PROTOCOL FOR THE IN-PATIENT MANAGEMENT OF CHILDREN WITH SEVERE ACUTE MALNUTRITION IN SOUTH AFRICA

*"Severely malnourished children are **different** from other children; so they need **different treatment**"*

CONDITION	PREVENTION	WARNING SIGNS	IMMEDIATE ACTION
1.Hypoglycaemia *(Low blood sugar)* Hypoglycaemia is a blood glucose <3mmol/L	For all children:- 1. Feed immediately "stabilizing feed" /F75 every 3 hours (8 feeds), day and night. Start straightaway i.e. on arrival at hospital and within 30 minutes after admission. (Use feeding chart to find amount to give). 2. Encourage mothers to stay with very ill children to watch for any deterioration, help feed and keep child warm.	1. Low temperature (hypothermia) noted on routine check. 2. Child feels cold. 3. Child becomes drowsy or lethargic. 4. Signs of Shock 5. If blood sugar is low, monitor blood sugar every 30 minutes to 60 minutes and intervene accordingly.	Perform Dextrostix test in outpatients/casualty and on admission on all patients. **If conscious and blood sugar is below 3 mmol/L:-** 1. If hypoglycaemic, feed 2hourly (12 feeds in 24 hours). Use feeding chart to find amount to give. Start straightaway. Afterwards, feed 3-4hours. 2. Give 50 ml of 10% glucose (to **prepare mix** 10ml 50% dextrose with 40ml sterile water) or sugar solution (1 rounded teaspoon sugar in 3 tablespoons of plain water) **orally or if child refuses, via nasogastric tube (NG tube)**. If 10% glucose is not available, give sugar solution or F75 rather than wait for glucose. Test again 30 minutes after treatment. If blood sugar is still low, repeat **oral** 50ml 10% glucose or sugar solution. Consider putting up a short IV line. **If unconscious,** give dextrose **IV** (2ml/kg of sterile 10% glucose: prepare **1ml/kg 50% dextrose mixed with 4ml/kg sterile water**), followed by **oral** 50ml of 10% glucose or **oral** sugar solution or **via NG tube**. **Monitor response to treatment.** 3. Monitor blood sugar 3-hourly until stable especially in first 48hours. If blood sugar is persistently low, review feed and look for infections.
2. Hypothermia *(Low temperature)* Hypothermia is Axillary/underarm temperature <35^{0}C	For all children:- 1. Feed straightaway and then every 2-3 hours, day and night. 2. Keep warm. Cover with a blanket. Let mother sleep with child to keep child warm. 3. Keep room warm, no draughts. 4. Keep bedding/clothes dry. Dry carefully after bathing (do not bathe if very ill). 5. Avoid exposure during examinations, bathing.	1. Cold extremities 2.Lethargic 3. Poor appetite NOTE: Hypothermia in malnourished children often indicates co-existing hypoglycaemia and serious infection.	Take temperature at outpatients/casualty and on admission. (Ensure thermometer is well shaken down). **If the temperature is below 36.5^{0}C**: 1. Begin feeding straightaway (or start rehydration if diarrhoea with dehydration). 2. Active re-warming: Put the child on the mother's bare chest (skin- to -skin contact) and cover the child. Cover the child's head, clothe the child, apply a warmed blanket and place a heater or lamp nearby. 3. Feed 2-3hourly (8-12 feeds in 24 hours). **4. Check temperature 3-4hourly.Monitor during re-warming** • Take temperature every two hours: stop active re-warming when temperature rises above 36.5^{0}C • Take temperature every 30 minutes if heater is used because the child may become overheated.
3. Some or Severe Dehydration (without Shock) *(Too little fluid in the body)*	1. When a child has watery diarrhoea, give 10ml/kg Oral Rehydration Solution (ORS) after each loose stool to replace stool losses to prevent dehydration. 2. Treat some or severe dehydration with ORS to prevent severe dehydration or shock	Profuse watery diarrhoea, sunken eyes, slow skin pinch, absent tears, dry mouth, very thirsty, reduced urine output.	**DO NOT GIVE IV FLUIDS EXCEPT IN SHOCK** (see Emergency Treatment Wall Chart for treating shock) **If there is some or severe dehydration:** Give ORS, oral or by NG tube, 20ml/kg every hour for 4 hours (i.e. 5 mL/kg every 15min for 4hours) using frequent small sips. Show the caregiver how to give ORS with a cup and spoon If child vomits wait 10 minutes and then continue more slowly. Stop ORS when there are 3 or more hydration signs, or signs of overhydration. **Monitor during rehydration for signs of overhydration:** • increasing oedema and puffy eyelids • increasing pulse and respiratory rate Check for signs at least hourly. Stop if pulse increases by 25 beats/minute and respiratory rate by 5 breaths/minute. Encourage caregiver to continue feeding the child, especially if breast-feeding. **Review at least hourly** general condition, capillary filling time, level of consciousness, skin turgor, sunken eyes, respiratory rate, abdomen, if passing urine and number/quality of stools – If shock redevelops, treat for shock (see Emergency Wall Chart). If dehydration is improving – continue for up to 10 hours If there is no dehydration go to prevention 10ml/kg ORS orally after each loose stool If dehydration is not improving consider IV fluids with great care.
4. Electrolyte imbalance *(Too little potassium and magnesium, and too much sodium)*	1. Use ORS 60mmol sodium/L and F75 formula as these are low in sodium. 2. Do not add salt to food. **3. Do not treat oedema with diuretics** **Give extra potassium and magnesium (either as CMV in feeds or as a supplement)**	Oedema develops or worsens, poor appetite and apathy	1. If the child is on Stabilizing feed **with added** minerals and vitamins (CMV) they will receive the necessary Potassium, Magnesium, Copper and Zinc within their feeds daily, **or** 2. **Give daily**: extra potassium (4mmol/kg/day body weight) and magnesium (0.4-0.6mmol/kg/day). **For potassium**, give Oral *Mist Pot Chloride(*MPC) solution: MPC 1ml/kg 8 hourly (1ml=1mmol K+), **AND Trace element mix** (contains MgSO4 280mg/ml, ZnSO4 36mg/ml, CuSO4 0.1mg/ml,) daily orally, **or magnesium individually**, give a single IM injection of 50% magnesium sulphate (0.3ml/kg body weight) to a maximum of 2ml. or 1ml of 2% MgS04 daily mixed with food.
5. Infections	1. Good nursing care 2. Reduce overcrowding if possible (separate room or ward for malnourished children) 3. Wash hands before	NOTE: The usual signs of infection, such as fever, are often absent so **assume all** severely malnourished children have	**Starting on the first day, give antibiotics to all children.** 1. **If the child is severely ill** (apathetic, lethargic) or has complications (hypoglycaemia, hypothermia, raw skin/fissures, meningitis, respiratory tract or urinary tract infection) give IV/IM **Ceftriaxone 100mg/kg/day** for 7days 2. **If the child has medical complications** but not seriously ill, give IV/IM **Ampicillin**: 50mg/kg IM/IV 6-hourly for 7 days AND **Gentamicin**: 7.5mg/kg IM/IV once daily for 7 days.

	preparing feeds and before and after dealing with any child. 4. Follow Guidelines for "safe preparation, storage and handling of feeds" 4. Give measles vaccine to unimmunized children over 6 months of age.	infection and treat with antibiotics. Hypothermia and hypoglycaemia are signs of severe infection. ***NOTE***: Ensure all doses are given. Give them on time.	If a child fails to improve after 48 hours, **search for new infection, then** change to Ceftriaxone 100mg/kg daily IM/IV for 5-7 days (or guided by local microbiological flora). If child does not improve after 5 days • Refer to higher level of care *3.* **If the child has no medical complications,** give antibiotics orally **Amoxicillin**15mg/kg 8-hourly for 5 days ***NOTE***: *Avoid steroids as these depress immune function*. *Give measles vaccine if due. Continue use of cotrimoxazole to prevent PCP pneumonia if indicated.* **Treat for intestinal infestation (parasitic worms)** once stable: 1-2 yrs old **or** < 10kg Mebendazole 100mg po bd for 3 days > 2 yrs **and** > 10kg Mebendazole 500mg po single dose **Investigate for TB**. Do Tuberculin Skin Test and read it within 48 hours. Record the findings. **Counsel and Test for HIV**. Record the findings.

CONDITION	M A N A G E M E N T
6. Micronutrient Deficiencies	**Give**: 1. ***Vitamin A orally on day 1***. If under 6 months give 50,000 units; if 6-11 months give 100,000 units; and if 12-59 months give 200,000 units. If the child has any signs of vitamin A deficiency (eye changes: xeropthalmia/drying of the eye), **repeat** this dose on day 2 and day 14. Children with severe measles should receive vitamin A on days 1,2 and 14 2. Folic acid 2.5mg daily orally (5mg on day 1). (Folic acid is in CMV, if CMV is used in feeds then give only the 5mg dose of day 1) 3. Multivitamin syrup 5 ml daily orally (Multivitamins are in CMV, so if CMV is used in feeds then omit the syrup 4. If the child is on Stabilizing feed **with added** minerals and vitamins (CMV) they will receive the necessary Potassium, Magnesium, Copper and Zinc within their feeds, **or** 5. If CMV is not used, give daily orally **trace element mix (TEM)** (ZnSO4 36mg/ml, CuSO4 0.1mg/ml, MgSO4 280mg/ml): 2.5ml if weight up to 10kg OR 5ml if weight ≥ 10kg 6. If CMV or TEM not available then give elemental Zinc (2mg/kg body weight/day) and copper sulphate solution (0.3mg Cu/kg body weight/day). 7. Start iron (3mg/kg/day) when you change to the F100 catch-up formula. **(DO NOT GIVE IRON IN THE INITIAL & STABILISATION PHASE EVEN IF ANAEMIC)**
7. Stabilization feeding (stabilisation phase)	1. Give stabilizing feed (F75- feeding chart for volumes). These provide Energy: 100kcal/kg/day and Protein: 0.9g /kg/day. The fluid requirement is130ml/kg/day. 2. Give 8-12 feeds over 24 hours. Monitor intake and output (vomiting, diarrhoea, urine output) in Feed Chart/Fluid Balance Charts. Keep a 24-hour intake chart. Measure feeds carefully. Record leftovers. 3. If the child has gross oedema (Oedema 3+), reduce the volume to 100 ml/kg/day (see F75 feed chart for gross oedema for volumes) 4. If the child has poor appetite, encourage the child to finish the feed. If not finished, keep the leftovers and re-offer later. If less than 80% of the amount offered is not taken, insert a nasogastric tube in order to feed the child. If in doubt, check feeding chart for intakes. 5. If the child is breastfed, encourage continued breastfeeding. 6. Weigh daily and plot weight daily.
8. Transition feeding and Catch-up growth rehabilitation phase	1. Transition to catch-up feed (F100)[1] as soon as appetite has returned (usually within one week) and/or oedema is lost or is reduced. Change to F100 (this provides energy: 150-220Kcal/kg/day and Protein: 4-6 g/kg/day). **Transition Phase**: for 2 days, replace F75 with the same amount of F100. On day 3, increase each feed by 10ml until some feed remains. 2. Give 8 feeds over 24 hours. As the child is eager to eat, progress to 5 feeds of F100 and 3 specially modified family meals, high in energy and protein. Ready-to-Use Therapeutic Food (RUTF) may be introduced and given at discharge for catch-up growth. 3. Encourage the child to eat as much as possible, so that the child can gain weight rapidly. If the child has finished everything, offer more and increase subsequent feeds. Make sure that the child is actively fed. Involve the mother/caregiver in the feeding all the time. 4. Weigh daily and plot weight daily. Use daily weight chart for recording and monitoring weight changes.
9. Loving care, play and stimulation	1. Provide tender loving care 2. Help and encourage mothers to comfort, feed, and play with their children 3. Involve mother/caregiver in all the play/stimulation exercises. 4. Involve an occupational therapist and /or physiotherapist to plan a stimulation programme for the ward. 4. Give structured play when the child is well enough.
10. Preparation for follow-up after discharge	**1. Investigate for TB**. Repeat Tuberculin Skin Test if initial response was negative, and read it within 48 hours. Record the findings. **2. Ensure counselling and Test for HIVs was done. Record the findings.** **3.** Involve mother in the discharge process and follow-up plans. 3. Obtain information on family background and **socio-economic status**. Refer to Social Services (SASSA, Social Development, Home Affairs) and/or hospital social workers **4. Give health and nutritional education.** Issue mother/caregiver with the **Family Booklet for Child Health**. Share educational messages about the child and self or example, Family Practices booklet containing information on when to return urgently to Clinic, hygiene, infant feeding and complementary feeding advice, stimulation, family planning, HIV, immunization, role of male partner). Work with Dietician to counsel mothers/caregivers on how to modify family foods, how often to feed and how much to give. **5. Register** child on **the Severe Acute Malnutrition In-Patient care register**. Ensure the child is counted onto the district health information system (**DHIS**) admissions, discharges and/or deaths tally sheet. 6. Establish a link with local PHC Clinic and family's local Community Care Givers (CCG's) for **home follow-up**. **6. Discharge Criteria**: Discharge when there are signs of improvement: Good appetite, infection resolved, oedema resolved **AND** consecutive weight gain for 5 days (target weight-for-height reaches WHZ ~-1SD) 7. Prepare a **Discharge Summary** and write a brief clinical summary in **RTHB**. 8. Send a **referral letter to the local PHC clinic**. Ensure child is enrolled on nutrition supplementation programme at local clinic or child returns to hospital outpatient in one week.

[1] Do not give F100 to children below 6 months. Encourage mother to breastfeed or choose an appropriate infant formula