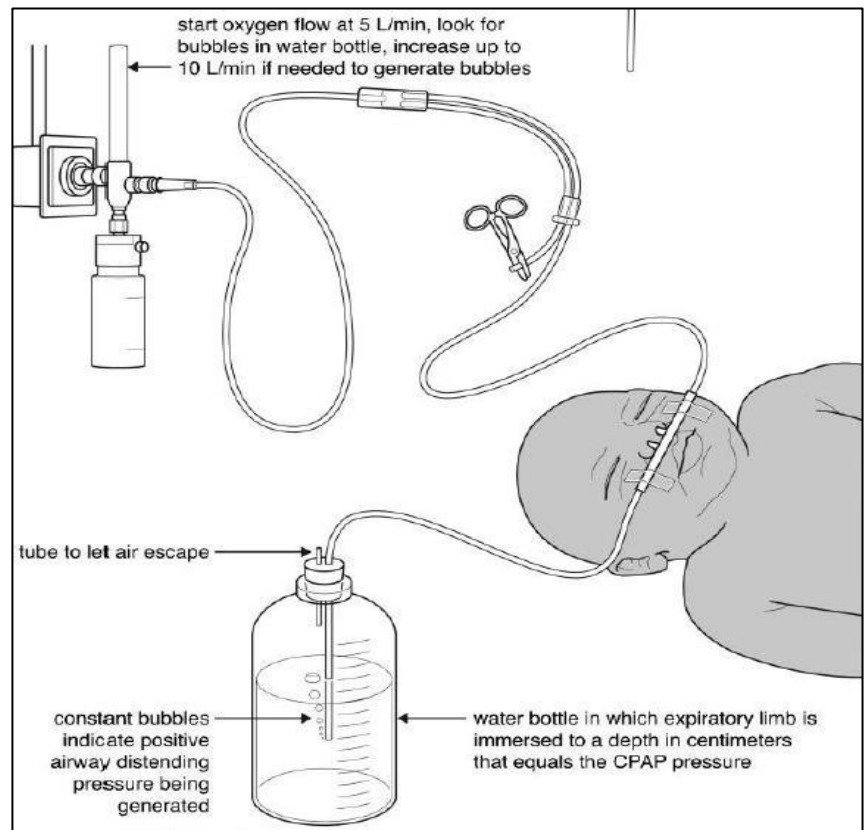
CPAP gives positive pressure to keep the alveoli open, making it easier to breathe in and out. CPAP reduces respiratory distress and improves oxygenation.

### When to start CPAP?

- $\text{SpO}_2 < 90\%$  on oxygen
- Grunting
- Severe respiratory distress
- Preterm babies  $< 32$  weeks or birth weight  $< 1.5\text{kg}$

### When to discontinue CPAP?

- When the baby's respiratory distress has improved
- When  $\text{SpO}_2$  is  $> 90\%$



### How to use a spacer

The inhaler works much better with a spacer. The spacer contains air with a high concentration of salbutamol.

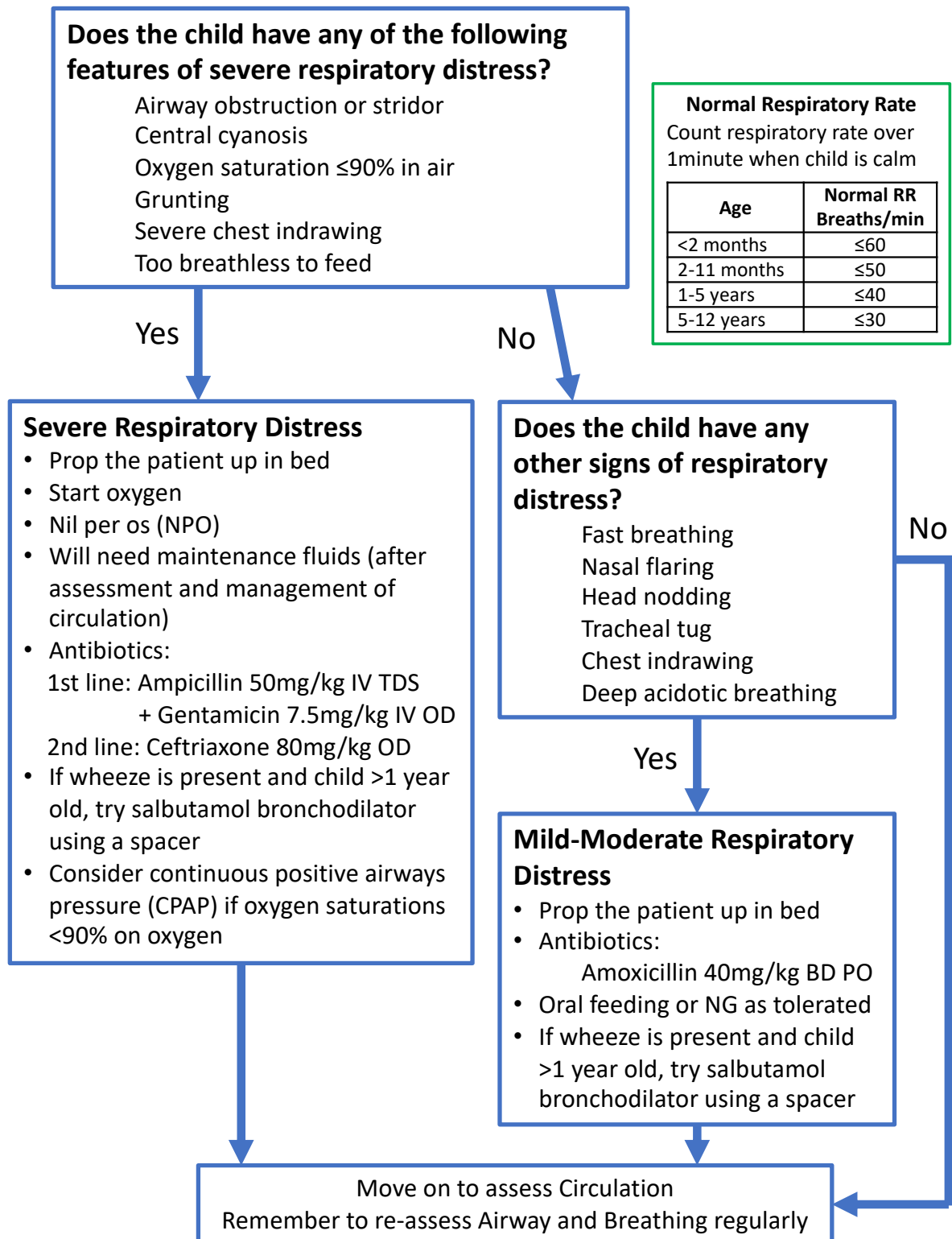
If the child breathes the air from the spacer, the salbutamol is transported into the airways deep in the lung. Smaller children need a mask for a seal between mouth and spacer, older children can manage with the mouthpiece of the bottle.

- The spacer should be clean
- Shake the inhaler
- The child should sit upright
- Make sure that the mask has a tight seal
- Give one puff and wait for 10 seconds/ or until the child has breathed for 3 to 5 times
- Don't give more than one puff at one time



## Summary Diagram

# Assessment and Treatment of Respiratory Distress



## 6. Circulation

### Assessment for Shock

**Check the pulse:** The central pulse can be felt at the femoral, brachial or carotid arteries. If no pulse can be felt, proceed immediately to basic life support. A peripheral pulse can be felt at the radial artery. Is the pulse fast or slow? Strong or weak?

Normal heart rate varies with age:

|          |                                                   |
|----------|---------------------------------------------------|
| <b>A</b> | <b>Airway</b>                                     |
| <b>B</b> | <b>Breathing</b>                                  |
| <b>C</b> | <b>Circulation (including severe Dehydration)</b> |
| <b>D</b> | <b>Disability (coma and convulsion)</b>           |

Normal heart rates in children:

- 0-1 years old: 110-160 beats per minute
- 1-5 years old: 90-140 beats per minute
- 5-12 years old: 80-120 beats per minute

Note: normal pulse rates are 10% slower in sleeping children

**Check the temperature of the hands and feet:** up to which point are they cold?

**Check the capillary refill time (CRT):** squeeze the child's fingertip for 5 seconds and count how long it takes the skin of the fingertip, or the pink base of the nail, to return to the normal colour. A prolonged capillary refill time is more than 3 seconds. In neonates, count the capillary refill time at the sternum.

### Diagnosing Shock:

1. Cold extremities
2. Capillary refill time longer than 3 seconds
3. Weak and fast pulse (tachycardia)

**ALL 3 features must be present to diagnose shock.**  
If only **1-2** features are present, the child has **impaired circulation** but is not in shock.

### Diagnosing Shock in SAM:

The severely malnourished child is considered to have shock if he or she:

- is lethargic or unconscious, and
- has cold hands.

plus either:

- slow capillary refill (longer than 3 seconds), or
- weak or fast pulse.

Bradycardia, absent peripheral pulses and weak central pulses all indicate the child is going to die very soon and needs emergency treatment immediately.

The immediate treatment of shock – fluids – depends on whether the child is severely:

- Anaemic
- Malnourished
- Dehydrated

These must therefore also be assessed at this point.

## Assessment for anaemia

To assess for anaemia you look for:

- Pallor of the palm - you compare the colour of the child's palm or sole of the foot with those of the caregiver.
- Pallor can also be assessed by pulling down the lower eyelid and looking at the conjunctivae but this is less reliable.

Pallor is a very common priority sign. Anaemia can affect all ages and the most common cause is malaria. A complication of anaemia is heart failure and cardiogenic shock.

## Assessment for severe acute malnutrition (SAM)

- Look for visible wasting of buttocks and shoulders
- Check for pitting oedema of both feet – feet and legs look swollen and, when pressed firmly with the thumb, and indented impression (pit) is left

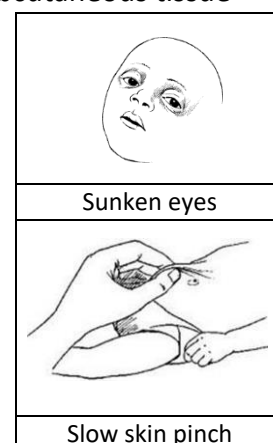
(A MUAC can also be done to assess for malnutrition).

## Assessment for severe dehydration

Ask about diarrhoea – if present, assess for severe dehydration which is **2 or more of**:

- Sunken eyes – ask mother if the child normally looks like this
- Very slow skin pinch >2 seconds – pinch the skin, including the subcutaneous tissue on the side of the abdomen vertically between your thumb and fingers and lift it. The skin should return to normal in less than 2 seconds.
- Lethargy
- Inability to drink

| Severe Dehydration              | Some Dehydration           |
|---------------------------------|----------------------------|
| Sunken eyes                     | Sunken eyes                |
| Very slow skin pinch (> 2 secs) | Slow skin pinch (< 2 secs) |
| Unable to drink/feed            | Thirsty / drinks eagerly   |
| Lethargic                       | Irritable / restless       |



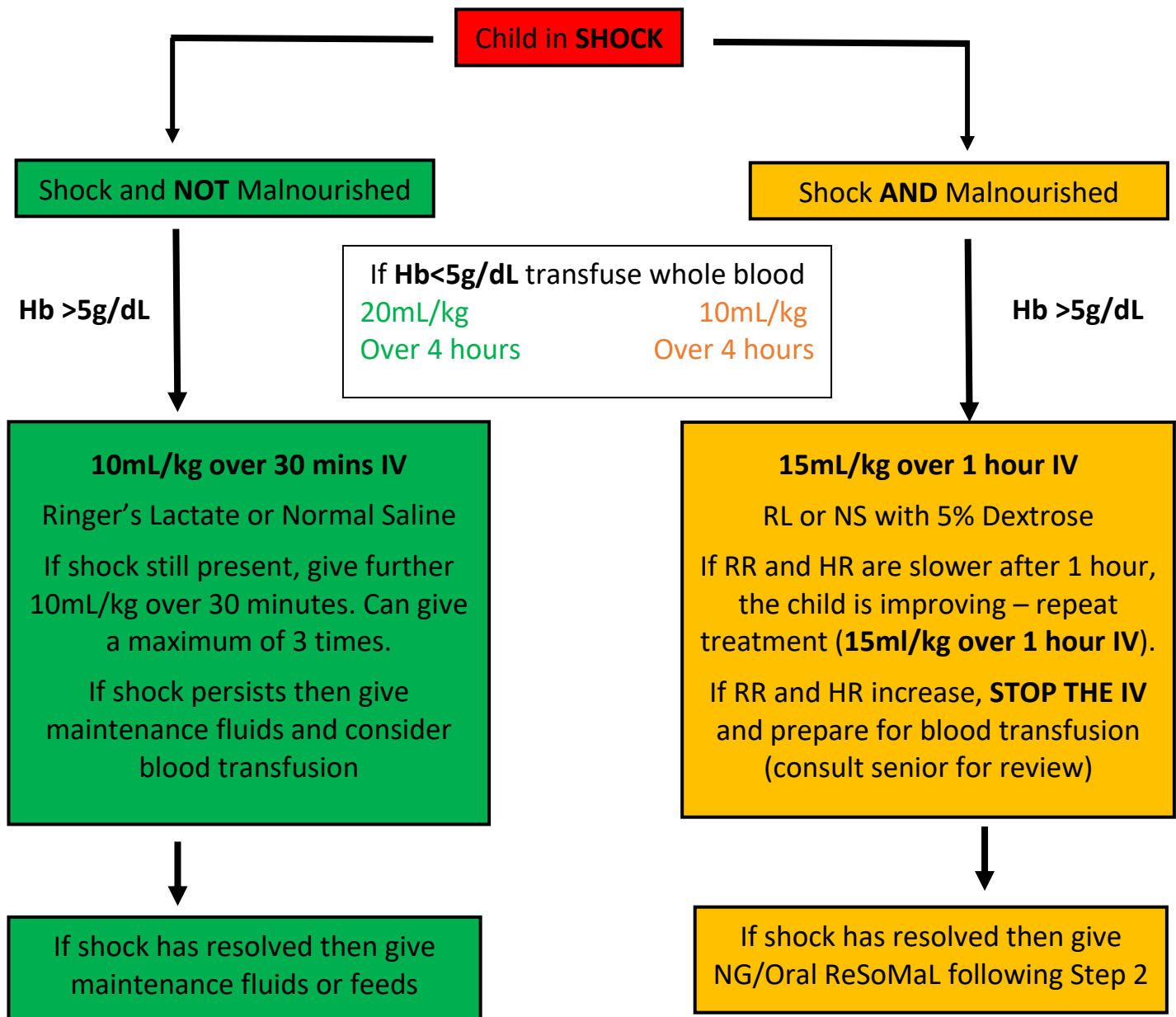
Sunken eyes

Slow skin pinch

# Fluid management in children with shock without severe dehydration

**Shock not SAM:** cold extremities **with** prolonged capillary refill time >3seconds **and** weak and rapid pulse

**Shock in SAM:** lethargic or unconscious **and** cold hands **and** **either** capillary refill time >3seconds **or** weak **or** fast pulse



**Re-assess the child regularly**

Ringer's Lactate (RL) with 5% Dextrose = 450mL of RL with 50mL of 50% Dextrose

Normal Saline (NS) with 5% Dextrose = 450mL of NS with 50mL of 50% Dextrose

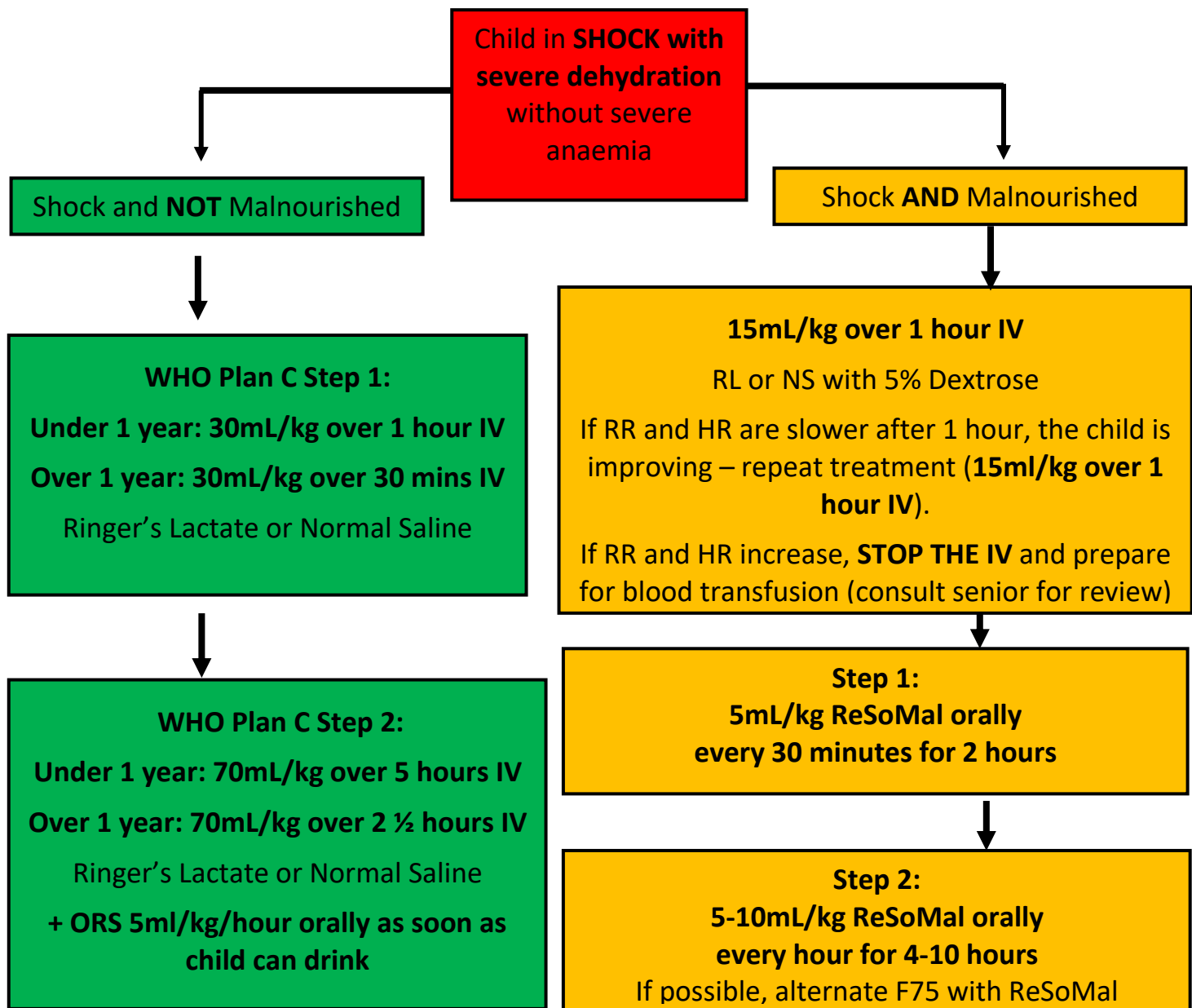
**In the malnourished child the heart muscle is weak and wasted therefore giving IV fluids in big amounts is dangerous. IV fluids should only be used in the malnourished child for shock and given cautiously. Whole blood transfusion is recommended within the first 24 hours of admission in SAM children presenting with shock and severe anaemia, if there is no improvement in the first 15ml/kg of fluid, even without checking Hb level.**

# Fluid management in children with shock secondary to severe dehydration

**Shock not SAM:** cold extremities **with** prolonged capillary refill time >3seconds **and** weak and rapid pulse

**Shock in SAM:** lethargic or unconscious **and** cold hands **and either** capillary refill time >3seconds  
or weak or fast pulse

**Severe dehydration** = diarrhoea + 2 of: sunken eyes, very slow skin pinch, lethargy, unable to drink



**Re-assess the child regularly**

Ringer's Lactate (RL) with 5% Dextrose = 450mL of RL with 50mL of 50% Dextrose

Normal Saline (NS) with 5% Dextrose = 450mL of NS with 50mL of 50% Dextrose

In the malnourished child the heart muscle is weak and wasted therefore giving IV fluids in big amounts is dangerous. IV fluids should only be used in the malnourished child for shock and given cautiously. Whole blood transfusion is recommended within the first 24 hours of admission in SAM children presenting with shock and severe anaemia, if there is no improvement in the first 15ml/kg of fluid, even without checking Hb level.

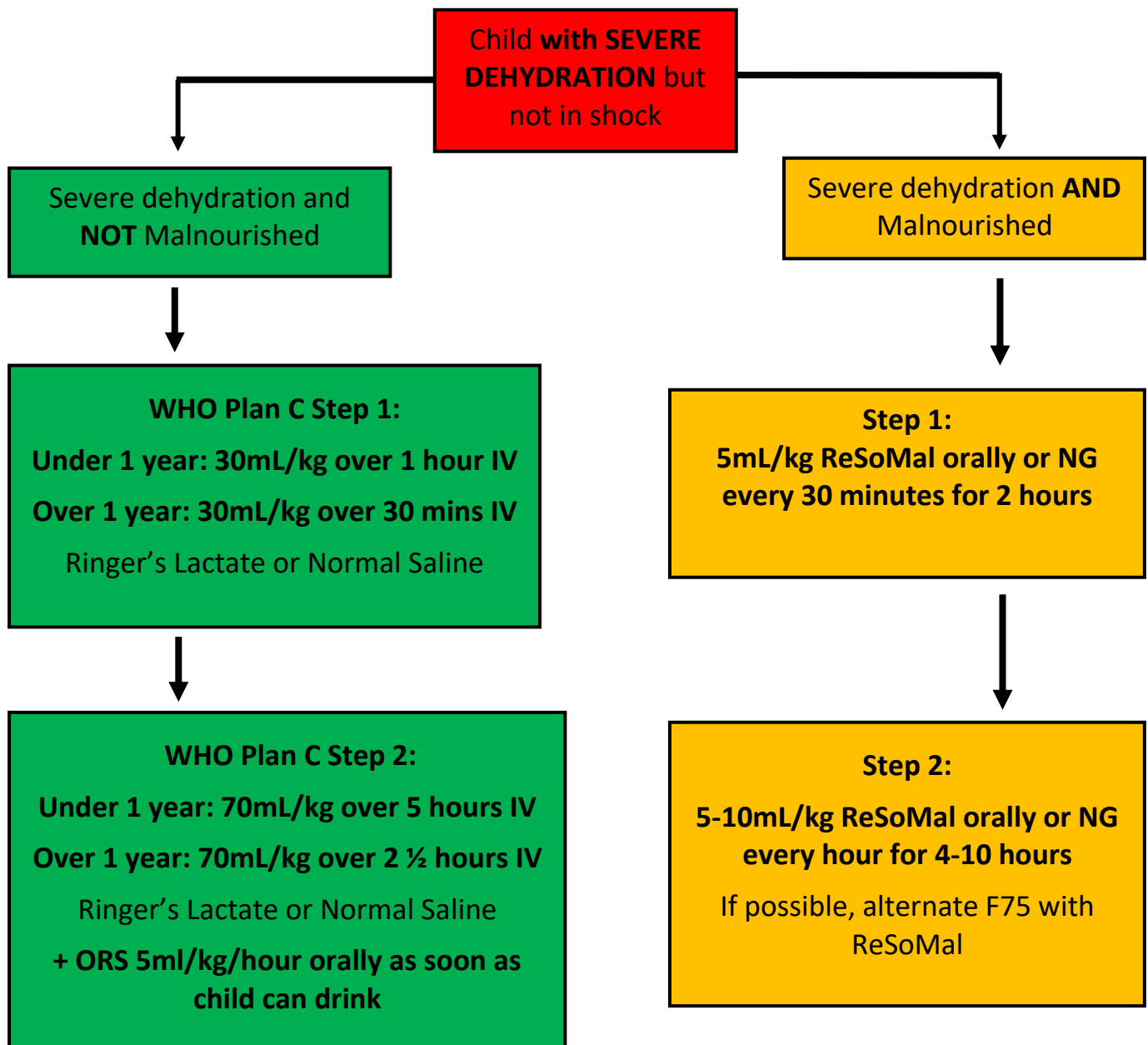
## Fluid management in children with severe dehydration but not in shock

**Shock not SAM:** cold extremities **with** prolonged capillary refill time >3seconds **and** weak and rapid pulse

**Shock in SAM:** lethargic or unconscious **and** cold hands **and** **either** capillary refill time >3seconds

**or** weak or fast pulse

**Severe dehydration** = diarrhoea + 2 of: sunken eyes, very slow skin pinch, lethargy, unable to drink

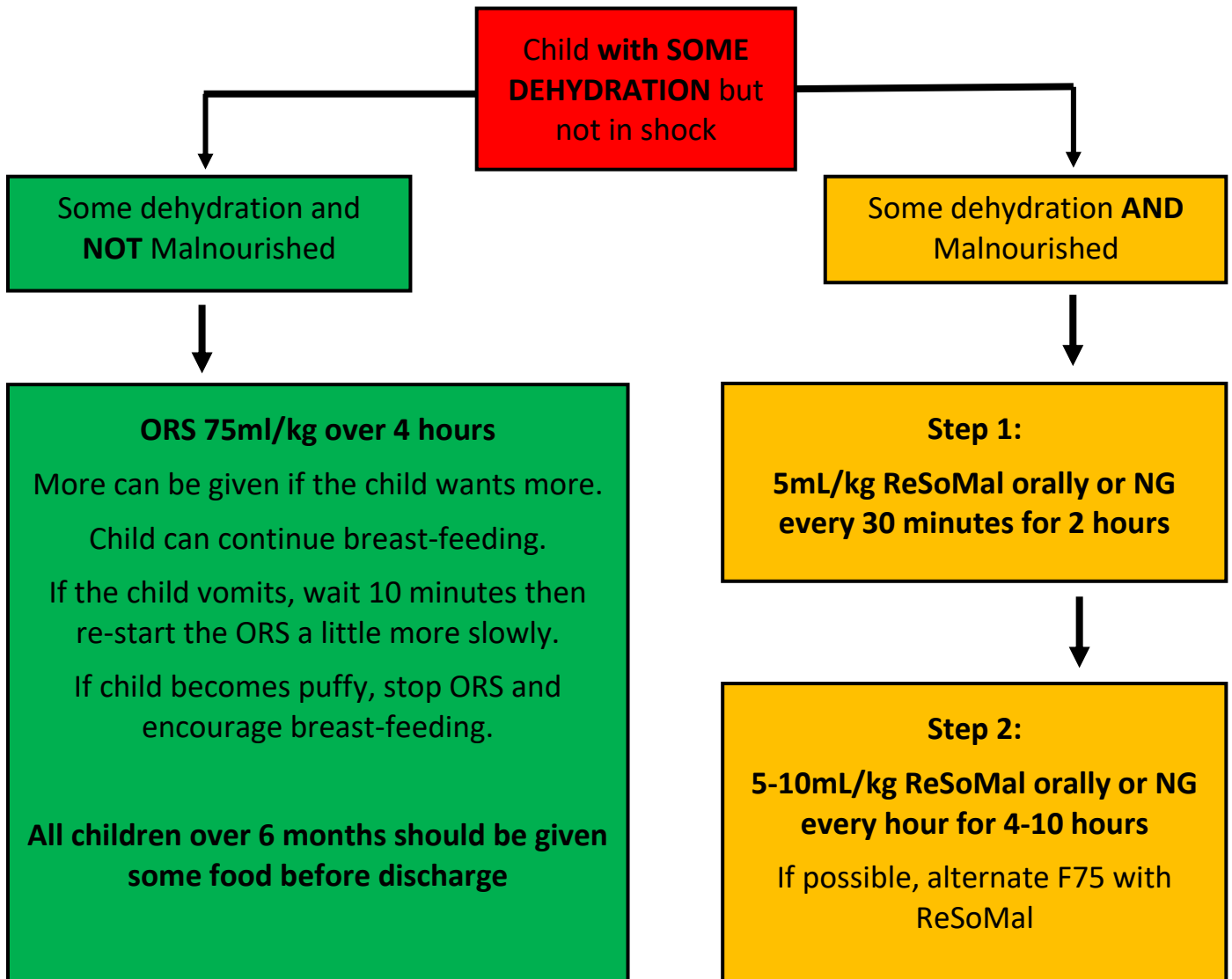


### Re-assess the child regularly

In malnourished children, only consider very careful IV rehydration with Ringer's Lactate + 5% Dextrose if the child is unable to tolerate oral or NG fluids.

## Fluid management in children some dehydration but not in shock

**Some dehydration** = diarrhoea + 2 of: sunken eyes  
slow skin pinch (<2 seconds)  
restless/irritable  
thirsty/drinks eagerly



**Re-assess the child regularly**

Dehydration is very difficult to assess in malnourished children therefore the treatment of a malnourished child with diarrhoea is the same for severe and some dehydration.

In malnourished children, only consider very careful IV rehydration with Ringer's Lactate + 5% Dextrose if the child is unable to tolerate oral or NG fluids.

## Maintenance Fluids and Feed

### Maintenance fluid for a child over 1 month

Maintenance fluids will normally be given as dextrose/normal saline (DNS).

The maintenance fluid calculation for 24 hours is:

|                              |           |
|------------------------------|-----------|
| First 0-10kg of body weight: | 100mls/kg |
| Next 10-20kg:                | 50mls/kg  |
| Subsequent weight >20 Kg:    | 25mls/kg  |

If the child has a fever, consider giving more fluid: 10% more fluid for every 1 degree of fever.

In the malnourished child the preferred route for fluid is oral/NG ReSoMal

Example: Calculate the hourly rate for maintenance fluid in a well-nourished 22kg child

$$10\text{kg} \times 100 = 1000 \quad 10\text{kg} \times 50 = 500 \quad 2\text{kg} \times 25 = 50$$

$$1000 + 500 + 50 = 1550$$

$$1550 \text{ mls over 24 hours} = 65 \text{ mls/hr}$$

### Drop Rates

- The drop rate for a standard (adult) giving set is 20 drops/ml
- The drop rate for a paediatric burette (Soluset) is 60 drops/ml

The calculation to derive the number of drops/min from the number of mls/hr is:

$$(X \text{ mls/hr} \div 60) \times \text{drop rate}$$

Example: Calculate the drop rate for administering the IV fluid to the 22kg child above

$$65\text{mls/hr} \div 60 = 1.1 \text{ mls/min}$$

$$1.1\text{ml/min} \times 20 = 22 \text{ drops/min}$$

### Maintenance feeds for a child over 1 month

The total amount of maintenance fluid or feed required over 24 hours for children over one month is calculated using the same formula as above. The total amount of feed in 24 hours can be divided to give the correct amount for each feed, depending on how often you will feed the child. For example, for 2 hourly feeding divide the total amount by 12 or for 3 hourly feeding divide it by 8.

Example: Calculate the volume of maintenance feed required over 24 hours for an 8kg child

$$8\text{kg} \times 100 = 800\text{ml over 24 hours of IV fluid or PO/NG feeds}$$

How much feed would you give if you want to feed the child every 3 hours?

$$800\text{mls} \div 8 = 100\text{mls every 3 hours}$$

# Watery Diarrhoea

## Treatment of watery diarrhoea:

- Rehydration (IV or oral depending on degree of dehydration, nutritional status and ability to drink)
- Zinc
- Advise to feed continuously
- Antibiotics **only** if bloody diarrhoea

## Intravenous & Intra osseous Access

You need to gain intravenous access in order to:

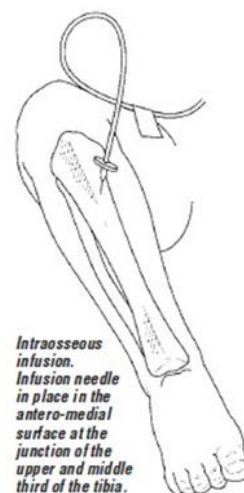
- give fluids
- give medication
- take blood samples

Access can be intravenous (IV) or intra osseous (IO).

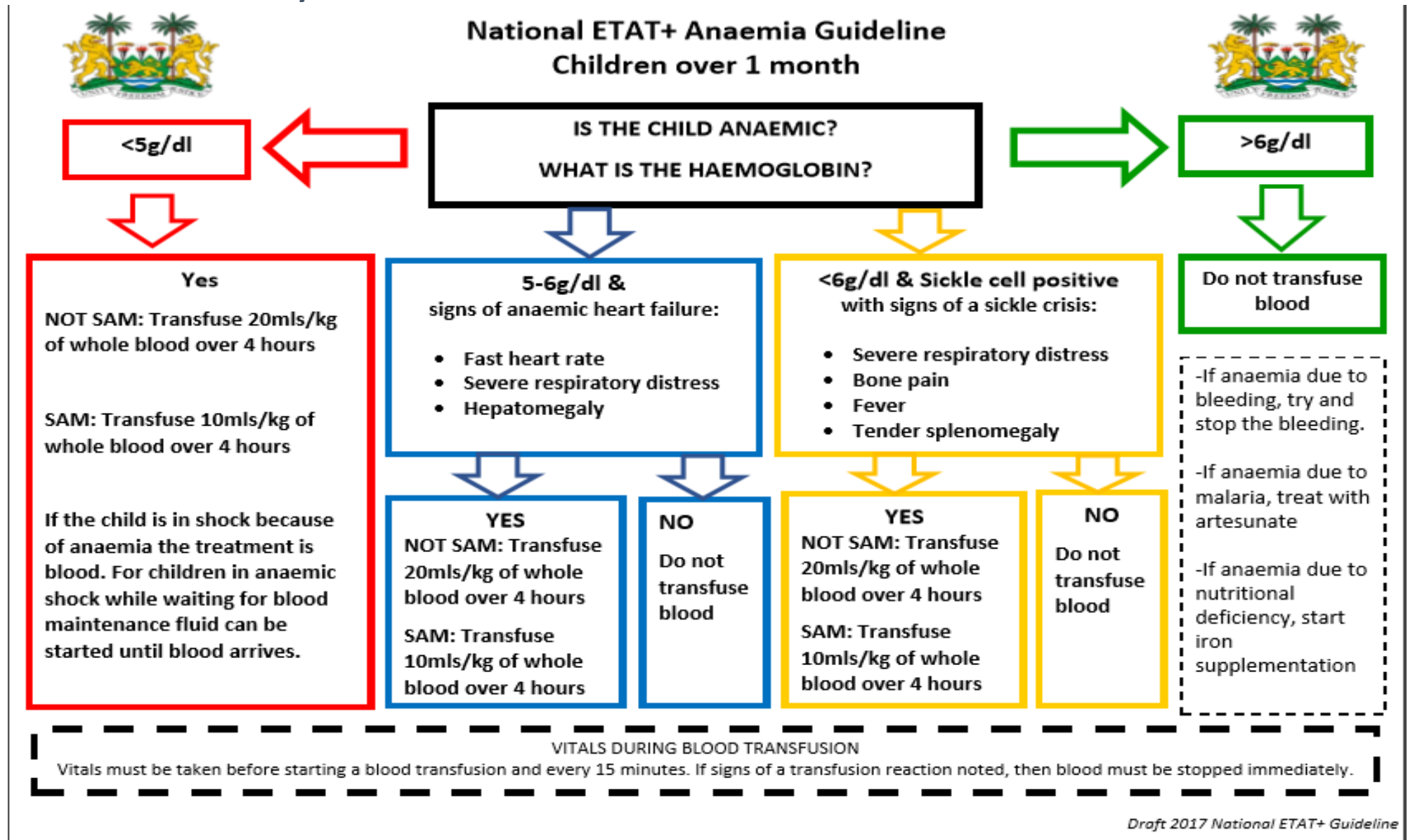
If getting intravenous (IV) access, take a blood sample for Hb, malaria RDT (or thick film), blood glucose/sugar (which will be discussed in chapter 8) and any other tests clinically indicated and available.

## Intra Osseous Access

|                      |                                                                                                                                                                                                                   |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>When?</b>         | In emergencies if IV access is not possible<br>In shock after 2 failed attempts to place an IV line                                                                                                               |
| <b>Where?</b>        | Inner side of the lower leg below the knee – upper to middle third of the tibia                                                                                                                                   |
| <b>How?</b>          | Sterile procedure<br>Insert the needle at a 90-degree angle by gentle, firm, drilling or twisting movement<br>Stop if you can aspirate blood or you feel a loss of resistance<br>Flush (3ml) and feel for leakage |
| <b>Don't If</b>      | Skin Infection, Broken bones, Bleeding problem                                                                                                                                                                    |
| <b>Complications</b> | Fluid leaking into surrounding tissues, Infection, Fracture of the bone                                                                                                                                           |



## Anaemia Summary Flowchart



## 7. Disability (Coma and Convulsion)

|          |                                                   |
|----------|---------------------------------------------------|
| <b>A</b> | <b>Airway</b>                                     |
| <b>B</b> | <b>Breathing</b>                                  |
| <b>C</b> | <b>Circulation (including severe Dehydration)</b> |
| <b>D</b> | <b>Disability (coma and convulsion)</b>           |

### Assessment of Disability

**Coma:** A common way to describe a child's level of consciousness is using the AVPU scale. Coma is P or U on this scale.

|          |                          |                                                                                |
|----------|--------------------------|--------------------------------------------------------------------------------|
| <b>A</b> | <b>Alert</b>             | Child looking around and responsive to the environment                         |
| <b>V</b> | <b>Responds to Voice</b> | Turns head or opens eyes to mother's call                                      |
| <b>P</b> | <b>Responds to Pain</b>  | Rub your knuckles gently on the child's sternum; child will push the hand away |
| <b>U</b> | <b>Unresponsive</b>      | Not responding or faintly groaning instead of reacting                         |

In babies under two months of age, it is not possible to use AVPU. Instead, assess the tone (floppy or rigid or normal) and spontaneous movements. Also look for inability to feed and hard to settle.

**Convulsions (also known as fits):** A child having a generalised convulsion will not respond normally (U on AVPU) and may have jerking movement of some or all limbs, cycling movements of the legs or twitching of the face and eyes. The breathing is often grunting or an abnormal pattern. Convulsions can be very obvious or very subtle, seen only when the child is fully unwrapped. Partial seizures occur when only one part of side of the body is affected.

**Blood sugar level:** measure blood sugar level with a glucometer. If there is no glucometer available and AVPU is less than A, i.e. V or P or U then treat for low blood sugar.

Also consider whether the child is irritable, does not like light (photophobia), has neck stiffness or a bulging fontanelle or a rash.

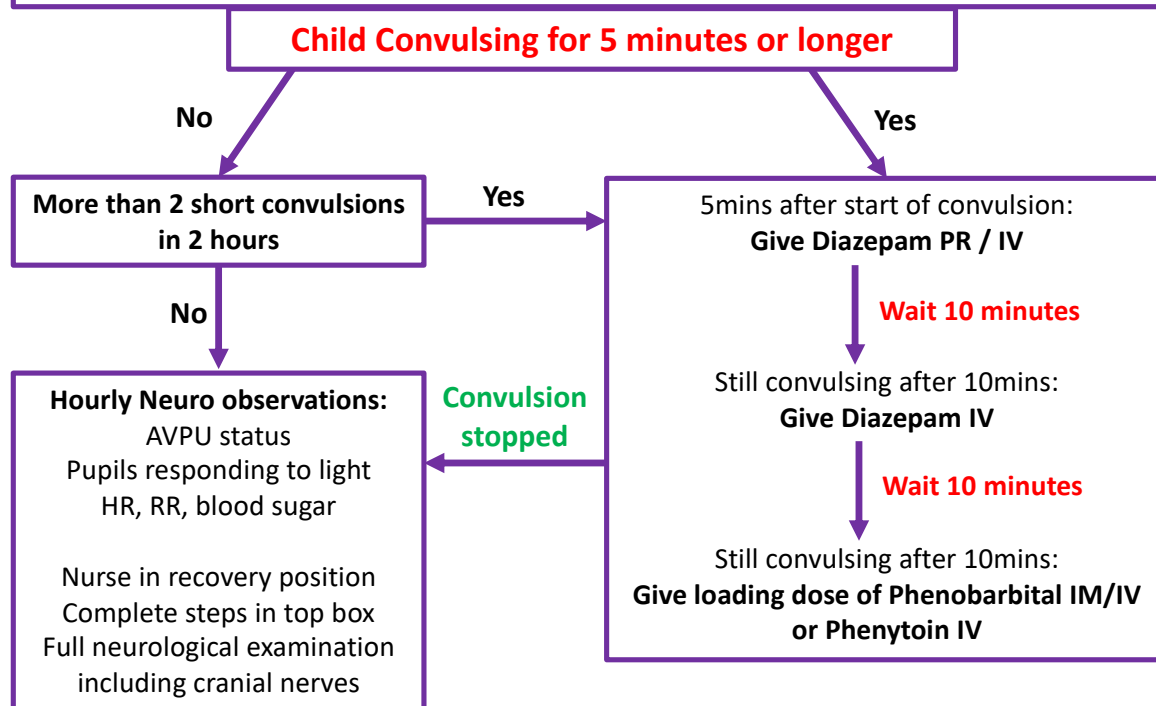
### Management of Disability

- **The emergency treatment is first to manage A, B and C correctly.** If the patient is P or U on the AVPU score, then the **airway** is at risk so put the child in the recovery position and/or airway support with jaw thrust or Guedel or nasopharyngeal airway. Give **oxygen**.
- **Measure the blood glucose (sugar)** – if it is <3mmol/l then this is low (hypoglycaemia) so treat with 5ml/kg of IV Dextrose 10%. In neonates, the recommended dose is 2ml/kg of Dextrose 10%. **If you cannot measure the blood sugar and AVPU is V, or P or U, assume that the blood sugar is low and give 5ml/kg of Dextrose 10%.**
- **Treat convulsions if present**
- Place NG tube and aspirate stomach (don't feed) to protect from aspiration.

# Management of Convulsions in Children aged over 1 month

Address the Airway, Breathing and Circulation before treating the convulsions, check and treat blood glucose, then treat the convulsions use the flow chart below:

1. Check time; note when convulsion started
2. SSSS: Safe to approach, stimulate, shout for help, consider setting
3. Airway - open and maintain the airway
4. Breathing - give oxygen
5. Circulation - assess for signs of shock, severe anaemia, malnutrition and dehydration
6. Disability - check blood sugar level if available
7. Site IV access and send blood for Hb and malarial RDT
8. If no glucometer or blood sugar <3mmol then give 5ml/kg bolus of Dextrose 10%
9. Treat prolonged convulsion (lasting 5 minutes or longer) or multiple convulsions (more than 2 convulsions in 2 hours) using the protocol below
10. Give IV Ceftriaxone (100mg/kg) and IV Artesunate (<20kg: 3mg/kg; >20kg 2.4mg/kg) if not already given in the last 24 hours
11. Place in the recovery position
12. Perform full set of vitals including temperature
13. Ensure child is receiving appropriate maintenance fluid or feed



## Anti-convulsant Doses:

Diazepam IV: 0.05ml/kg or 0.25mg/kg

Diazepam PR: 0.1ml/kg

Phenobarbital loading dose: 15mg/kg IV/IM over 15mins

Phenobarbital maintenance: 5mg/kg OD to start after 24hrs for 2 days

Phenytoin IV: 15mg/kg over 1 hour

**Important Note:** Focus on treating hypoglycaemia before treating the convulsions

## Preparation and Administration of D10% and Diazepam

| Weight<br>(kg)                                                                                                                            | Dextrose 10% (D10%)<br>5 mls/kg of D10% over 5 – 10 minutes<br>IV/IO |                                                                                                                                                                        | IV <u>diluted</u> Diazepam<br>10mg in 10 mls<br>0.25 mg/kg |             | IV undiluted Diazepam<br>10mg in 2ml solution<br>0.25 mg/kg |             | PR undiluted Diazepam<br>10mg in 2ml solution<br>0.5 mg/kg |             |
|-------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|-------------|-------------------------------------------------------------|-------------|------------------------------------------------------------|-------------|
|                                                                                                                                           | Volume of D10%                                                       | To make D10%                                                                                                                                                           | Dose in mg                                                 | Dose in mls | Dose in mg                                                  | Dose in mls | Dose in mg                                                 | Dose in mls |
| 3                                                                                                                                         | 15 mls                                                               | <u>50% Glucose and water for injection:</u><br><br>10 mls syringe:<br>✓ 2 mls 50% Glucose<br>✓ 8 mls water<br>20 mls syringe:<br>✓ 4 mls 50% Glucose<br>✓ 16 mls Water | 0.75 mg                                                    | 0.75mls     | 0.75 mg                                                     | 0.15 mls    | 1.5 mg                                                     | 0.3 mls     |
| 4                                                                                                                                         | 20 mls                                                               |                                                                                                                                                                        | 1 mg                                                       | 1ml         | 1 mg                                                        | 0.2 mls     | 2 mg                                                       | 0.4 mls     |
| 5                                                                                                                                         | 25 mls                                                               |                                                                                                                                                                        | 1.25 mg                                                    | 1.25mls     | 1.25 mg                                                     | 0.25 mls    | 2.5 mg                                                     | 0.5 mls     |
| 6                                                                                                                                         | 30 mls                                                               |                                                                                                                                                                        | 1.5 mg                                                     | 1.5mls      | 1.5 mg                                                      | 0.3 mls     | 3 mg                                                       | 0.6 mls     |
| 7                                                                                                                                         | 35 mls                                                               |                                                                                                                                                                        | 1.75 mg                                                    | 1.75mls     | 1.75 mg                                                     | 0.35 mls    | 3.5 mg                                                     | 0.7 mls     |
| 8                                                                                                                                         | 40 mls                                                               |                                                                                                                                                                        | 2 mg                                                       | 2mls        | 2 mg                                                        | 0.4 mls     | 4 mg                                                       | 0.8 mls     |
| 9                                                                                                                                         | 45 mls                                                               |                                                                                                                                                                        | 2.25 mg                                                    | 2.25mls     | 2.25 mg                                                     | 0.45 mls    | 4.5 mg                                                     | 0.9 mls     |
| 10                                                                                                                                        | 50 mls                                                               |                                                                                                                                                                        | 2.5 mg                                                     | 2.5mls      | 2.5 mg                                                      | 0.5 mls     | 5 mg                                                       | 1 ml        |
| 11                                                                                                                                        | 55 mls                                                               | <u>50% Glucose and D5%:</u><br><br>10 mls syringe:<br>✓ 1 ml 50% Glucose<br>✓ 9 mls 5% Glucose<br><br>20 mls syringe:<br>✓ 2 mls 50% Glucose<br>✓ 18 mls 5% Glucose    | 2.75 mg                                                    | 2.75mls     | 2.75 mg                                                     | 0.55 mls    | 5.5 mg                                                     | 1.1 mls     |
| 12                                                                                                                                        | 60 mls                                                               |                                                                                                                                                                        | 3 mg                                                       | 3mls        | 3 mg                                                        | 0.6 mls     | 6 mg                                                       | 1.2 mls     |
| 13                                                                                                                                        | 65 mls                                                               |                                                                                                                                                                        | 3.25 mg                                                    | 3.25mls     | 3.25 mg                                                     | 0.65 mls    | 6.5 mg                                                     | 1.3 mls     |
| 14                                                                                                                                        | 70 mls                                                               |                                                                                                                                                                        | 3.5 mg                                                     | 3.5mls      | 3.5 mg                                                      | 0.7 mls     | 7 mg                                                       | 1.4 mls     |
| 15                                                                                                                                        | 75 mls                                                               |                                                                                                                                                                        | 3.75 mg                                                    | 3.75mls     | 3.75 mg                                                     | 0.75 mls    | 7.5 mg                                                     | 1.5 mls     |
| 16                                                                                                                                        | 80 mls                                                               |                                                                                                                                                                        | 4 mg                                                       | 4mls        | 4 mg                                                        | 0.8 mls     | 8 mg                                                       | 1.6 mls     |
| 17                                                                                                                                        | 85 mls                                                               |                                                                                                                                                                        | 4.25 mg                                                    | 4.25mls     | 4.25 mg                                                     | 0.85 mls    | 8.5 mg                                                     | 1.7 mls     |
| 18                                                                                                                                        | 90 mls                                                               |                                                                                                                                                                        | 4.5 mg                                                     | 4.5mls      | 4.5 mg                                                      | 0.9 mls     | 9 mg                                                       | 1.8 mls     |
| 19                                                                                                                                        | 95 mls                                                               |                                                                                                                                                                        | 4.75 mg                                                    | 4.75mls     | 4.75 mg                                                     | 0.95 mls    | 9.5 mg                                                     | 1.9 mls     |
| 20                                                                                                                                        | 100 mls                                                              |                                                                                                                                                                        | 5 mg                                                       | 5mls        | 5 mg                                                        | 1 ml        | 10 mg                                                      | 2 mls       |
| <b>Preparing <u>Diluted</u> Diazepam:</b><br>Diazepam 10mg (2mls) diluted with 8mls of water for injection to make 10mg in 10mls solution |                                                                      |                                                                                                                                                                        |                                                            |             |                                                             |             |                                                            |             |

## Preparation and Administration of Phenobarbitone and Phenytoin

| Weight (kg)                                                                                                                                                      | Phenobarbitone<br><i>Loading dose:</i><br><b>15 mg/kg</b> | Phenobarbitone<br><i>Maintenance dose:</i><br><b>5 mg/kg daily</b><br>(high dose – chronic therapy) |             | Phenytoin<br><i>Loading dose:</i><br><b>15 mg/kg</b> | Phenytoin<br><i>Maintenance dose:</i><br><b>5 mg/kg daily</b> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------------------------------------------------|-------------|------------------------------------------------------|---------------------------------------------------------------|
|                                                                                                                                                                  | IV infusion / 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                                                                                                  | 1 ½ 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                                                                                                  | 2 ½ tabs    | 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                                                           |
| How to give Phenobarbitone/Phenytoin via IV infusion:                                                                                                            |                                                           |                                                                                                     |             |                                                      |                                                               |
| ✓ Draw up the needed amount of drug and mix with 100 mls Normal Saline                                                                                           |                                                           |                                                                                                     |             |                                                      |                                                               |
| ✓ Divide the total amount into 5 and give that amount every 3 minutes for 5 times (within 15 minutes)                                                            |                                                           |                                                                                                     |             |                                                      |                                                               |
| ✓ Example: for a 5 kg child, you will need 75 mg of the drug, mixed with 100 mls of NS. Give 20 mls of the solution every 3 minutes, 5 times (within 15 minutes) |                                                           |                                                                                                     |             |                                                      |                                                               |

## 8. Malaria

### MALARIA TREATMENT FLOW CHART FOR HOSPITALS

#### The Patient's Journey

If temperature  $\geq 38.0^{\circ}\text{C}$  or history of fever in recent 48 hours: test for malaria

1. The Health Worker completes urgent request form for laboratory tests
2. Test request for MPs sent to the Laboratory
3. Whilst waiting for laboratory results, RDT test could be done where applicable
4. For outpatients: tests are done in main laboratory (MPS)
5. Test done: laboratory technician gives report to caregiver and record
6. Health Worker records results in inpatient chart or on outpatient card

Test **Positive**

Check for signs of severe malaria:

- Prostration (unable to walk/sit without support or drink/breastfeed)
- $\geq 2$  convulsions in 24 hours
- Altered consciousness
- Blood sugar  $\leq 3$  mmol/L
- Hb  $\leq 5.0$  g/dL (or PCV  $\leq 15\%$ )
- Shock (compensated or decompensated)
- Increased work of breathing where pneumonia is unlikely

**One or more  
Signs present**

Signs **Absent**

#### **Uncomplicated Malaria: Treat with ACT**

1. Use dosage chart
2. Treat any co-infections
3. Tell caregiver to return if symptoms persist after 3 days

Test **Negative**

Antimalarial not required.  
Look for another cause of illness. Repeat test if concern remains.

#### **Severe Malaria: Treat with Artesunate IV/IO (alternatively, Artemether IM or Quinine IV/IO)**

1. Use dosage chart
2. Doctors to determine frequency of monitoring
3. Treat hypoglycaemia – use hypoglycaemia guideline
4. Check for malnutrition: record Z-score. Caution with fluids in malnutrition
5. Doctors to determine maintenance fluids/feeds
6. Do not give bolus iv fluids for shock unless the cause is gastroenteritis
7. If Hb  $\leq 5$  g/dl transfuse 20ml/kg whole blood urgently (note: if malnutrition or heart failure see anaemia guideline)
8. Treat co-infection – see guideline
9. If unconscious – use coma guideline

This Malaria Treatment flow chart for hospitals is based on the Malaria Case Management Guideline and is approved by the National Malaria Control Programme of the Ministry of Health and Sanitation

## **Malaria Drug Treatment**

### **Uncomplicated Malaria**

First-line drug for children above 3kg is oral Artemether plus Lumefantrine twice daily for three days. Prescribe as in the table below. Nurse to supervise the first treatment. If child vomits tablets, admit & treat with IV / IM artesunate or artemether IM.

| Weight (Kg) | Age                                            | 20/120mg tablets |             |             |             |             |             |
|-------------|------------------------------------------------|------------------|-------------|-------------|-------------|-------------|-------------|
|             |                                                | Day 1            |             | Day 2       |             | Day 3       |             |
|             |                                                | Morning          | Evening     | Morning     | Evening     | Morning     | Evening     |
| 5 – 14      | >3yrs                                          | 1 tab/dose       | 1 tab/dose  | 1 tab/dose  | 1 tab/dose  | 1 tab/dose  | 1 tab/dose  |
| 15-24       | 4-8yrs                                         | 2 tabs/dose      | 2 tabs/dose | 2 tabs/dose | 2 tabs/dose | 2 tabs/dose | 2 tabs/dose |
| 25-34       | 9-14yrs                                        | 3 tabs/dose      | 3 tabs/dose | 3 tabs/dose | 3 tabs/dose | 3 tabs/dose | 3 tabs/dose |
| >35         | >14yrs                                         | 4 tab/dose       | 4 tab/dose  | 4 tab/dose  | 4 tab/dose  | 4 tab/dose  | 4 tab/dose  |
| >35         | 1 tablet AL 80/480mg fixed dose, twice per day |                  |             |             |             |             |             |

**AL 80/480mg fixed dose. A higher strength of AL that has 6 tablets instead of 24 for a complete dosing regimen**

### **Severe Malaria**

**First-line drug: Artesunate IV / IO; Alternative drugs: Artemether IM or Quinine IV / IO**

| Weight (kg) | Artesunate: Dose<br>3mg/kg if <20kg or<br>2.4mg/kg if ≥20kg<br>at time 0 hr, 12 hr, 24<br>hr, then daily |                           | Artemether:<br>Loading 3.2 mg/kg<br>Maintenance dose 1.6 mg/kg<br>(once daily) |                               | Quinine:<br>Loading dose 20 mg/kg<br>Maintenance dose 10 mg/kg<br>(8 hrly) |                              |                         |
|-------------|----------------------------------------------------------------------------------------------------------|---------------------------|--------------------------------------------------------------------------------|-------------------------------|----------------------------------------------------------------------------|------------------------------|-------------------------|
|             | IV / IO                                                                                                  |                           | IM in thigh                                                                    |                               | Infusion IV / IO over 4 hours                                              |                              |                         |
|             | Dose (mg)                                                                                                | Dose (ml) of 60mg in 6mls | Loading dose (mg)                                                              | Maintaining dose (mg) 24 hrly | Loading dose (mg)                                                          | Maintaining dose (mg) 8 hrly | Volume (ml) 5% dextrose |
| 3.0 - 3.9   | 9                                                                                                        | 0.9                       | 10                                                                             | 5                             | 60                                                                         | 30                           | 30                      |
| 4.0 - 4.9   | 12                                                                                                       | 1.2                       | 13                                                                             | 6                             | 80                                                                         | 40                           | 40                      |
| 5.0 - 5.9   | 15                                                                                                       | 1.5                       | 16                                                                             | 8                             | 100                                                                        | 50                           | 50                      |
| 6.0 - 6.9   | 18                                                                                                       | 1.8                       | 19                                                                             | 10                            | 120                                                                        | 60                           | 60                      |
| 7.0 - 7.9   | 21                                                                                                       | 2.1                       | 22                                                                             | 11                            | 140                                                                        | 70                           | 70                      |
| 8.0 - 8.9   | 24                                                                                                       | 2.4                       | 26                                                                             | 13                            | 160                                                                        | 80                           | 80                      |
| 9.0 - 9.9   | 27                                                                                                       | 2.7                       | 29                                                                             | 14                            | 180                                                                        | 90                           | 90                      |
| 10.0 - 10.9 | 30                                                                                                       | 3.0                       | 32                                                                             | 16                            | 200                                                                        | 100                          | 100                     |
| 11.0 - 11.9 | 33                                                                                                       | 3.3                       | 35                                                                             | 18                            | 220                                                                        | 110                          | 110                     |
| 12.0 - 12.9 | 36                                                                                                       | 3.6                       | 38                                                                             | 19                            | 240                                                                        | 120                          | 120                     |
| 13.0 - 13.9 | 39                                                                                                       | 3.9                       | 42                                                                             | 21                            | 260                                                                        | 130                          | 130                     |
| 14.0 - 14.9 | 42                                                                                                       | 4.2                       | 45                                                                             | 22                            | 280                                                                        | 140                          | 140                     |
| 15.0 - 15.9 | 45                                                                                                       | 4.5                       | 48                                                                             | 24                            | 300                                                                        | 150                          | 150                     |
| 16.0 - 16.9 | 48                                                                                                       | 4.8                       | 51                                                                             | 26                            | 320                                                                        | 160                          | 160                     |
| 17.0 - 17.9 | 51                                                                                                       | 5.1                       | 54                                                                             | 27                            | 340                                                                        | 170                          | 170                     |
| 18.0 - 18.9 | 54                                                                                                       | 5.4                       | 58                                                                             | 29                            | 360                                                                        | 180                          | 180                     |
| 19.0 - 19.9 | 57                                                                                                       | 5.7                       | 61                                                                             | 30                            | 380                                                                        | 190                          | 190                     |
| 20.0 - 20.9 | 48                                                                                                       | 4.8                       | 64                                                                             | 32                            | 400                                                                        | 200                          | 200                     |

**Follow injection drugs with 3 days oral ACT (Artemether/Lumefantrine or ASAQ). If the child is unable to tolerate oral medication continue injection drugs for 6 days.**

**Artesunate IV / IO.:** Give every 12 hours for the first three doses (time 0, 12 hrs. and 24 hrs.). Use a minimum of 3 doses before switching to oral ACT.

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.

- **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

| Preparing IV artesunate            | IV       | IM       |
|------------------------------------|----------|----------|
| Artesunate powder (mg)             | 60 mg    | 60 mg    |
| Sodium Bicarbonate (mls, 5%)       | 1 ml     | 1 ml     |
| Normal Saline or 5% Dextrose (mls) | 5 mls    | 2 mls    |
| Total volume                       | 6 mls    | 3 mls    |
| Artesunate concentration mg/ml     | 10 mg/ml | 20 mg/ml |

**Artemether IM.:** Use a minimum of loading and one maintenance dose before switching to oral ACT.

**Quinine IV / IO:** Use a minimum of loading and three maintenance doses before switching to oral ACT.

**Please note:** If a patient is deteriorating on treatment please discuss immediately with the Doctor

#### **Co-infection in Severe malaria for a child**

There is high risk of a bacterial co-infection (~10%)

**When no focal sign of bacterial infection consider**

Ampicillin 50 mg/kg/dose four times per day. Change to amoxicillin syrup when changing to oral ACT. Treat for 5 days.

#### **Sign of pneumonia or septicaemia**

Ampicillin 50 mg/kg/dose QID; PLUS gentamicin 7.5 mg/kg/dose OD for 5 days.

#### **Sign of coma or meningitis**

Ceftriaxone 100 mg/kg/dose OD (inject slowly over 5 minutes) or

Chloramphenicol 25 mg/kg/dose QID; PLUS ampicillin 50 mg/kg QID

## 9. Sickle Cell Disease

### Sickle Cell Emergencies and Management

Patients with emergency conditions will require an urgent referral for clinical review and management

| Sickle Crises/Problem        | Pathophysiology                                                                  | Presentation                              | Treatment                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Severe painful crisis</b> | Sickle cells block the small vessels, restricting oxygen delivery to the tissues | Severe pain in any part of the body       | <ul style="list-style-type: none"> <li>• Analgesia – paracetamol, ibuprofen, diclofenac, morphine (depending on the severity of the pain) <ul style="list-style-type: none"> <li>○ Pain scale used for deciding on treatment (ask for senior review for pain management)</li> </ul> </li> <li>• Oxygen if available</li> <li>• IV (one and a half) maintenance fluids if not drinking enough</li> <li>• Antibiotics if fever</li> <li>• Blood transfusion may be required</li> </ul> |
| <b>Chest crisis</b>          | Sickle cells block the small vessels in the lungs                                | Chest pain, respiratory distress, hypoxia | <ul style="list-style-type: none"> <li>• Oxygen if SpO<sub>2</sub>&lt;95%</li> <li>• Antibiotics (including Macrolides)</li> <li>• Analgesia – paracetamol, ibuprofen, diclofenac, morphine</li> <li>• IV maintenance fluids if not drinking enough</li> <li>• Encourage deep breaths / blowing to keep lungs expanded</li> <li>• Blood transfusion may be required</li> </ul>                                                                                                       |
| <b>Stroke</b>                | Sickle cells block vessels in the brain, starving parts of the brain of oxygen   | Weakness, speech problems, coma           | <ul style="list-style-type: none"> <li>• Manage airway if at risk</li> <li>• Oxygen if available</li> <li>• Antibiotics (exclude meningitis)</li> <li>• IV maintenance fluids if not drinking enough</li> <li>• Blood transfusion may be required</li> </ul>                                                                                                                                                                                                                         |

|                               |                                                                                 |                                                      |                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------------------|---------------------------------------------------------------------------------|------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Infection</b>              | The spleen is damaged or destroyed by sickling so can't protect from infections | Fever, impaired circulation, signs of painful crisis | <ul style="list-style-type: none"> <li>Antibiotics (ceftriaxone or ciprofloxacin)</li> <li>Treat shock if present ideally with blood but IV fluid can be used until blood available. 10ml/kg NS bolus over 1 hour</li> <li>Blood transfusion may be required</li> <li>IV maintenance fluids if not drinking enough</li> </ul>                                       |
| <b>Sequestration</b>          | Red blood cells become trapped in the spleen or liver                           | Pallor, impaired circulation, large spleen or liver  | <ul style="list-style-type: none"> <li>Blood transfusion may be required</li> <li>If in shock, can give fluid bolus while waiting for blood</li> <li>Antibiotics</li> </ul>                                                                                                                                                                                         |
| <b>Priapism</b>               | Occlusion of the penile blood vessels                                           | Penile pain and restlessness                         | <ul style="list-style-type: none"> <li>First line management <ul style="list-style-type: none"> <li>Urinate often</li> <li>Vigorous exercise</li> <li>Increased fluid intake</li> <li>Analgesia</li> <li>Warm bath</li> </ul> </li> </ul> <p><b><i>Within 2 hours, if all these measures do not resolve the symptoms, consult higher health facilities.</i></b></p> |
| <b>Hyperhaemolytic Crisis</b> | Massive haemolysis of RBCs                                                      | Deeply jaundiced, severe pallor, and dark urine      | <ul style="list-style-type: none"> <li>May require blood transfusion</li> <li>Consult senior clinician</li> </ul>                                                                                                                                                                                                                                                   |

Other investigations: Hb, RDT for malaria, Chest X-ray (where possible)

### Other treatment

- Avoid precipitating factors e.g. cold, dehydration
- Ensure child is up to date with vaccinations (pneumococcal, haemophilus B, meningococcal A and C)
- Start lifetime oral penicillin V prophylaxis against infection (due to hyposplenism)
- Malaria prophylaxis – Fansidar monthly
- Oral folate
- Consider hydroxyurea

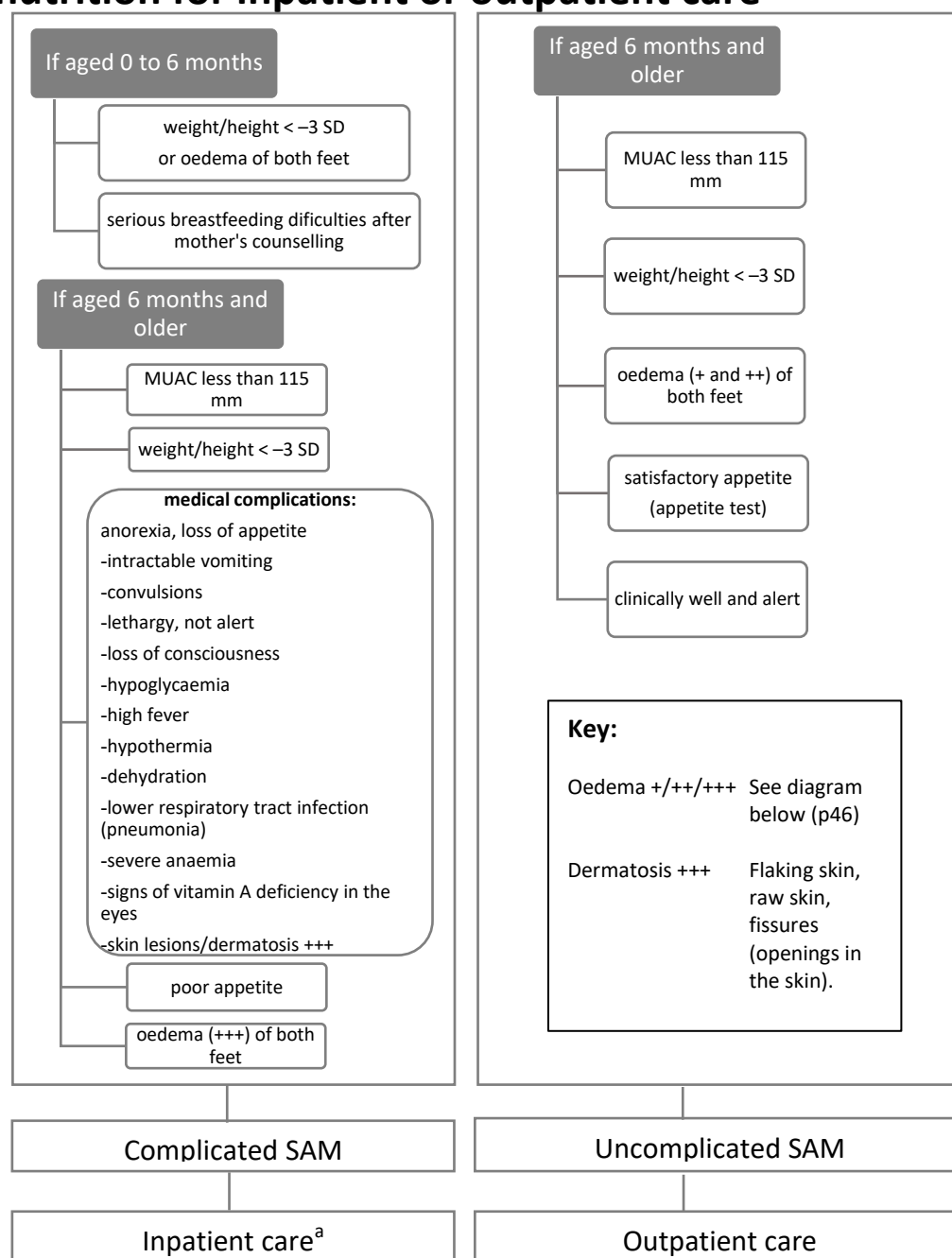
# 10. Severe Acute Malnutrition (SAM)

## Diagnosing SAM

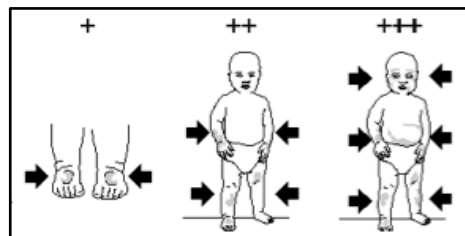
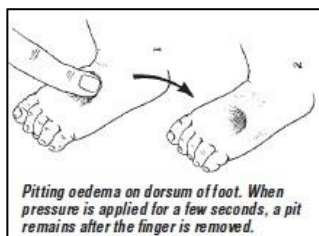
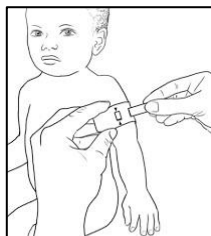
**Severe wasting:** Mid upper arm circumference (MUAC) <11.5cm  
Or Weight for height/length (WFH) <-3SD

Or **Oedema of both feet**

## Admission criteria for children with severe acute malnutrition for inpatient or outpatient care



<sup>a</sup> where there is no outpatient programme, children with severe acute malnutrition with or without complications should be admitted for inpatient treatment.



The extent of oedema is commonly rated in the following way:

- + mild: both feet
- ++ moderate: both feet, plus lower legs, hands or lower arms
- +++ severe: generalized oedema including both feet, legs, hands, arms and face.

## Management of SAM

### Danger Signs in SAM:

Always check for the following at presentation and manage accordingly;

- **Shock:** lethargic or unconscious; with cold hands, slow capillary refill (> 3 s), or weak (small volume), rapid pulse and low blood pressure
- History of **watery diarrhoea**
- **Severe Dehydration:** Lethargy, unable to drink or drinks poorly, oliguria or anuria, history of watery diarrhoea, sunken eyes (*helpful sign if the mother says the sunken appearance is recent*), cold extremities (may be a sign of both severe dehydration and septic shock)
- Severe palmar pallor
- Bilateral pitting oedema
- **Fever** (temperature >37.5°C) or **hypothermia** (temperature <35°C)
- Signs of HIV infection
- **Skin changes of kwashiorkor:** hypo or hyperpigmentation desquamation, ulceration exudative lesions, **resembling severe burns** often with secondary infection
- Eye signs of **vitamin A deficiency:** closing or reluctant to open eyes, dry conjunctiva or cornea, Bitot spots, corneal ulceration

### The Ten Step Approach to Management of SAM

There is a 10-step approach to managing children with SAM

1. Hypoglycaemia
2. Hypothermia
3. Dehydration
4. Electrolytes
5. Infection
6. Micronutrients
7. Initial feeding

Immediate

8. Catch up feeding
9. Sensory stimulation
10. Prepare for follow up

# Emergency Management of Severe Acute Malnutrition

**1** Does the child have any of these features?

## **Marasmus/severe wasting**

- Old person's face
- Irritable
- Visible wasting (buttocks, upper arms)
- Low weight

## **Kwashiorkor**

- Apathy
- Oedema of legs, arms, face (pitting oedema both feet)
- Pale, sparse hair, weak roots
- Pale, thin, peeling skin
- Hepatomegaly

**YES**

**2** Does the child have SAM?

To be diagnosed with SAM the child must have:

- ✓ **Severe wasting**
  - MUAC <11.5cm
  - Or Weight for height/length <-3SD

**OR**

- ✓ **Oedema of both feet**

**YES**

**4** **Complicated SAM**

ALL CHILDREN WITH COMPLICATED SAM MUST BE ADMITTED.

Don't forget your ABCD assessment.

ALL children with complicated SAM need:

- IV antibiotics
  - First line:
    - Ampicillin 50mg/kg TDS IV
    - Plus
    - Gentamicin 7.5mg/kg/IV OD
  - Start IV antibiotics for 2 days then reassess and consider switching to oral amoxicillin
- Treat hypoglycaemia (RBS <3mmol/L)
  - Conscious child: oral sugar feed with 50mls of D10% or 1 teaspoon of sugar mixed in 3 tablespoons of clean water
  - Unconscious child: 5mls/kg D10%
- Warmth
  - Hypothermia is associated with low sugar and infections.
- If the child has diarrhoea give ReSoMal PO/NG
  - Step 1: 5mls/kg every 30 mins for 2 hours
  - Step 2: 5-10mls/kg over 1 hour for 4-10 hours
- Start F75 in step 2 or as soon as available and alternate with ReSoMal
- SCREEN FOR HIV AND TB

**YES**

**3** **IMMEDIATELY GIVE A FEED OR ORAL/NG GLUCOSE**

Does the child have complicated SAM?

Complicated SAM:

- ✓ SAM with a medical complication OR
- ✓ SAM with no appetite

**NO**

**4** **Uncomplicated SAM**

- ✓ SAM with NO medical complication
- ✓ SAM but child has appetite

Children with uncomplicated SAM can be managed as outpatients

Start oral antibiotics for 5 days

- Amoxicillin 25mg/kg PO BD

Patient should be started on ready to use therapeutic food (RUTF)

SCREEN FOR HIV AND TB

# 11. Neonatal Care

## Newborn Resuscitation

Some babies don't breathe properly when they are born. This resuscitation protocol is for these babies who have never taken a breath. (Use normal infant BLS for babies who breathe normally at birth and then become unwell later, requiring resuscitation).

The aim of neonatal resuscitation is to open the lungs and establish regular breathing of a baby immediately after birth/delivery.

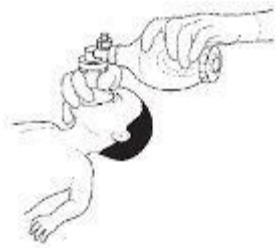
### Preparation is very important

If problems are suspected, make sure that two members of staff are present to help the baby. Make sure that you have ready and functioning:

- A clock
- Gloves
- At least two warm towels/cloths
- Hat
- Sterile scissors and ties/cord clamp
- A bag-valve-mask (ambu-bag)
- A stethoscope
- Suction device (insert image for reference)
- If available: nasal prongs, IV cannula, IV fluids, adrenaline, radiant warmer, O<sub>2</sub> concentrator, monitor/pulse oximeter.



|                        |                                                                                                                                                                                                                                                       |                                                                                                                                                                                                     |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Assess the baby</b> | <ul style="list-style-type: none"> <li>• Safety First: PPE, safe environment</li> <li>• <b>Dry the baby and stimulate (rub the back or sole of the feet)</b></li> <li>• Wrap in a towel/put hat on</li> <li>• Shout for help</li> </ul>               | <b>Assess (look, listen and feel):</b> <ul style="list-style-type: none"> <li>• Crying or breathing?</li> <li>• Good muscle tone or vigorous movement?</li> <li>• Colour pale/blue/pink?</li> </ul> |
| <b>Open the airway</b> | <b>Open the mouth</b> <ul style="list-style-type: none"> <li>• Suction mouth and nose <b>only</b> if meconium blocking the airway</li> </ul> <b>Position airway</b> <ul style="list-style-type: none"> <li>• Neutral position for neonates</li> </ul> |                                                                                                                                                                                                     |

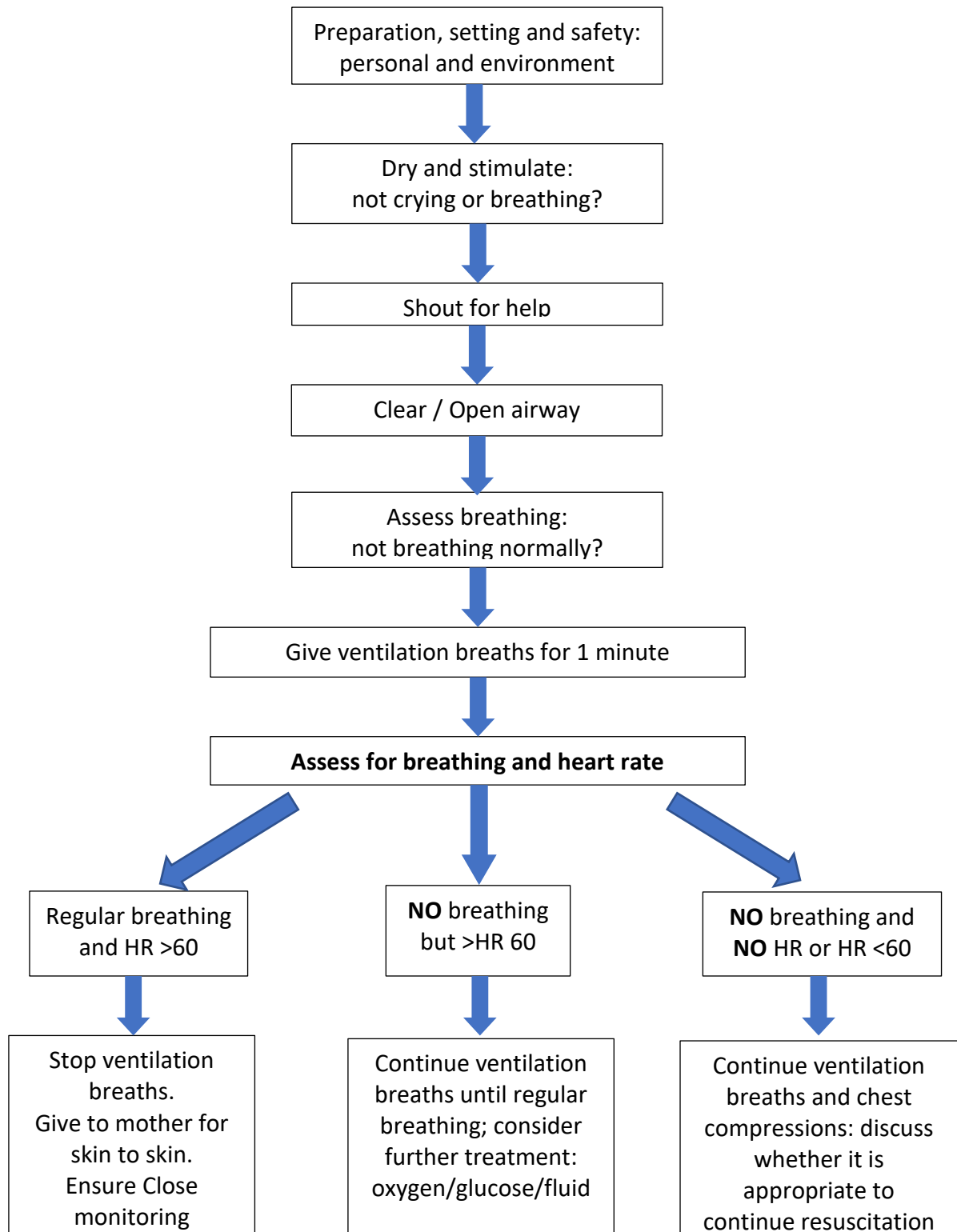
|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Ventilate the baby for one minute</b>          | <p><b>If not breathing or only gasping, start bag-valve-mask ventilation</b></p> <ul style="list-style-type: none"> <li>Give one breath every 1-2 seconds: continue ventilation for one minute</li> </ul> <p><b>Bag-valve-mask ventilation (BVM) - technique</b></p> <ul style="list-style-type: none"> <li>Select appropriate mask</li> <li>Good seal (covering nose and mouth)</li> <li>Gently squeeze the bag until you see the chest rise</li> <li>If the chest is not rising it means there is ineffective ventilation, consider: <ul style="list-style-type: none"> <li>Airway obstruction: reposition head, jaw thrust, clear airway</li> <li>Inadequate seal: two-person technique</li> <li>Faulty equipment</li> </ul> </li> </ul>   |
| <b>After one minute</b>                           | <p><b>Check for respiration and pulse:</b></p> <ul style="list-style-type: none"> <li>if with pulse (&gt;60 b/min) and no breathing – continue ventilation</li> <li>If no pulse or pulse is &lt;60 b/min and no breathing – continue ventilation and commence chest compression (<b>if the second person is available</b>).</li> <li>CPR in newborn - 3:1 = three compressions to one ventilation</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>After two minutes: Check for signs of life</b> | <p><b>Signs of life?</b></p> <ul style="list-style-type: none"> <li>No/inadequate breathing but heart rate present: continue ventilation breaths and consider further treatment: <ul style="list-style-type: none"> <li>Oxygen therapy with the BVM</li> <li>Bolus IV glucose (if RBS&lt;2.2mmol)- 2ml/kg 10% dextrose</li> <li>Maintenance IV fluids</li> </ul> </li> <li>No breathing and no heart rate present (or HR &lt;60): continue ventilation breaths and chest compression (3:1)</li> <li>Every 2 minutes check for the heart rate or signs of life</li> </ul>                                                                                                                                                                                                                                                                                                                                            |
| <b>When to stop?</b>                              | <p><b>Stop:</b></p> <ul style="list-style-type: none"> <li>When the baby is breathing regularly or crying</li> <li>If <b>NO</b> heart rate for more than 10 minutes If heart rate less than 60 b/min for more than 20 minutes</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

### After resuscitation

- Keep the baby warm and dry (and wrapped).
- Check the blood sugar if glucometer available and correct hypoglycaemia if concerned (glucose <2.2mmol/L give 2ml/kg 10% dextrose).

- Breast feed (or NG feed/spoon feed/IV fluids-if too unwell to feed) within 1 hour of birth. Keep on NPO (for at least 24 hours) if too unwell to feed, if in severe respiratory distress and or if hypoxic ischaemic encephalopathy (HIE) is suspected.
- Document: date, time, who was present and actions taken during the resuscitation.
- Make a plan: if the patient is successfully resuscitated organise senior review and send them to SCBU or to the mother. Close monitoring is required.

## Summary Diagram of Newborn Resuscitation



# ACTION PLAN Helping Babies Breathe

Prepare for birth\*

See HMS Action Plans for mother

Birth



**Dry thoroughly**

**Crying?**

Crying

Not crying



**Keep warm**  
**Check breathing**



Breathing well



**Keep warm**  
**Clear airway if needed**  
**Stimulate**

**Breathing?**



Not breathing

Breathing

**Ventilate**  
**Cut cord**

**Cut cord**



**Essential Care for Every Baby**  
(See ECEB Action Plan)

**Monitor**  
**with mother**

Breathing

**Improve ventilation**



Not breathing  
No chest movement  
**Call for help**

Not breathing

**Heart rate?**



Normal

Slow

Not breathing

**Continue ventilation**  
**Decide on advanced care**

\* Equipment to help a baby breathe



Disinfect equipment immediately after use

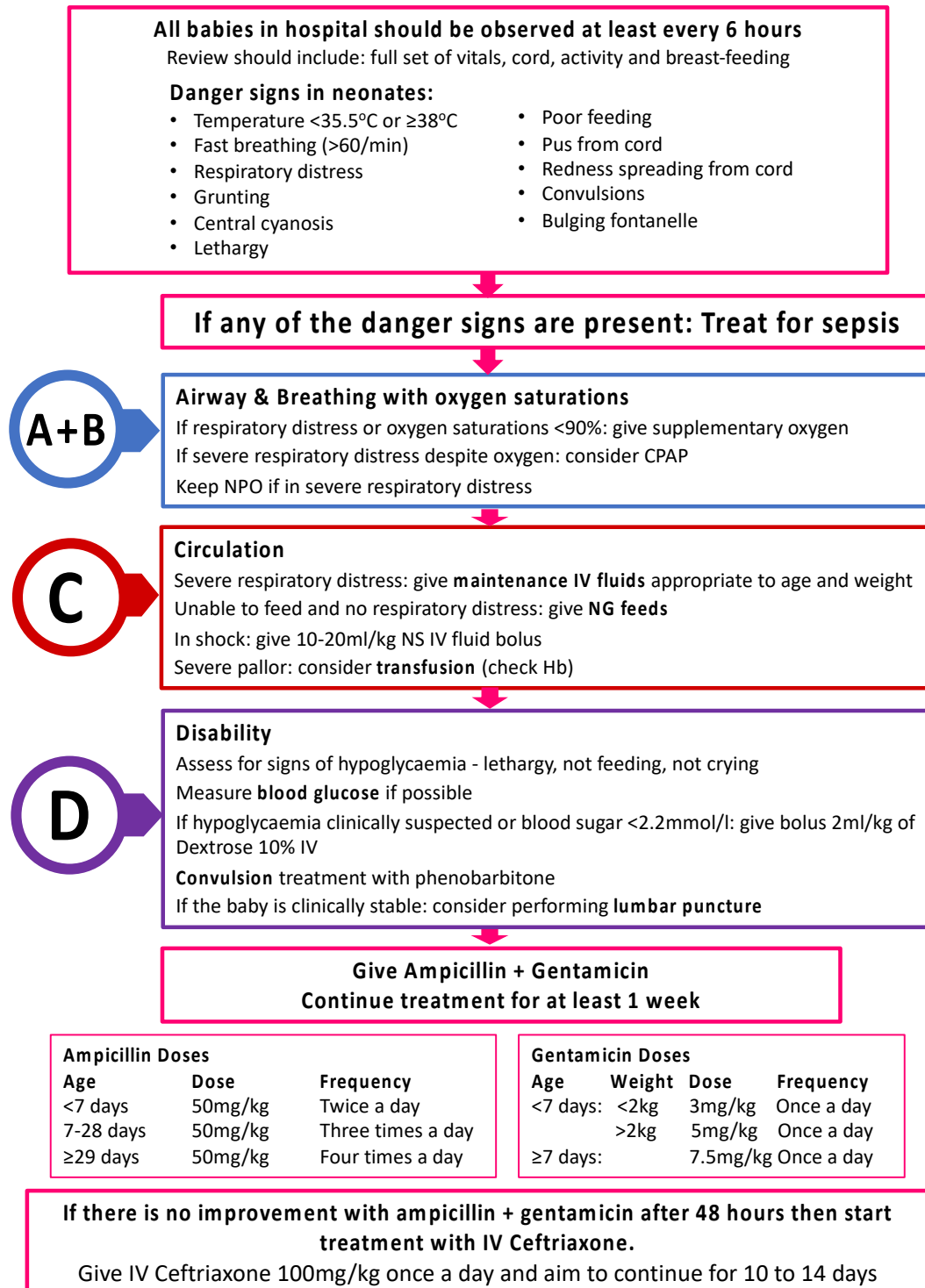
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20-02552 Rev C

# Summary diagram of presumed bacterial infection in newborn

## TREATMENT OF SUSPECTED NEONATAL SEPSIS



## Apgar Scoring System

| Indicator |                                  | 0 Points     | 1 Point                         | 2 Points                       |
|-----------|----------------------------------|--------------|---------------------------------|--------------------------------|
| A         | Activity<br>(muscle tone)        | Absent       | Flexed limbs                    | Active                         |
| P         | Pulse                            | Absent       | < 100 BPM                       | > 100 BPM                      |
| G         | Grimace<br>(reflex irritability) | Floppy       | Minimal response to stimulation | Prompt response to stimulation |
| A         | Appearance<br>(skin color)       | Blue<br>Pale | Pink body<br>Blue extremities   | Pink                           |
| R         | Respiration                      | Absent       | Slow and irregular              | Vigorous cry                   |



## 12. Communication, Transfer & Handover

### Handing over patients

Clear handover is important so that the child continues to get the care they need.

Find out who you are handing over to; nurse looking after patient, nurse in charge or doctor

Introduce yourselves if you don't know each other already.

Make sure they are free to listen and are giving you their full attention and avoid interruptions.

To ensure all necessary information has been handed over, use the **ISBAR** handover format: Identification, Situation, Background, Assessment, Recommendation.

|                             |                                                                                                                                    |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <b>Identification</b>       | Patient name, date of birth, gender and weight                                                                                     |
| <b>Situation</b>            | What is happening to the patient at the moment?<br>Include diagnosis and length of stay                                            |
| <b>Background</b>           | What are the issues that led to the situation<br>Treatment given<br>Relevant past medical history, immunisation status             |
| <b>Assessment</b>           | What is your ABCD assessment and what time was it done                                                                             |
| <b>Recommendations/Plan</b> | What needs to be done to ensure the patient receives the correct treatment<br>Check the other person has understood; any questions |

Check the other person has understood the plan and give the other person a chance to ask questions

# Appendices

## Weight-for-length reference card (WHO Child Growth Standards)

| Boys' weight (kg) |       |       |       |        | Length <sup>a</sup><br>(cm) | Girls' weight (kg) |       |       |       |       |
|-------------------|-------|-------|-------|--------|-----------------------------|--------------------|-------|-------|-------|-------|
| –4 SD             | –3 SD | –2 SD | –1 SD | Median |                             | Median             | –1 SD | –2 SD | –3 SD | –4 SD |
| 1.7               | 1.9   | 2.0   | 2.2   | 2.4    | 45                          | 2.5                | 2.3   | 2.1   | 1.9   | 1.7   |
| 1.8               | 2.0   | 2.2   | 2.4   | 2.6    | 46                          | 2.6                | 2.4   | 2.2   | 2.0   | 1.9   |
| 2.0               | 2.1   | 2.3   | 2.5   | 2.8    | 47                          | 2.8                | 2.6   | 2.4   | 2.2   | 2.0   |
| 2.1               | 2.3   | 2.5   | 2.7   | 2.9    | 48                          | 3.0                | 2.7   | 2.5   | 2.3   | 2.1   |
| 2.2               | 2.4   | 2.6   | 2.9   | 3.1    | 49                          | 3.2                | 2.9   | 2.6   | 2.4   | 2.2   |
| 2.4               | 2.6   | 2.8   | 3.0   | 3.3    | 50                          | 3.4                | 3.1   | 2.8   | 2.6   | 2.4   |
| 2.5               | 2.7   | 3.0   | 3.2   | 3.5    | 51                          | 3.6                | 3.3   | 3.0   | 2.8   | 2.5   |
| 2.7               | 2.9   | 3.2   | 3.5   | 3.8    | 52                          | 3.8                | 3.5   | 3.2   | 2.9   | 2.7   |
| 2.9               | 3.1   | 3.4   | 3.7   | 4.0    | 53                          | 4.0                | 3.7   | 3.4   | 3.1   | 2.8   |
| 3.1               | 3.3   | 3.6   | 3.9   | 4.3    | 54                          | 4.3                | 3.9   | 3.6   | 3.3   | 3.0   |
| 3.3               | 3.6   | 3.8   | 4.2   | 4.5    | 55                          | 4.5                | 4.2   | 3.8   | 3.5   | 3.2   |
| 3.5               | 3.8   | 4.1   | 4.4   | 4.8    | 56                          | 4.8                | 4.4   | 4.0   | 3.7   | 3.4   |
| 3.7               | 4.0   | 4.3   | 4.7   | 5.1    | 57                          | 5.1                | 4.6   | 4.3   | 3.9   | 3.6   |
| 3.9               | 4.3   | 4.6   | 5.0   | 5.4    | 58                          | 5.4                | 4.9   | 4.5   | 4.1   | 3.8   |
| 4.1               | 4.5   | 4.8   | 5.3   | 5.7    | 59                          | 5.6                | 5.1   | 4.7   | 4.3   | 3.9   |
| 4.3               | 4.7   | 5.1   | 5.5   | 6.0    | 60                          | 5.9                | 5.4   | 4.9   | 4.5   | 4.1   |
| 4.5               | 4.9   | 5.3   | 5.8   | 6.3    | 61                          | 6.1                | 5.6   | 5.1   | 4.7   | 4.3   |
| 4.7               | 5.1   | 5.6   | 6.0   | 6.5    | 62                          | 6.4                | 5.8   | 5.3   | 4.9   | 4.5   |
| 4.9               | 5.3   | 5.8   | 6.2   | 6.8    | 63                          | 6.6                | 6.0   | 5.5   | 5.1   | 4.7   |
| 5.1               | 5.5   | 6.0   | 6.5   | 7.0    | 64                          | 6.9                | 6.3   | 5.7   | 5.3   | 4.8   |
| 5.3               | 5.7   | 6.2   | 6.7   | 7.3    | 65                          | 7.1                | 6.5   | 5.9   | 5.5   | 5.0   |
| 5.5               | 5.9   | 6.4   | 6.9   | 7.5    | 66                          | 7.3                | 6.7   | 6.1   | 5.6   | 5.1   |
| 5.6               | 6.1   | 6.6   | 7.1   | 7.7    | 67                          | 7.5                | 6.9   | 6.3   | 5.8   | 5.3   |
| 5.8               | 6.3   | 6.8   | 7.3   | 8.0    | 68                          | 7.7                | 7.1   | 6.5   | 6.0   | 5.5   |
| 6.0               | 6.5   | 7.0   | 7.6   | 8.2    | 69                          | 8.0                | 7.3   | 6.7   | 6.1   | 5.6   |
| 6.1               | 6.6   | 7.2   | 7.8   | 8.4    | 70                          | 8.2                | 7.5   | 6.9   | 6.3   | 5.8   |
| 6.3               | 6.8   | 7.4   | 8.0   | 8.6    | 71                          | 8.4                | 7.7   | 7.0   | 6.5   | 5.9   |
| 6.4               | 7.0   | 7.6   | 8.2   | 8.9    | 72                          | 8.6                | 7.8   | 7.2   | 6.6   | 6.0   |
| 6.6               | 7.2   | 7.7   | 8.4   | 9.1    | 73                          | 8.8                | 8.0   | 7.4   | 6.8   | 6.2   |
| 6.7               | 7.3   | 7.9   | 8.6   | 9.3    | 74                          | 9.0                | 8.2   | 7.5   | 6.9   | 6.3   |
| 6.9               | 7.5   | 8.1   | 8.8   | 9.5    | 75                          | 9.1                | 8.4   | 7.7   | 7.1   | 6.5   |
| 7.0               | 7.6   | 8.3   | 8.9   | 9.7    | 76                          | 9.3                | 8.5   | 7.8   | 7.2   | 6.6   |
| 7.2               | 7.8   | 8.4   | 9.1   | 9.9    | 77                          | 9.5                | 8.7   | 8.0   | 7.4   | 6.7   |
| 7.3               | 7.9   | 8.6   | 9.3   | 10.1   | 78                          | 9.7                | 8.9   | 8.2   | 7.5   | 6.9   |
| 7.4               | 8.1   | 8.7   | 9.5   | 10.3   | 79                          | 9.9                | 9.1   | 8.3   | 7.7   | 7.0   |
| 7.6               | 8.2   | 8.9   | 9.6   | 10.4   | 80                          | 10.1               | 9.2   | 8.5   | 7.8   | 7.1   |
| 7.7               | 8.4   | 9.1   | 9.8   | 10.6   | 81                          | 10.3               | 9.4   | 8.7   | 8.0   | 7.3   |
| 7.9               | 8.5   | 9.2   | 10.0  | 10.8   | 82                          | 10.5               | 9.6   | 8.8   | 8.1   | 7.5   |
| 8.0               | 8.7   | 9.4   | 10.2  | 11.0   | 83                          | 10.7               | 9.8   | 9.0   | 8.3   | 7.6   |
| 8.2               | 8.9   | 9.6   | 10.4  | 11.3   | 84                          | 11.0               | 10.1  | 9.2   | 8.5   | 7.8   |
| 8.4               | 9.1   | 9.8   | 10.6  | 11.5   | 85                          | 11.2               | 10.3  | 9.4   | 8.7   | 8.0   |
| 8.6               | 9.3   | 10.0  | 10.8  | 11.7   | 86                          | 11.5               | 10.5  | 9.7   | 8.9   | 8.1   |
| 8.7               | 9.5   | 10.2  | 11.1  | 12.0   | 87                          | 11.7               | 10.7  | 9.9   | 9.1   | 8.3   |
| 8.9               | 9.7   | 10.5  | 11.3  | 12.2   | 88                          | 12.0               | 11.0  | 10.1  | 9.3   | 8.5   |
| 9.1               | 9.9   | 10.7  | 11.5  | 12.5   | 89                          | 12.2               | 11.2  | 10.3  | 9.5   | 8.7   |
| 9.3               | 10.1  | 10.9  | 11.8  | 12.7   | 90                          | 12.5               | 11.4  | 10.5  | 9.7   | 8.8   |
| 9.5               | 10.3  | 11.1  | 12.0  | 13.0   | 91                          | 12.7               | 11.7  | 10.7  | 9.9   | 9.0   |
| 9.7               | 10.5  | 11.3  | 12.2  | 13.2   | 92                          | 13.0               | 11.9  | 10.9  | 10.1  | 9.2   |
| 9.8               | 10.7  | 11.5  | 12.4  | 13.4   | 93                          | 13.2               | 12.1  | 11.1  | 10.2  | 9.4   |
| 10.0              | 10.8  | 11.7  | 12.6  | 13.7   | 94                          | 13.5               | 12.3  | 11.3  | 10.4  | 9.5   |
| 10.2              | 11.0  | 11.9  | 12.8  | 13.9   | 95                          | 13.7               | 12.6  | 11.5  | 10.6  | 9.7   |
| 10.3              | 11.2  | 12.1  | 13.1  | 14.1   | 96                          | 14.0               | 12.8  | 11.7  | 10.8  | 9.9   |
| 10.5              | 11.4  | 12.3  | 13.3  | 14.4   | 97                          | 14.2               | 13.0  | 12.0  | 11.0  | 10.1  |
| 10.7              | 11.6  | 12.5  | 13.5  | 14.6   | 98                          | 14.5               | 13.3  | 12.2  | 11.2  | 10.2  |
| 10.8              | 11.8  | 12.7  | 13.7  | 14.9   | 99                          | 14.8               | 13.5  | 12.4  | 11.4  | 10.4  |
| 11.0              | 12.0  | 12.9  | 14.0  | 15.2   | 100                         | 15.0               | 13.7  | 12.6  | 11.6  | 10.6  |

Note: A more detailed table is available at [http://www.who.int/childgrowth/standards/weight\\_for\\_length/en](http://www.who.int/childgrowth/standards/weight_for_length/en).

a. Length is measured for children aged under 2 years or, if age is not known, below 87 cm.

*When recumbent length cannot be measured:*

Recumbent length is on average 0.7 cm greater than standing height; although the difference is of no importance to individual children, when recumbent length cannot be measured, a correction may be made by adding 0.7 cm to the height if the child is aged under 2 years (or below 87 cm if age not known).

### Common drug doses

| Drug                                                                                                    | Dose                                                 | Route    | Frequency               | Comment                                                       |
|---------------------------------------------------------------------------------------------------------|------------------------------------------------------|----------|-------------------------|---------------------------------------------------------------|
| Adrenaline 1:1000                                                                                       | <6yrs 0.15mls<br>>6yrs 0.3mls<br>>12yrs 0.5mls       | IM       |                         | Anaphylaxis                                                   |
| Adrenaline 1:10,000                                                                                     | 0.1mls/kg                                            | IV       |                         | Cardiac arrest                                                |
| <b>To make adrenaline 1:10,000 from 1:1000</b><br><i>1ml 1:1000 + 9mls Normal saline or 5% Dextrose</i> |                                                      |          |                         |                                                               |
| Ampicillin                                                                                              | 50mg/kg                                              | IV/IM    | QID                     | First line for pneumonia                                      |
| Artemether                                                                                              | Loading dose: 3.2mg/kg<br>Maintenance dose: 1.6mg/kg | IM       | OD                      | Second line for severe malaria if artesunate not available    |
| Artesunate                                                                                              | <20kg 3mg/kg<br>>20kg 2.4mg/kg                       | IV       | 12hrly-OD/Daily         | First line for severe malaria                                 |
| Ceftriaxone                                                                                             | 50mg/kg<br>Or<br>100mg/kg                            | IV<br>IV | BD<br>OD                | First line for meningitis: >1 month                           |
| Ceftriaxone                                                                                             | 80mg/kg                                              | IV       | OD/Daily                | Second line for pneumonia                                     |
| Dexamethasone                                                                                           | 0.6mg/kg                                             | PO       |                         | First line for croup                                          |
| Dextrose 10%                                                                                            | 5mls/kg                                              | IV       | PRN                     | Hypoglycaemia                                                 |
| Diazepam                                                                                                | 0.05ml/kg<br>0.25mg/kg                               | IV       |                         | First line for convulsion<br>Can be repeated after 10 minutes |
| Diazepam                                                                                                | 0.1mls/kg                                            | PR       |                         | First line for convulsion<br>Can be repeated after 10 minutes |
| Gentamicin                                                                                              | 7.5mg/kg                                             | IV       | OD/Daily                | First line for pneumonia                                      |
| Hydrocortisone                                                                                          | 1mth-1yrs 25mg<br>1-6yrs 50mg<br>6yrs+ 100mg         | IV/IM    | TDS                     | For severe asthma and anaphylaxis                             |
| Paracetamol                                                                                             | 15mg/kg                                              | PO       | QID                     | Pain, fever                                                   |
| Phenobarbital                                                                                           | 15mg/kg                                              | IV/IM    | Loading dose over 15min | Second line for convulsion                                    |
| Phenytoin                                                                                               | 15mg/kg                                              | IV       | Loading dose over 1 hr  | Second line for convulsion                                    |

### Common Neonatal drug doses

| Drug          | Dose                                                     | Route | Frequency                         | Comment                                                                                     |
|---------------|----------------------------------------------------------|-------|-----------------------------------|---------------------------------------------------------------------------------------------|
| Ampicillin    | First week of life:<br>50mg/kg                           | IV/IM | BD                                | First line for serious bacterial infection in combination with gentamicin                   |
|               | Weeks 2-4 of life:<br>50mg/kg                            | IV/IM | TDS                               |                                                                                             |
| Ceftriaxone   | 100mg/kg                                                 | IV    | OD                                | Pus draining from eyes<br>Meningitis                                                        |
| Dextrose 10%  | 2ml/kg                                                   | IV    |                                   | Hypoglycaemia<br>Blood sugar <2.2                                                           |
| Gentamicin    | First week of life:<br>• Low birth weight infant: 3mg/kg | IV/IM | OD                                | First line for serious bacterial infection in combination with ampicillin                   |
|               | • Normal birth weight: 5mg/kg                            | IV/IM | OD                                |                                                                                             |
|               | Weeks 2-4 of life:<br>7.5mg/kg                           | IV/IM | OD                                |                                                                                             |
| Phenobarbital | Loading dose:<br>20mg/kg                                 | IV/IM | Give loading dose over 15 minutes | First line for convulsions                                                                  |
|               | Maintenance dose:<br>5mg/kg                              | PO    | OD                                | 24 hours after the loading dose is given, the maintenance dose should be started for 2 days |

## Bibliography

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