Module 1

Introduction
1. Introduction
Training course on the inpatient management of severe acute malnutrition. Module 1. Introduction

(Training course on the inpatient management of severe acute malnutrition)

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Annex 2. Equipment, supplies and staff needed for severe acute malnutrition ward 16
The World Health Organization (WHO) *Training course on the inpatient management of severe acute malnutrition* includes training modules, training guides, and supporting materials. The training package is based on the 2002 *WHO Training course on the management of severe malnutrition*¹, which was updated in 2009² to include the WHO Child Growth Standards, the use of mid-upper arm circumference to assess wasting, and the provision of ready-to-use therapeutic foods (RUTF) for the management of severe acute malnutrition, which enabled early transfer of children from inpatient to outpatient care. In 2013, WHO issued the *Guideline: updates on the management of severe acute malnutrition in infants and children*³, which provided updated recommendations on the following:

- a. admission and discharge criteria for children aged 6–59 months with severe acute malnutrition;
- b. where to manage children with severe acute malnutrition who have bilateral pitting oedema;
- c. use of antibiotics in the management of children with severe acute malnutrition in outpatient care;
- d. changes in the provision of vitamin A supplementation in the treatment of children with severe acute malnutrition;
- e. options for therapeutic feeding approaches in the management of severe acute malnutrition in children aged 6–59 months;
- f. fluid management of children with severe acute malnutrition and dehydration with and without shock;
- g. management of HIV-infected children with severe acute malnutrition;
- h. identifying and managing infants who are less than 6 months old with severe acute malnutrition.

The training course has been updated to incorporate these updates. Table 1 lists the key technical updates made for each module.

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<table>
<thead>
<tr>
<th>Module</th>
<th>Procedure</th>
<th>2009 version</th>
<th>New version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module 2: Principles of care</td>
<td>Admission criteria for inpatient care for children aged 6 months or older</td>
<td>Use of visible severe wasting as a sign of severe acute malnutrition</td>
<td>Visible severe wasting is no longer recommended as a sign of severe acute malnutrition, due to its subjective nature</td>
</tr>
<tr>
<td></td>
<td>Admit all severely malnourished children for inpatient care</td>
<td>• Severely malnourished children with medical complications or failed appetite test should be admitted for inpatient care (or severely malnourished children who have mitigating circumstances such as disability, social issues, or difficulties with access to care) • Severely malnourished children without these signs or mitigating circumstances should be managed in outpatient care</td>
<td>Emphasis on appetite test as an important procedure to decide whether severely malnourished children should be admitted for inpatient or outpatient care</td>
</tr>
<tr>
<td>Oedema of both feet</td>
<td>• Children with severe acute malnutrition who have severe bilateral oedema (+++) should be admitted for inpatient care, even when they do not present with medical complications and have appetite • Children who have only + or ++ bilateral pitting oedema but present with medical complications or have no appetite, or are wasted, should be admitted for inpatient care • Children aged 6 months or older who have + or ++ bilateral pitting oedema but no medical complications and have appetite should be managed in outpatient care</td>
<td>• Children with severe acute malnutrition who have severe bilateral oedema (+++) should be admitted for inpatient care, even when they do not present with medical complications and have appetite • Children who have only + or ++ bilateral pitting oedema but present with medical complications or have no appetite, or are wasted, should be admitted for inpatient care • Children aged 6 months or older who have + or ++ bilateral pitting oedema but no medical complications and have appetite should be managed in outpatient care</td>
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<tr>
<td>Module</td>
<td>Procedure</td>
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</table>
| Module 2: Principles of care | Criteria for transfer to outpatient care for children aged 6 months or older | Transfer to outpatient care when:  
• medical complications have been treated, and  
• the child has minimal oedema, and  
• the child is alert, and  
• the child eats 75% of the proposed daily amount of ready-to-use therapeutic food (RUTF); | The decision should be determined by assessment of clinical condition and not anthropometric outcomes |

Criteria for discharge from all care for children aged 6 months or older | Discharge from all care when:  
• weight-for-height/length Z-score is ≥ −2, and  
• no oedema for at least 2 weeks, or  
• mid-upper arm circumference is ≥ 125 mm, and  
• no oedema for at least 2 weeks | The anthropometric indicator used to confirm severe acute malnutrition should also be used to assess whether a child has reached nutritional recovery  
Children admitted with only bilateral pitting oedema +++ should be discharged from treatment based on whichever anthropometric indicator is routinely used in programmes  
Percentage weight gain should not be used as a discharge criterion |
<table>
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<th>Module</th>
<th>Procedure</th>
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<th>New version</th>
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</table>
| Module 3: Initial management | Doses of routine antibiotics | • Amoxicillin 25 mg/kg  
• Gentamicin 5 mg/kg  
• Ampicillin 50 mg/kg | The doses of routine antibiotics have been adjusted, for example: amoxicillin 25–40 mg/kg, gentamicin 7.5 mg/kg, to reflect the latest recommendations from the 2013 WHO Pocket book of hospital care for children |
<p>| Vitamin A | | Children with severe acute malnutrition should receive the daily recommended nutrient intake of vitamin A (5000 IU) throughout the treatment period. If the children are receiving F-75, F-100 or RUTF that comply with WHO specifications (and therefore already contain sufficient vitamin A), or vitamin A is part of other daily supplements, the children do not require additional vitamin A. Children with severe acute malnutrition should be given a high dose of vitamin A (50 000 IU, 100 000 IU or 200 000 IU, depending on age) on admission, only if they are given therapeutic foods that are not fortified as recommended in WHO specifications and vitamin A is not part of other daily supplements. |
| | | High dose only indicated in corneal ulceration | Give a high dose (50 000 IU, 100 000 IU or 200 000 IU, depending on age) of vitamin A to children with severe acute malnutrition and eye signs of vitamin A deficiency or recent measles in inpatient care on Days 1, 2, and 15 (or at discharge to outpatient care), irrespective of the type of therapeutic food they are receiving. |
| Atropine | 1% 3 times a day | The concentration of atropine has been adjusted to 0.1% 3 times a day following discussion with and guidance from several experts as well as the WHO Model List of Essential Medicines. |</p>
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<th>New version</th>
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| Module 4: Feeding | Transition to RUTF | Two options for transitioning children from F-75 to RUTF are suggested:  
\[ a.\] Start feeding by giving RUTF as prescribed for the transition phase. If the child does not take the prescribed amount, then top up the feed with F-75. Increase the amount of RUTF over 2–3 days until the child takes the appropriate amount of RUTF to meet energy needs, or:  
\[ b.\] Give the child the prescribed amount of RUTF for the transition phase. If the child does not take at least half the prescribed amount in the first 12 hours, then stop giving RUTF and give F-75 again. Retry the same approach after another 1–2 days until the child takes the appropriate amount of RUTF to meet energy needs |
| Transition for children with oedema | | Children with bilateral pitting oedema should transition to RUTF when appetite returns and oedema is reducing |
| Rehabilitation phase for children on F-100 | | Children who are taking F-100 and are achieving rapid weight gain during rehabilitation should be changed to RUTF. Ensure that they are finishing up the appropriate amount of RUTF before transferring them for outpatient care |
| Admission criteria for infants aged 0–6 months | • Weight-for-height Z-score < –3, and/or  
• Bilateral oedema | • Weight-for-length Z-score < –3, or  
• Presence of bilateral pitting oedema, or  
• Recent weight loss  
• Prolonged failure to gain weight  
• Serious breastfeeding difficulties after mother’s counselling |
| Feeding for infants aged 0–6 months | F-75 as a supplement to breast milk | • Infants with severe acute malnutrition but no oedema should be given expressed breast milk. Where this is not possible, commercial (generic) infant formula or F-75 or diluted F-100 may be given, either alone or as the supplementary feed together with breast milk  
• Infants with severe acute malnutrition and bilateral pitting oedema should be given F-75 as a supplement to breast milk |
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<tr>
<th>Module</th>
<th>Procedure</th>
<th>2009 version</th>
<th>New version</th>
</tr>
</thead>
</table>
| **Module 4: Feeding** | Criteria for transfer to outpatient care for infants aged 0–6 months     | Transfer to outpatient care when:                                            | • all clinical conditions are resolved, and  
• the infant has good appetite, is clinically well and alert, and  
• weight gain is satisfactory, and  
• the infant has been checked for immunizations, and  
• the mother or caregiver is linked with community-based follow-up and support |
|                     | Criteria for discharge from all care for infants aged 0–6 months          | Discharge from all care when the infant:                                    | • is breastfeeding effectively or feeding well with replacement feeds, and  
• has adequate weight gain, and  
• has a weight-for-length Z-score ≥ –2 |
<p>| <strong>Module 5: Daily care</strong> |                                                                                | Similar updates as those made to modules 3 and 4, where applicable          |                                                                                                                                         |
| <strong>Module 6: Monitoring and problem solving</strong> |                                                                                | No major technical updates. Minor updates, for example where RUTF replaces F-100 |                                                                                                                                         |
| <strong>Module 7: Involving mothers in care</strong> | Criteria for referral to outpatient care for children aged 6 months or older | Similar updates as in module 2                                               |                                                                                                                                         |
|                     | Criteria for discharge from all care for children aged 6 months or older   | Similar updates as in module 2                                               |                                                                                                                                         |</p>
<table>
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<tr>
<th>Module</th>
<th>Procedure</th>
<th>2009 version</th>
<th>New version</th>
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</thead>
<tbody>
<tr>
<td><strong>Module 8: Outpatient management of severe acute malnutrition</strong></td>
<td></td>
<td>New module</td>
<td></td>
</tr>
<tr>
<td><strong>Supporting materials</strong></td>
<td>Critical care pathways and answers to exercises</td>
<td>All critical care pathways and answers to exercises have been updated to reflect the updates in modules</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Organization of supporting materials</td>
<td>The supporting materials have been incorporated within the modules and guides concerned</td>
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</tbody>
</table>
ACKNOWLEDGEMENTS

This updated version was coordinated by Zita Weise Prinzo, Department of Nutrition for Health and Development, together with Chantal Gegout (formerly in the Department of Nutrition for Health and Development), in collaboration with Wilson Were, Department of Maternal Child and Adolescent Health. Thanks are due to Jaden Bendabenda, Department of Nutrition for Health and Development, for finalizing this version and preparing it for publication. Special thanks are due to Diana Estevez, who helped during the finalization process.

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In addition, special thanks are due to Beatrice Amadi, Teaching Hospital, Lusaka, Zambia, for her contribution during the pilot testing and for reviewing the course, and to Professor Michael Golden and Dr Yvonne Grellety for reviewing and providing invaluable technical inputs to the course.

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FINANCIAL SUPPORT

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ABBREVIATIONS

CCP  critical care pathway
CMV  combined minerals and vitamins
IV   intravenous
ORS  oral rehydration solution
ReSoMal  rehydration solution for malnutrition
RUTF read-to-use therapeutic food
WHO World Health Organization
1. IMPORTANCE OF SEVERE ACUTE MALNUTRITION AS A HEALTH PROBLEM

Severe acute malnutrition is one of the most common causes of morbidity and mortality among children aged under 5 years worldwide. Many severely malnourished children die at home without care, but even when hospital care is provided case fatality rates may be high.

Severely malnourished children who have medical complications are likely to die due to practices that may be appropriate for most children but dangerous for severely malnourished children. With appropriate case management during inpatient care and proper follow-up during outpatient care, the lives of many children can be saved, and severe acute malnutrition wards can dramatically lower the case fatality rates.

2. PURPOSE OF THIS TRAINING COURSE

This course is designed for paediatricians, senior nurses, nutritionists, dietitians and doctors who provide care for children with severe acute malnutrition who have medical complications.

When completing the modules, participants will be able to follow procedures to manage severe acute malnutrition. The course will not teach basic medical techniques that are taught in schools of medicine and nursing (such as how to insert an intravenous (IV) line or take a blood sample).

An action plan for the inpatient management of severe acute malnutrition is provided in Annex 1 to this module, and a list of supplies and necessary equipment needed to provide this service is presented in Annex 2.

It is expected that participants will return to their hospitals and begin to implement the procedures learned in this course and adapt the tools to their context.
3. COURSE METHODS AND MATERIALS

This course uses a variety of methods of instruction, including:

<table>
<thead>
<tr>
<th>Reading</th>
<th>Written exercises</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group discussions</td>
<td>Role plays</td>
</tr>
<tr>
<td>Photos and videos</td>
<td>Demonstrations and practice</td>
</tr>
</tbody>
</table>

All these activities are considered essential to understand and incorporate the information presented in this instruction. It is recommended that participants are active and complete the lectures and written exercises to incorporate the relevant elements of this course, which may save lives.

To a great extent, participants work at their own pace through the modules, although in some activities, such as role plays and discussions, small groups will work together.

The course is led by a facilitator, whose role is to answer questions, provide individual feedback to exercises, lead the discussions, structure role plays and guide participants through the eight modules of the course. The facilitators are assisted by a clinical instructor and a course director.

The modules are presented in the following order:
1. Introduction
2. Principles of care
3. Initial management
4. Feeding
5. Daily care
6. Monitoring and problem solving
7. Involving mothers in care
8. Outpatient management of severe acute malnutrition.

In addition to the modules, ask the facilitator to give you the following course materials:
• photographs
• five reference cards:
  - weight-for-height reference card
  - F-75 reference card
  - F-100 reference card
  - ready-to-use therapeutic food (RUTF) reference card
  - antibiotics reference card
• sample discharge card.

All other course materials, such as the video and blank recording forms, will be provided in your classroom as needed.

4. LEARNING OBJECTIVES FOR MODULES

Each module and clinical practice session in this course will provide information and examples and will allow you to practise the skills necessary for managing severely malnourished children. The skills and information presented in each module are briefly outlined below.

Module 2: Principles of care
• identifying the child with severe acute malnutrition:
  - defining severe acute malnutrition
  - recognizing signs of severe acute malnutrition
  - weighing and measuring the child
• admission procedure for child with severe acute malnutrition
• how the physiology of severe acute malnutrition affects care of the child
• essential components of care:
  - feeding formulas
  - process for management of a severely malnourished child
  - important things NOT to do and why
• transfer to outpatient care.

Module 3: Initial management
• recognizing the danger signs
• identifying and managing the severely malnourished child with:
  - hypoglycaemia
  - hypothermia
  - shock
  - very severe anaemia
  - eye disorders, including corneal ulceration
  - watery diarrhoea or vomiting
• preparing rehydration solution for malnutrition (ReSoMal)
• selecting appropriate antibiotics and calculating dosages
• keeping a written record of initial findings and treatments.

Module 4: Feeding
• preparing F-75 and F-100
• feeding the child during stabilization
• feeding the child in transition
• adjusting feeding plan during rehabilitation
• feeding infants aged under 6 months with severe acute malnutrition
• planning feeding for the ward.

**Module 5: Daily care**

• handling a severely malnourished child appropriately
• caring for the skin and bathing a severely malnourished child
• giving prescribed antibiotics and other medications and supplements
• caring for the eyes
• monitoring pulse, respiration and temperature, and watching for danger signs
• completing and interpreting the daily care page, monitoring record, and weight chart of the critical care pathway (CCP).

**Module 6: Monitoring and problem solving**

• identifying problems by monitoring:
  - individual patient progress, weight gain and care
  - overall weight gain on the ward
  - patient outcomes (such as recovery, referral, death)
  - case-fatality rate for the ward
  - case management practices
  - food preparation, ward procedures, and hygiene
• investigating causes of problems
• determining solutions appropriate for causes
• conducting a problem-solving session with a group.

**Module 7: Involving mothers in care**

• encouraging involvement of mothers in hospital care
• preparing mothers to continue good care at home, including proper feeding of the child and stimulation using play
• giving complete discharge instructions.

**Module 8: Outpatient management of severe acute malnutrition**

• principles of outpatient management of severe acute malnutrition
• case findings and triage for admission into outpatient care
• medical management
• nutrition management
• follow-up and discharge criteria
• monitoring and reporting.
5. **OBJECTIVES FOR CLINICAL PRACTICE SESSIONS**

Each clinical session has specific objectives for observation and practice. The course schedule is designed so that participants learn about skills in the modules before practising those skills in a clinical session.

**Day 1: tour of ward(s)**
- observe the admissions area
- observe the emergency treatment area
- observe how the severe malnutrition ward or area is organized
- observe kitchen area
- observe any special areas for play, health education, or other activities
- monitor the ward using checklist. Provide feedback on the good practices and areas for improvement of the ward.

**Day 2: clinical signs**
- observe children and look for clinical signs of severe acute malnutrition
- weigh and measure children
- look up weight-for-height Z-scores
- measure mid-upper arm circumference
- identify children who are severely malnourished.

**Day 3: initial management**
- discuss principles of initial management of severely malnourished children during inpatient care
- identify clinical signs of severe acute malnutrition, hypoglycaemia, hypothermia, shock, and dehydration
- practise using dextrostix or glucometer
- practise filling a critical care pathway (CCP) during initial management
- assist in doing initial management, if feasible, such as:
  - take rectal\(^1\) temperature
  - give bolus of glucose for hypoglycaemia
  - warm the child
  - give first feed
  - assess need for eye care.

**Day 4: flexible half day**
- Any of the preceding activities may be repeated for extra practice. If the case management in the hospital is good, participants may be assigned to “shadow” and assist a caregiver in the hospital for part of the day. This day may also be a good opportunity to observe a teaching session with mothers or a play session.

\(^1\) Infection prevention procedures should be followed when taking rectal temperature.
Day 5: initial management and feeding

• observe and assist in doing initial management, if feasible, including:
  - identify signs of possible dehydration in a severely malnourished child
  - measure and give rehydration solution for malnutrition (ReSoMal)
  - monitor a child on ReSoMal
  - determine antibiotics and dosages
• observe nutrition staff and nurses measuring and giving feeds
• practise measuring, giving and recording feeds.

Day 6: feeding

• review 24-hour food intake charts and plan feeds for the next day
• determine if child is ready for ready-to-use therapeutic food (RUTF)/F-100
• continue to practise measuring, giving, and recording feeds.

Day 7: daily care and introduction to outpatient care

• keep CCPs on children observed and cared for
• participate in daily care tasks, as feasible:
  - measure respiratory rate, pulse rate and temperature
  - administer eye drops, antibiotics
  - change eye bandages
  - weigh child and record weight (on daily care page and on weight chart of CCP)
  - observe and assist with bathing children (depending on schedule)
• assist with feeding (continued practice)
• learn and discuss the principles of outpatient care.

Additional objectives

• observe teaching session with mothers
• observe play session.
ANNEX 1. EXAMPLE OF ACTION PLAN FOR IMPLEMENTATION TO IMPROVE MANAGEMENT OF SEVERE ACUTE MALNUTRITION

Instructions: for each activity, ask yourselves:
• Do we do this now? (If yes, put a tick under current status; if no, write in what you do now.)
• What must we do to start this activity? (Consider all the actions that are needed to introduce each change and write them in.)
• Who will take responsibility for seeing that these actions are carried out, and by when?
• What new resources will we need?
• Who will take responsibility for getting these resources, and by when?
<table>
<thead>
<tr>
<th>Step</th>
<th>Current status</th>
<th>Changes to be introduced</th>
<th>Who will organize changes?</th>
<th>Resource status</th>
<th>Who will organize resources?</th>
</tr>
</thead>
<tbody>
<tr>
<td>(X hospital)</td>
<td>(What we do now)</td>
<td>(New things we must do)</td>
<td>Who?</td>
<td>When?</td>
<td>(New resources needed)</td>
</tr>
<tr>
<td>Malnourished children need different care from other children</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prioritize severe wasting or oedema in outpatient department queue</td>
<td>There is no triage</td>
<td>Consider training layperson to triage in outpatient queue, train nurse to triage in under-5 outpatient department</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have separate room or corner for severe acute malnutrition</td>
<td>None</td>
<td>Organize separate corner</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Consider having special coloured registration cards to denote children for severe acute malnutrition treatment protocol</td>
<td></td>
<td></td>
<td>Check local UNICEF office to see if they can help</td>
</tr>
<tr>
<td>Step 1. Prevent or treat hypoglycaemia</td>
<td>Yes</td>
<td></td>
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<tr>
<td>Step</td>
<td>Current status</td>
<td>Changes to be introduced</td>
<td>Who will organize changes?</td>
<td>Resource status</td>
<td>Who will organize resources?</td>
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</tr>
<tr>
<td>(X hospital)</td>
<td>(What we do now)</td>
<td>(New things we must do)</td>
<td>Who?</td>
<td>When?</td>
<td>(New resources needed)</td>
</tr>
<tr>
<td>Feed every 2 hours day and night</td>
<td>Fed 3x daily, last feed 19:00, breakfast 06:00</td>
<td>Maintain 3-hourly feeds, but feed the very sick 2 hourly; problem-solve frequent feeds</td>
<td>Who?</td>
<td>When?</td>
<td>Need to involve mothers more in feeding and to wake them at night</td>
</tr>
<tr>
<td>Feed on time</td>
<td>Acute staff shortage (2 nurses for 80 beds at night; 2–3 in the day)</td>
<td>Community leaders may be able to stress importance of someone accompanying child</td>
<td></td>
<td></td>
<td>Currently most mothers return home to look after fields (etc.) so will need a change of attitude</td>
</tr>
<tr>
<td>Start straight away</td>
<td>Not done (long walk from home to hospital so hypoglycaemia is likely)</td>
<td>Give 50 ml 10% glucose to all on arrival</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>All staff know danger signs:</td>
<td>Not known</td>
<td>Train staff</td>
<td></td>
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<tr>
<td>low temperature</td>
<td></td>
<td>Consider making wall chart of danger signs</td>
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<tr>
<td>feels cold</td>
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<tr>
<td>becomes drowsy</td>
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</tr>
<tr>
<td>Give antibiotics</td>
<td>(Refer to step 5; no action needed here)</td>
<td></td>
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<tr>
<td>If hypoglycaemic, give 10% glucose or sucrose solution</td>
<td>Not given</td>
<td>Assume hypoglycaemic and give</td>
<td></td>
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</table>

1. INTRODUCTION | TRAINING COURSE ON THE INPATIENT MANAGEMENT OF SEVERE ACUTE MALNUTRITION
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<td>When?</td>
<td>(New resources needed)</td>
</tr>
<tr>
<td>If unconscious, give 10% sterile glucose IV</td>
<td>Not given</td>
<td>Introduce and make routine</td>
<td></td>
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</tbody>
</table>

**Step 2. Prevent or treat hypothermia**

- Feed every 2 hours day and night (See step 1)
- Cover child with blanket: Yes
- Keep room warm:
  - use heater: Kept warm (patients bring firewood)
  - exclude draughts
- Change wet clothes and bedding:
  - have 24-hour linen supply: Yes
- If hypothermic:
  - feed straight away and rewarm with heater or lamp or kangaroo method: Not always done
  - Train staff so correct procedures are routinely practised

**Step 3. Treat or prevent dehydration**

- Rehydrate orally, except in shock: No
  - Train doctors and relevant staff, especially in emergency areas
  - Consider wall charts of correct treatment
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<tr>
<td>Staff know:</td>
<td></td>
<td></td>
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<tr>
<td>how to prepare ReSoMal</td>
<td>Use standard WHO oral rehydration solution (ORS)</td>
<td>Train why ReSoMal is needed, how to prepare, who needs, and when to stop</td>
<td></td>
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<tr>
<td>how much to give and how often</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Record volume given, and time</td>
<td>Not recorded</td>
<td>Train</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All staff know danger signs of overhydration</td>
<td>No</td>
<td>Train</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff monitor pulse and respiration at least hourly during oral rehydration</td>
<td>Not monitored</td>
<td>Train</td>
<td></td>
<td></td>
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<tr>
<td>If in shock:</td>
<td></td>
<td></td>
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<tr>
<td>give IV 10% glucose</td>
<td>Not given</td>
<td>Display instructions for treatment of shock in emergency areas</td>
<td></td>
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<tr>
<td>give IV fluids</td>
<td>Yes (? type)</td>
<td></td>
<td></td>
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<tr>
<td>use giving set</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>monitor pulse and respirations every 5–10 minutes</td>
<td>Not monitored</td>
<td>Train on correct fluids, amount and duration</td>
<td></td>
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<tr>
<td><strong>Step 4. Correct electrolyte imbalance</strong></td>
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<tr>
<td>Give daily: combined minerals and vitamins (CMV) or mineral mix or potassium chloride (Slow-K)</td>
<td>(Not all have pharmacy) not given</td>
<td>Try to organize continuing supply of CMV</td>
<td>Programme manager is discussing with UNICEF</td>
<td></td>
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<tr>
<td></td>
<td>Yes (sterile potassium chloride)</td>
<td>If run out of CMV, use potassium chloride syrup + magnesium sulfate injection</td>
<td></td>
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<tr>
<td>Restrict salt</td>
<td>Yes</td>
<td></td>
<td></td>
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<tr>
<td>Do not give diuretics for oedema</td>
<td>Sometimes given</td>
<td>Issue orders</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Train doctors</td>
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<td><strong>Step 5. Treat infections</strong></td>
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<tr>
<td>Give antibiotics even if no clinical signs</td>
<td>Give antibiotics only if have clinical signs</td>
<td>Change procedure</td>
<td></td>
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<td></td>
<td></td>
<td>Train doctors and nurses</td>
<td></td>
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<tr>
<td>Give straight away</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Know what to give, and correct dose</td>
<td>Yes</td>
<td></td>
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<tr>
<td>All staff give on time</td>
<td>Yes</td>
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<tr>
<td>Protect broken skin (for example):</td>
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<tr>
<td>use paraffin gauze</td>
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<tr>
<td>bandage hands if scratching</td>
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<tr>
<td>If unimmunized, give measles vaccine if &gt; 6 months</td>
<td>?</td>
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<tr>
<td>Prevent cross-infection:</td>
<td></td>
<td></td>
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<tr>
<td>staff and caregivers know how infection spreads</td>
<td>Caregivers do not know</td>
<td>Train staff and caregivers about need for improved practices</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>one child per bed</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>wash hands</td>
<td>Not always</td>
<td></td>
<td></td>
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<tr>
<td>barrier nurse if infectious</td>
<td>?</td>
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<tr>
<td>boil water for feeds</td>
<td>?</td>
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<tr>
<td>store feeds in fridge</td>
<td>(No fridge)</td>
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<tr>
<td>feed by cup, not bottles</td>
<td>?</td>
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<tr>
<td>do not share spoons</td>
<td>?</td>
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<tr>
<td>no flies, rats etc.</td>
<td>Flies present</td>
<td></td>
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<tr>
<td><strong>Step 6. Treat micronutrient deficiencies</strong></td>
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<tr>
<td>Do not give iron in stabilization phase and do not give iron if child is receiving ready-to-use therapeutic food (RUTF)</td>
<td>Iron is given routinely</td>
<td>Train staff, explain the risk of giving iron in stabilization phase, explain that RUTF already contains iron</td>
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<tr>
<td><strong>Step 7. Start cautious feeding</strong></td>
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<tr>
<td>Give F-75 (starter formula)</td>
<td>Not done</td>
<td>Introduce</td>
<td></td>
<td>Commercial (pre-packaged) F-75</td>
<td></td>
</tr>
<tr>
<td>Know how much to give</td>
<td>Not known</td>
<td>Train staff about all aspects of feeding, including use of laminated cards and recording forms</td>
<td></td>
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</tr>
<tr>
<td>Chart amounts offered, left over, taken, vomited</td>
<td>Not done</td>
<td>Train staff about all aspects of feeding, including use of laminated cards and recording forms</td>
<td>Will need patience and supervision</td>
<td>Scan recording forms and print</td>
<td></td>
</tr>
<tr>
<td>Tube-feed if needed</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>know when needed</td>
<td>Staff do not know</td>
<td>Train staff about when to tube-feed, and correct techniques</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>know how to pass tube</td>
<td>No</td>
<td></td>
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</tr>
<tr>
<td>know how to use, e.g. do not push, let feed run in</td>
<td>No</td>
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<tr>
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<td>Who?</td>
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<td>When?</td>
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<td>Step 8. Catch-up growth</td>
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<tr>
<td>Staff know:</td>
<td></td>
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<td></td>
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<tr>
<td>what to do if child vomits</td>
<td>No</td>
<td>Train staff</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>to transfer to RUTF/F-100 when very hungry</td>
<td>No</td>
<td></td>
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<tr>
<td>Step 9. Give loving care and stimulation</td>
<td></td>
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<td></td>
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<tr>
<td>Staff and caregivers give loving care</td>
<td>Not always</td>
<td>Encourage if feasible</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provide types of play that improve development</td>
<td>Not provided</td>
<td>No action now</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use everyday activities to improve development</td>
<td>Not done</td>
<td>Encourage staff and caregivers to talk, sing, etc. to children</td>
<td></td>
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<tr>
<td>Step 10. Prepare for follow-up</td>
<td></td>
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<tr>
<td>Teach mothers about feeding at home</td>
<td>Not done</td>
<td>No action now</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teach mothers how to give structured play</td>
<td>Not done</td>
<td>No action now</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organize referral letter</td>
<td>Yes; given follow-up date</td>
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ANNEX 2. EQUIPMENT, SUPPLIES AND STAFF NEEDED FOR SEVERE ACUTE MALNUTRITION WARD

Equipment and supplies needed for severe acute malnutrition ward

Ward equipment and supplies

- bandages
- blankets or wraps for warming children
- board for measuring length (plus pole of known length for checking accuracy)
- calculator
- child weighing scales (plus items of known weight for checking scales)\(^2\)
- mid-upper arm circumference (MUAC) tapes
- clock
- dextrostix or glucometer with test strips
- eye pads
- gauze
- haemoglobinometer
- stethoscope
- incandescent lamp or heater
- paediatric nasogastric tubes
- running water
- safe, home-made toys
- stadiometer (to measure standing height)
- sterile needles
- sticky tape
- supplies for blood transfusion:
  - blood packs
  - bottles
  - syringes and needles
  - grouping and cross-match, testing for HIV, syphilis, and hepatitis (necessary before transfusion)
  - other blood-collecting materials
- supplies for IV:
  - scalp vein (butterfly) needles, gauge 21 or 23
  - citrate solution, 10–100 units/ml
  - poles or means of hanging bottles of IV fluid
  - tubing
  - bottles or bags
- syringes (2 ml for drugs, 5 ml for drawing blood, 10 ml)
- syringes (50 ml for feeds)
- thermometers (preferably rectal and low-reading)

\(^2\) Scales must be functioning correctly, preferably digital mother-child scale, in order to weigh even the very ill or weak, since weighing is done while being held by caregiver, and digital scale for infants aged under 6 months.
• wash basin for bathing children

For hygiene of mothers and staff

• method for waste disposal
• place for washing bedding and clothes
• soap for handwashing
• toilet and handwashing facilities

For reference and record keeping

• relevant tables, such as:
  - weight-for-height reference card
  - F-75 reference card
  - F-100 reference card
  - RUTF reference card
  - antibiotics reference card
• suitable forms for record keeping, such as CCP and other forms requesting similar information (weight charts, monitoring records, etc.)
• 24-hour food intake charts

Kitchen equipment and supplies

• clean water supply
• dietary scales able to weigh to 5 grams
• electric blender or manual whisks
• feeding cups, saucers, spoons
• foods similar to those used in homes (for teaching or use in transition to home foods)
• jugs (1 litre and 2 litres)
• large containers and spoons for mixing and cooking feed for the ward
• measuring cylinders (or suitable utensils for measuring ingredients and leftovers)
• recipes/preparation instructions for therapeutic milks
• refrigeration

Pharmacy equipment and supplies

• combined minerals and vitamins (CMV) or mineral mix (if CMV not available)
• electrolytes and minerals:
  - potassium chloride
  - tripotassium citrate
  - magnesium chloride
  - zinc acetate
  - copper sulfate
• folic acid
• glucose (or sucrose)
• iron syrup (e.g. ferrous fumarate)
• IV fluids – one of the following, listed in order of preference:
- half-strength Darrow’s solution with 5% glucose (dextrose)
- Ringer’s lactate solution with 5% glucose*
- 0.45% (half-normal) saline with 5% glucose*

* If either of these is used, sterile potassium chloride (20 mmol/L) should be added if possible.

- multivitamin without iron
- pharmaceutical scales
- sterile water for diluting
- vaccines (Bacillus Calmette-Guérin (BCG), oral poliomyelitis vaccine (OPV), diphtheria-pertussis-tetanus (DPT) and measles)
- vitamin A
- water for injection (ampoules 2, 5 and 10 ml)
- WHO ORS for use in making ReSoMal (or commercial ReSoMal)
- 0.9% saline (for soaking eye pads)

**Drugs**

- amoxicillin
- ampicillin
- artemether + lumefantrine tablets
- artesunate suppository
- atropine eye drops
- benzylpenicillin
- cefotaxime
- ciprofloxacin (oral formulation)
- cloxacillin
- cotrimoxazole
- fluconazole for injection
- gentamicin
- magnesium sulfate for injection (intramuscular)
- mebendazole, albendazole or other drugs for treatment of worms
- metronidazole
- nystatin
- tetracycline or chloramphenicol eye drops

**For skin**

- gentian violet
- nystatin ointment or cream (for candidiasis)
- paraffin gauze (tulle gras)
- permethrin: cream and lotion
- petroleum jelly ointment
- zinc oxide ointment

**Laboratory resources, accessible if needed**

- blood culture
- cerebrospinal fluid culture
• full blood count
• malaria slide or rapid diagnostic test (in malaria-endemic areas)
• HIV test kits (in areas of high HIV prevalence)
• stool culture
• tuberculosis tests (X-ray, culture of sputum, Mantoux test)
• urinalysis

**Staff needed for severe acute malnutrition ward**

**Clinical staff**

Clinical staff include nurses, doctors, nutritionists and dietitians. They must be specifically trained in the management of severe acute malnutrition in order to appropriately treat affected children. It should be stressed that treating severely malnourished children using management protocols for non-malnourished children is dangerous and may result in severe complications or even death.

**Assistants**

The assistants undertake such activities as weighing the child, supervising feeding, and interacting with the mother or the person in charge of the child, and can also play a role in the emotional and physical stimulation of the child. One assistant per 10 patients is appropriate. The assistants will be trained by the clinical care staff.

**Support staff**

Cleaners, kitchen staff and other support staff are essential for maintaining a clean environment and assisting in such areas as the preparation of therapeutic milks.

**Supervisors**

A supervisor must be responsible for each unit of patient care. It is important that the supervisor in charge of the severe acute malnutrition ward has received specific training in the management of severe acute malnutrition.
For more information, please contact:
Department of Nutrition and Food Safety
World Health Organization
Avenue Appia 20
CH-1211 Geneva 27
Switzerland
Email: nutrition@who.int
Website: https://www.who.int/health-topics/nutrition