

Web Annex B.

Steps for the inpatient management of severe acute malnutrition (abbreviated handout)

TABLE 1. TREATMENT AND PREVENTION OF COMMON DISORDERS ASSOCIATED WITH SEVERE ACUTE MALNUTRITION

Step	Prevention/management	Warning signs (clinical signs)	Immediate action
1. Treat or prevent hypoglycaemia (defined as a blood glucose level < 3 mmol/L)	For all children: <ul style="list-style-type: none"> • Feed straight away and then every 2–3 hours, day and night • Encourage mothers to watch for any deterioration, help feed child and keep child warm 	<ul style="list-style-type: none"> • Low temperature (hypothermia) noted on routine check • Lethargy, limpness and loss of consciousness • Child can become drowsy Note: <ul style="list-style-type: none"> • Major risk of death in absence of rapid and correct treatment • Hypoglycaemia is often associated with hypothermia 	<ul style="list-style-type: none"> • Conduct glucose test on admission • If hypoglycaemia is suspected but no tests are available, or if it is not possible to get enough blood for test, assume that the child has hypoglycaemia and give treatment immediately without laboratory confirmation If the child is conscious: <ul style="list-style-type: none"> • Give a bolus of 10% glucose (50 ml) or sugar solution (1 rounded teaspoon sugar in 3 tablespoons of water) orally or via nasogastric tube. Bolus of 10% glucose is best, but if not available give sugar solution or F-75 rather than wait for glucose • Start feeding with F-75 immediately after giving glucose and follow the feeding schedule (2-hourly feeds) • Recheck blood sugar after 2 hours: if normal, then feed 2-hourly (12 feeds in 24 hours). If blood glucose is still low, verify that F-75 and antibiotics were given correctly If the child is unconscious: <ul style="list-style-type: none"> • Give glucose intravenously (IV) (5 ml/kg of sterile 10% glucose), followed by 50 ml of 10% glucose or sucrose by nasogastric tube • If the IV dose cannot be given immediately, give the nasogastric dose first
2. Treat or prevent hypothermia (defined as a rectal temperature < 35.5°C or an axillary temperature < 35°C)	For all children: <ul style="list-style-type: none"> • Feed straight away and then every 2–3 hours, day and night • Keep warm; use kangaroo technique, cover with a blanket • Let mother sleep with child to keep child warm • Keep room warm, no draughts • Keep bedding and clothes dry • Dry carefully after bathing (do not bathe if very ill) • Avoid exposure during examinations and bathing • Use a heater or incandescent lamp with caution; do not use hot water bottle or fluorescent lamp 	Low temperature Note: Hypothermia in malnourished children often indicates coexisting hypoglycaemia and serious infection	<ul style="list-style-type: none"> • Take rectal temperature on admission • If thermometer is not available assume hypothermia If rectal temperature is below 35.5°C or axillary temperature below 35°C: <ul style="list-style-type: none"> • Feed straight away (or start rehydration if needed) • Rewarm: put the child on the mother's bare chest (skin-to-skin contact) and cover them, or clothe the child including the head, cover with a warmed blanket and place a heater or lamp nearby • Feed 2-hourly (12 feeds in 24 hours) • Every hypothermic child should also be checked or treated for hypoglycaemia and infection Monitor during rewarming: Take temperature every 30 minutes until it becomes normal and stop rewarming when it rises above 36.5°C (or 36°C axillary)
3a. Treat dehydration	Give ReSoMal if the child has dehydration (see under immediate action)	Profuse watery diarrhoea, thirst, hypothermia, weak or absent radial pulse, cold hands and feet, reduced urine output Note: In case of profuse watery diarrhoea or cholera, ReSoMal should not be given; instead use low-osmolarity oral rehydration solution (ORS) without changing the amounts and frequency	Do not give IV fluids except in shock (see separate protocol for treating shock) If dehydrated: <ul style="list-style-type: none"> • Give ReSoMal 5 ml/kg every 30 minutes for 2 hours (orally or by nasogastric tube (omit this step if the child has already received IV fluids for shock and is switching to ReSoMal – continue with next step) • Then give 5–10 ml/kg in alternate hours for up to 10 hours (i.e. give ReSoMal and F-75 formula in alternate hours). Use initial management chart • Stop giving ReSoMal when there are 3 or more hydration signs (less thirsty, less lethargic, slowing of respiratory and pulse rate, passing urine, not thirsty) or if the child has reached the target weight, or any signs of overhydration Monitor every 30 minutes for the first 2 hours during rehydration for signs of overhydration: <ul style="list-style-type: none"> • Increasing pulse and respiratory rate • Increasing oedema and puffy eyelids Thereafter: Check for signs at least hourly. Stop if pulse increases by 25 beats/minute or respiratory rate by 5 breaths/minute

Step	Prevention/management	Warning signs (clinical signs)	Immediate action
3b. Treat shock	Manage diarrhoea, treat infection promptly	<ul style="list-style-type: none"> A child in shock is semiconscious or unconscious and has cold hands <p>plus either:</p> <ul style="list-style-type: none"> Slow capillary refill (longer than 3 seconds) or Weak fast pulse <p>Note: Monitor closely: use the critical care pathway initial management chart</p>	<p>If child is in shock:</p> <ul style="list-style-type: none"> Give oxygen Give sterile 10% glucose (5 ml/kg) by IV Give IV fluid at 15 ml/kg over 1 hour, using one of the following solutions in order of preference: <ul style="list-style-type: none"> -Half-strength Darrow's solution with 5% glucose (or dextrose) or -Ringer's lactate with 5% glucose* or -Half-normal saline with 5% glucose* <p>* If either of these is used, add sterile potassium chloride (20 mmol/L) if possible</p> <ul style="list-style-type: none"> Keep the child warm measure and record pulse and respiration every 10 minutes <p>If there are signs of improvement over a period of 1 hour (pulse and respiration rates fall):</p> <ul style="list-style-type: none"> Repeat IV 15 ml/kg for 1 more hour Then give 5–10 ml/kg ReSoMal in alternate hours with F-75 for up to 10 hours <p>If there are no signs of improvement after the first hour of IV fluid assume child has septic shock. In this case:</p> <ul style="list-style-type: none"> Give maintenance fluids (4 ml/kg/h) while waiting for blood Order 10 ml/kg fresh whole blood and when blood is available, stop oral intake and IV fluids Give a diuretic Transfuse whole fresh blood (10 ml/kg slowly over 3 hours) <p>If signs of heart failure:</p> <ul style="list-style-type: none"> Give packed cells instead of whole blood Treat septic shock (see under serious complications)
4. Correct electrolyte imbalance (Too little potassium and magnesium, and too much sodium)	<ul style="list-style-type: none"> Use WHO recommended feeds Do not add salt to food introduced during the rehabilitation phase 	Oedema develops or worsens	<p>Follow feeding recommendation, as well as recommendation for treatment of dehydration:</p> <ul style="list-style-type: none"> Extra potassium (4 mmol/kg body weight) and magnesium (0.6 mmol/kg) are important Potassium and magnesium are already added in F-75 <p>Note: In case commercial (prepackaged) F-75 is not available:</p> <ul style="list-style-type: none"> For potassium, add combined minerals and vitamins (CMV) or electrolyte/mineral solution or 10% potassium chloride solution to feeds. If these are unavailable, give crushed Slow-K half a tablet/kg body weight daily For magnesium, add CMV or electrolyte/mineral solution to feeds
5. Treat infections	<ul style="list-style-type: none"> Keep malnutrition ward in a separate room Reduce overcrowding Wash hands before preparing feeds and before and after dealing with any child Give measles vaccine to unimmunized children aged over 6 months Provide good nursing care 	<p>Note:</p> <ul style="list-style-type: none"> The usual signs of infection, such as fever, are often absent. Assume all severely malnourished children have infection and treat with antibiotics Hypothermia and hypoglycaemia are signs of severe infection Ensure all doses are taken as prescribed 	<p>Starting on the first day, give broad-spectrum antibiotics to all children:</p> <ul style="list-style-type: none"> Gentamicin* IV or intramuscular (IM) 7.5 mg/kg once per day up to 7 days and Ampicillin: 50 mg/kg IM/IV 6-hourly for 2 days, followed then by oral amoxicillin 25–40 mg/kg every 12 hours for 5 days <p>If serious complications (e.g. severe sepsis, shock) or resistance to amoxicillin and ampicillin, give:</p> <ul style="list-style-type: none"> Cefotaxime for children or infants older than 1 month 50 mg/kg every 8–12 hours plus oral ciprofloxacin 10–20 mg/kg twice per day for 5 days In case of sepsis or septic shock, use cefotaxime and ciprofloxacin If staphylococcal infection is suspected add cloxacillin 25–50 mg/kg 4 times per day for 14 to 21 days <p>For parasitic worms (helminthiasis, whipworm), treatment will be given in outpatient care.</p>

TABLE 2. MANAGEMENT OF RECOVERY AND REHABILITATION PHASES

Step	Management
<p>6. Correct micronutrient deficiencies</p> <p>Note: Severely malnourished children are at high risk of blindness due to vitamin A deficiency</p>	<p>Give vitamin A on day 1, day 2 and at the end of rehabilitation if the child has visible signs of vitamin A deficiency, signs of eye infection, or has measles now or has had measles in the past 3 months. For corneal ulceration add atropine drops and bandage</p> <p>Note: Vitamin A, folic acid, multivitamins, zinc and copper are already added in commercial (pre-packaged) F-75, RUTF and F-100</p>
<p>7. Begin cautious feeding (Stabilization phase and transition phase)</p> <p>Note:</p> <ul style="list-style-type: none"> Feeding is an essential part of management of severe acute malnutrition. Feeding should start immediately to prevent death. Never bottle feed. Never leave the child to feed alone 	<p>Stabilization phase:</p> <ul style="list-style-type: none"> Give F-75 formula (see feed chart for amounts). These provide 130 ml/kg/day Give 8–12 feeds over 24 hours (day and night) If the child has oedema +++, reduce the volume to 100 ml/kg/day (see feed chart for amounts) Always use starting weight to determine feed amounts <p>If the child has poor appetite, encourage the mother to coax and support the child finishing the feed. If eating 80% or less of the amount offered for 2 consecutive feeds, use a nasogastric tube. If in doubt, see feed chart for intakes below which tube-feeding is needed</p> <ul style="list-style-type: none"> Keep a 24-hour intake chart. Measure feeds carefully. Record leftovers If the child is breastfed, encourage continued breastfeeding but also give F-75 <p>Transition phase:</p> <ul style="list-style-type: none"> Switch to RUTF or F-100 as soon as appetite has returned and oedema is resolving Weigh daily and plot weight
<p>8. a) Prepare to transfer to outpatient care b) (For a few that may not tolerate RUTF) Increase feeding to recover weight: catch-up growth (rehabilitation phase)</p>	<ul style="list-style-type: none"> Transfer to outpatient care after successful transition on RUTF For a few children who may not tolerate RUTF, give F-100, 6 feeds over 24 hours
<p>9. Stimulate emotional and sensorial development (Use loving care, play and stimulation)</p>	<ul style="list-style-type: none"> Teach the mothers how to provide tender loving care Help and encourage mothers to comfort, feed, and play with their children Give structured play when the child is well enough. Teach the mothers how to continue play and stimulation at home
<p>10. Transfer to outpatient care</p>	<p>Inform the mother of the closest outpatient care facility to her home and give the mother a weekly ration of RUTF. Instruct the mother to report to the outpatient care facility a week later for follow-up</p>