Module 6

6. Monitoring and problem solving
Module 6

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Web Annex A. Weight gain tally sheet for ward (WHO/HEP/NFS/21.13)  
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, which was updated in 2009 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, 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>
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<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>
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<tr>
<td></td>
<td></td>
<td></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>
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<tr>
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<td>Admit all severely malnourished children for inpatient 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>
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<tr>
<td>Oedema of both feet</td>
<td></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>
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<td>New version</td>
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<tr>
<td>Module 2: Principles of care</td>
<td>Criteria for transfer to outpatient care for children aged 6 months or older</td>
<td>Transfer to outpatient care when:</td>
<td>The decision should be determined by assessment of clinical condition and not anthropometric outcomes</td>
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<tr>
<td></td>
<td></td>
<td>• medical complications have been treated, and</td>
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<td></td>
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<td>• the child has minimal oedema, and</td>
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<td>• the child is alert, and</td>
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<td></td>
<td>• the child eats 75% of the proposed daily amount of ready-to-use therapeutic food (RUTF);</td>
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<td></td>
<td></td>
<td>The anthropometric indicator used to confirm severe acute malnutrition should also be used to assess whether a child has reached nutritional recovery</td>
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<tr>
<td></td>
<td></td>
<td>Children admitted with only bilateral pitting oedema +++ should be</td>
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<td>discharged from treatment based on whichever anthropometric indicator is</td>
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<td>routinely used in programmes</td>
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<td>Percentage weight gain should not be used as a discharge criterion</td>
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<td></td>
<td>Criteria for discharge from all care for children aged 6 months or older</td>
<td>Discharge from all care when:</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• weight-for-height/length Z-score is ≥ −2, and</td>
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<td></td>
<td></td>
<td>• no oedema for at least 2 weeks, or</td>
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<tr>
<td></td>
<td></td>
<td>• mid-upper arm circumference is ≥ 125 mm, and</td>
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<tr>
<td></td>
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<td>• no oedema for at least 2 weeks</td>
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<tr>
<td>Module</td>
<td>Procedure</td>
<td>2009 version</td>
<td>New version</td>
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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* |
| 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. 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. |
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.

Children with bilateral pitting oedema should transition to RUTF when appetite returns and oedema is reducing.

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-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

Children with bilateral pitting oedema and 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.

Feeding for infants aged 0–6 months:

- 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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Module 4: Feeding

<table>
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<td>Module</td>
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<td>2009 version</td>
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<td>------------------------------------------------------------------------------</td>
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<tr>
<td>Module 4: Feeding</td>
<td>Criteria for transfer to outpatient care for infants aged 0–6 months</td>
<td>Transfer to outpatient care when:</td>
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<td>Criteria for discharge from all care for infants aged 0–6 months</td>
<td>Discharge from all care when the infant:</td>
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Module 5: Daily care

<table>
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<tr>
<th>Module 6: Monitoring and problem solving</th>
<th>Similar updates as those made to modules 3 and 4, where applicable</th>
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<tr>
<td>Module 7: Involving mothers in care</td>
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<tr>
<td>Criteria for referral to outpatient care for children aged 6 months or older</td>
<td>Similar updates as in module 2</td>
</tr>
<tr>
<td>Criteria for discharge from all care for children aged 6 months or older</td>
<td>Similar updates as in module 2</td>
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<td>Module</td>
<td>Procedure</td>
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<tr>
<td><strong>Module 8: Outpatient management of severe acute malnutrition</strong></td>
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<tr>
<td><strong>Supporting materials</strong></td>
<td>Critical care pathways and answers to exercises</td>
</tr>
<tr>
<td></td>
<td>Organization of supporting materials</td>
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</tbody>
</table>
ACKNOWLEDGEMENTS

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FINANCIAL SUPPORT

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### ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
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<tr>
<td>CCP</td>
<td>critical care pathway</td>
</tr>
<tr>
<td>CMV</td>
<td>combined minerals and vitamins</td>
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<tr>
<td>IMCI</td>
<td>Integrated Management of Childhood Illness</td>
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<tr>
<td>IV</td>
<td>intravenous</td>
</tr>
<tr>
<td>NG</td>
<td>nasogastric</td>
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<tr>
<td>OPD</td>
<td>outpatient department</td>
</tr>
<tr>
<td>ORS</td>
<td>oral rehydration solution</td>
</tr>
<tr>
<td>ReSoMal</td>
<td>rehydration solution for malnutrition</td>
</tr>
<tr>
<td>RUTF</td>
<td>ready-to-use therapeutic food</td>
</tr>
<tr>
<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
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<td>WHO</td>
<td>World Health Organization</td>
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</table>
INTRODUCTION

Monitoring is a long-term process that gathers information in an organized structure. When monitoring individual patients, their progress is observed, and timely action can be taken to ensure the treatment is adequate for them. When monitoring the overall patient outcomes, procedures and discharge, the efficiency of the ward can be evaluated and changes to the process can be proposed.

At the same time, this information can be useful to understand how the management of severe acute malnutrition is implemented in the ward and identify issues that can be modified and improved. There may be problems with an individual patient’s progress or care, such as failure to gain weight or treat an infection. There may also be problems that affect the entire ward, such as problems with staff performance, food preparation, or ward procedures or equipment. All of these problems require attention to prevent patient deaths.

This module teaches a process for identifying and solving problems that may occur on the ward. The process includes:

• identifying problems through monitoring
• investigating causes of problems
• determining solutions
• implementing solutions.

This process can be used in solving problems with individual patients or problems that may affect the entire ward.

LEARNING OBJECTIVES

This module will describe and allow you to practise the following skills:

• 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.
1. **USE A PROCESS TO IDENTIFY AND SOLVE PROBLEMS**

1.1 Identify problems

By monitoring *individual patient progress, weight gain and care*, you may identify problems such as the following.

- The patient’s appetite has not returned.
- The patient has failed to gain weight for several days while taking RUTF or F-100.
- The mother wants to take her child home before the child’s medical complication has resolved.
- The child seems to have an unrecognized infection.

By monitoring *overall weight gain on the ward, patient outcomes, and the case-fatality rate*, you may identify problems such as the following.

- 20% of children on the ward have poor weight gain.
- 75% of mothers leave with their children before the children’s medical complications have resolved.
- The case-fatality rate in the ward was 15% during the months of June through August.

By monitoring *case management practices, food preparation, ward procedures, and hygiene*, you may identify additional problems, which may in fact be causes of poor weight gain or adverse outcomes. For example, you may identify problems such as the following.

- IV fluids are given routinely by certain physicians.
- Children are not fed every 2 hours through the night.
- Staff do not consistently wash their hands with soap.

When a problem is identified, describe it in as much detail as possible.

To describe the problem, state when, where, and with whom the problem is occurring. Also try to determine when the problem began. Knowing the details will help you find the cause, or causes, of the problem.
Read each pair of problem descriptions below. Tick the problem description that is more detailed and therefore more useful.

1. a. There has been an increase in the number of deaths on the ward.
   b. Four deaths have occurred at night in the past month.

2. a. Tran is not gaining weight.
   b. After gaining 10 g/kg/day for 4 days, Tran has stayed the same weight for the last 3 days.

3. a. Dr Perez prescribes a diuretic for severe oedema, but no other doctors do this.
   b. Diuretics are sometimes prescribed for oedema.

4. a. Weight gain of some children on the ward is poor.
   b. Weight gain is poor for most children who are taking adapted home foods instead of F-100.

Check your own answers to this exercise by comparing them to the answers given on page 50 at the end of the module.

1.2 Investigate causes of problems

It is critical to find the cause(s) of a problem before trying to solve it. Different causes require different solutions.

Investigation of causes may involve doing laboratory tests for a patient, observing and asking questions of staff, reviewing patient records, or monitoring food preparation and ward procedures.
1.3 Determine solutions

Solutions will depend on the causes of the problems. For example, if staff do not know how to do a new procedure, a solution may be training. On the other hand, if the cause is a lack of equipment or supplies, a different solution is needed. Solutions should:

• remove the cause of the problem (or reduce its effects)
• be feasible (affordable, practical, realistic)
• not create another problem.

Example of problem-solving process

Problem: Weight gain on a severe acute malnutrition ward is not as good as it was several months ago. Instead of good weight gain for most children on ready-to-use therapeutic food (RUTF) or F-100 (that is, 10 g/kg/day or more), the typical weight gain is now less than 10 g/kg/day.

The senior nurse decides to investigate by monitoring ward procedures and food preparation. Following are some possible causes that she might find, along with an appropriate solution for each.

**Possible causes**

- The type of milk available for making feeds has changed and the recipes have not been adjusted appropriately.
- Staff add too much water when making F-100. They add 1000 ml instead of just enough water to make 1000 ml of formula.
- Measuring scoops have been lost and staff are estimating amounts of ingredients for feeds.
- There are more children on the ward and staff numbers have not increased. Nurses cannot spend as much time feeding each child.

**Possible solutions**

- Adjust the feed recipes appropriately to use milk that is available. Post the new recipes and teach them to staff.
- Explain the recipe to staff. Be sure that 1000 ml is clearly marked on mixing containers. Demonstrate how to add water to the mark.
- Obtain new scoops.
- Invest time in teaching mothers to feed and care for the children.

It is clear that buying new scoops will not solve the problem if the cause is really lack of an appropriate recipe. By investigating the cause of a problem, one can avoid wasting money and time on the wrong solutions.
1.4 Implement solutions

Implementing a solution may be relatively simple (such as speaking with an individual staff member, or changing a child’s feeding plan) or quite complex (such as changing staff assignments throughout the ward). Good communication with staff is important whenever any change is made.

To promote good communication when solving problems:
• hold regular staff meetings, during which positive feedback is given and any problems, causes, and solutions are discussed;
• provide staff with job descriptions that list their assigned tasks;
• provide clear instructions whenever any change is made;
• provide job aids such as checklists or posted instructions for any complex tasks.

Follow up to determine if a solution is implemented as intended. Then continue monitoring to determine whether the problem is solved. Give feedback to staff that includes praise for work done well, along with any instructions for improvement.
2. MONITOR AND SOLVE PROBLEMS WITH AN INDIVIDUAL PATIENT

2.1 Monitor individual patient progress and care

Nursing staff should monitor certain signs (such as pulse rate, respiratory rate, and temperature) repeatedly during the day, especially during initial treatment. If there are danger signs (such as increasing pulse and respiratory rate, or a sudden drop in temperature), the staff should immediately respond as described in Module 3 on initial management and Module 5 on daily care. Otherwise, information is simply recorded on the monitoring record of the critical care pathway (CCP), where it is reviewed by a clinician during rounds.

Clinicians should do a ward round at least once every day. During rounds, a clinician should do the following.

- Observe the child and question the mother and nurse.
  - Is the child more alert? Smiling? Sitting up? Able to play?
  - Has the child lost oedema?
  - Is there less diarrhoea?
  - Has dermatosis improved?
  - How is the child’s appetite?
- Review the child’s weight chart.
  - Is the child gaining weight according to the weight chart?
  - If there is a loss, is it due to decreasing oedema?
- Review the CCP and food intake chart.
  - Is the child getting the recommended feeds?
  - Is prescribed care (such as antibiotics) being given?
  - Are there any danger signs recorded on the CCP (increased pulse rate, respiratory rate, or temperature)?

Daily, during transition and rehabilitation, a clinician should calculate the child’s weight gain in grams per kilogram body weight (g/kg/day) and judge whether weight gain is sufficient.

**Good weight gain:** 10 g/kg/day or more  
**Moderate weight gain:** 5 up to 10 g/kg/day  
**Poor weight gain:** less than 5 g/kg/day
To calculate daily weight gain

1. Subtract the child’s weight yesterday (W1) from the child’s weight today (W2).

   **Note:** Do this even if the child has lost weight. If the child has lost weight, the result will be negative.

   Express the difference as grams (kg x 1000). This is the total amount of weight gained during the day.

   \[ W2 - W1 = \_\_\_\_ \text{ kg} \quad \_\_\_\_ \text{ kg} \times 1000 = \_\_\_\_ \text{ grams gained} \]

2. Divide the grams gained (from step 1) by the child’s weight yesterday. The result is the weight gain in g/kg/day.

   \[ \text{Weight gain in grams} \div W1 = \_\_\_\_ \text{ g/kg/day} \]

   **Note:** This calculation is not useful until the child is on RUTF or F-100, as the child is not expected to gain weight on F-75. In fact, weight may be lost on F-75 due to decreasing oedema.

Remember that this calculation will be most useful if the child is weighed at about the same time each day.

**Example**

Kofi began taking F-100 on Day 4 in the severe acute malnutrition ward. By Day 6 he began to gain weight. On Day 6 Kofi weighed 7.32 kg. On Day 7 he weighed 7.4 kg. His weight gain in g/kg/day can be calculated as follows:

1. \[ 7.4 \text{ kg} - 7.32 \text{ kg} = 0.08 \text{ kg}; \ 0.08 \text{ kg} \times 1000 = 80 \text{ grams gained} \]
2. \[ 80 \text{ grams} \div 7.32 = 10.9 \text{ g/kg/day} \]

A gain of **10.9 g/kg/day** is considered a good weight gain.
Short answer exercise

Calculate the daily weight gain for the children described below. Assume that the weights were taken at about the same time each day.

1. Mustaph weighed 7.25 kg on Day 10. He weighed 7.30 kg on Day 11. What was his weight gain in g/kg/day?

2. Kebba weighed 6.22 kg on Day 8. She weighed 6.25 kg on Day 9. What was her weight gain in g/kg/day?

3. Galo weighed 7.6 kg on Day 9. He weighed 7.5 kg on Day 10. What was his weight gain in g/kg/day? (Note: Since Galo lost weight, the answer will be negative.)

Check your own answers to this exercise by comparing them to the answers given on page 50 at the end of the module.

2.2 Identify the child who is failing to respond

A child is failing to respond if he or she:
• does not improve initially;
• gains weight but then levels off or deteriorates.

Some criteria for failure to respond are listed below as a guide.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Approximate time after admission</th>
</tr>
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<tbody>
<tr>
<td>Failure to regain appetite</td>
<td>Day 4</td>
</tr>
<tr>
<td>Failure to start to lose oedema</td>
<td>Day 4</td>
</tr>
<tr>
<td>Oedema still present</td>
<td>Day 10</td>
</tr>
<tr>
<td>Failure to gain at least 5 g/kg/day for 3 successive days after feeding freely on F-100</td>
<td>During rehabilitation</td>
</tr>
</tbody>
</table>
In this exercise you will review information about two cases to determine if they are making progress or if they are failing to respond.

**Case 1: Ceri**

Ceri was admitted 5 days ago with moderate oedema and a Z-score < -3. Parts of her CCP and her 24-hour food intake chart for Day 5 are provided on the next pages. Ceri’s pulse rate has remained at about 90 over the 5 days, and her breathing rate has remained at about 35.

Study the information about Ceri and answer the questions below.

1a. Is Ceri making progress? If so, describe her progress.

1b. Are there problems? If so, describe the problems.
**INITIAL MANAGEMENT**

**NAME** Ceri  
**DATE OF BIRTH** 08/09/13  
**AGE** 16 (months)  
**DATE OF ADMISSION** 09/02/2015  
**TIME** 08.30  
**HOSP. ID** 27

**SIGNS OF SAM**  
- **Severe wasting?** Yes  
- **Bilateral pitting oedema?** 0 ++ ++++  
- **Dehydration?** + ++ ++++ (swollen, sinewy)  
- **Weight (kg):** 6.6  
- **Height/length (cm):** 73  
- **WFLH z-score:** < -3  
- **MUAC (mm):** 

**TEMPERATURE**  
- **Rectal:** 36.5°C  
- **Axillary:**  
- **Pulse rate:** 90  
- **Respiratory rate:**

**BLOOD GLUCOSE (mmol/L)**  
- **Time glucose given:** Oral  
- **NGT:** N  

**HAEMOGLOBIN (Hb) (g/l):** 90  
**Packed cell vol (PCV):** 

**DEHYDRATION:**  
- **If dehydrated, circles signs present:**  
- **Diarrhoea:** Yes  
- **Blood in stool:** No  
- **Vomiting:** No  
- **Thirsty:** No

**MEASLES**  
- **Yes**  
- **No**

**EYE SIGNS:**  
- **None**  
- **Left**  
- **Right**

**FUSION/INFLAMMATION**  
- **X**

**BIOT'S SPOTS**  
- **X**  
- **X**

**CORNEAL CLINCHING**  
- **X**  
- **X**

**CORNEAL ULCERATION**  
- **If eye signs, give vitamin A & atropine immediately. Record below and on Daily Care page.**

**FEEDING**  
- **Begin feeding with F-75 as soon as possible.**  
- **If child is rehydrated, reweigh before determining amount to feed.**  
- **New weight:** 6.6 (kg)  
- **Amount for 2-hourly feedings:**  
- **Time first fed:** 09.00  
- ***If hypoglycaemic, feed ¼ of this amount every half hour for first 2 hours; continue until blood glucose reaches 3 mmol/l. Record all feeds on 24-hour Food Intake Chart.***

**ANTIBIOTICS (All receive)**  
- **Drug/Route**  
- **Ampicillin:** IM  
- **(From day 3) Amoxicillin:** Oral

**Doze/Frequency/Duration**  
- **Cefotaxime:** Once a day for 7 days  
- **Ampicillin:** Every 6 hours for 2 days  
- **Amoxicillin:** Every 12 hours for 5 days

**Time of 1st Dose**  
- **09.00**
NAME ___________  M  F  DATE OF BIRTH ___________  AGE ______ (months)  DATE OF ADMISSION ___________  HOSP. ID: ___________

### DAILY CARE

<table>
<thead>
<tr>
<th>DAYS IN HOSPITAL</th>
<th>1</th>
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<td>Bilateral pitting oedema</td>
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<tr>
<td>Diarrhoea (indicate number of loose stools)</td>
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<td>Vomiting (indicate the frequency)</td>
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<tr>
<td>Amount to give per feed (ml/packet)</td>
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<td>12</td>
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<td>8</td>
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<tr>
<td>Total amount taken (ml/packet)</td>
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<td>NG tube Yes/No</td>
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</table>

### ANTIBIOTICS AND OTHER DRUGS

- **Folic acid (if there is clinical anaemia)**
- **VITAMIN A**: 200,000 IU 15.00 PS PS
  - Give at the end of rehabilitation routinely unless evidence of dose in past month and no eye sign. Give Day 1, Day 2 and end of rehabilitation if child admitted with eye sign or recent measles.
- **Drug for worms**: None
- **Iron (if not in feed)**
- **Drug for worms**: None
- **Iron supplementary (daily)**: Give iron in rehabilitation only if child is on F-100. Do not give iron if child is on RUTF.
- **Eye Problems**
  - **Tetracycline ointment 3x daily or Chloramphenicol 1 drop 4x daily**: 09.00 PS PS PS PS PS
  - 15.00 PS PS PS PS PS
  - 21.00 AO AO AO AO AO
  - 03.00 AO AO AO AO AO
  - Left: Right
- **Dermatosis 0 +++++**: + + + + +
- **Zinc oxide**: DE DE DE DE DE
- **Other**: None

---

6. MONITORING AND PROBLEM SOLVING | TRAINING COURSE ON THE INPATIENT MANAGEMENT OF SEVERE ACUTE MALNUTRITION
24-HOUR FOOD INTAKE CHART  
*Complete one chart for every 24-hour period*

Name: Ceri  
Hospital ID Number: 30  
Admission weight (kg): 6.6  
Today's weight (kg): 6.5

<table>
<thead>
<tr>
<th>Time</th>
<th>a. Amount offered (ml)</th>
<th>b. Amount left in cup (ml)</th>
<th>c. Amount taken orally (a - b)</th>
<th>d. Amount taken by NG, if needed (ml)</th>
<th>e. Estimated amount vomited (ml)</th>
<th>f. Watery diarrhoea (if present, yes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:00</td>
<td>110</td>
<td>20</td>
<td>90</td>
<td></td>
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</tr>
<tr>
<td>11:00</td>
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<td>85</td>
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<td>14:00</td>
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<td>17:00</td>
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<td>20:00</td>
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<td>23:00</td>
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<td>05:00</td>
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<td>90</td>
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<td>no</td>
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</tbody>
</table>

**Column totals**  
c. 610  
d. 0  
e. 0  
Total yes: 0

Total volume taken over 24 hours = amount taken orally (c) + amount taken by NG (d) – amount vomited (e) = 610 ml
Case 2: Lennox

Lennox was admitted 10 days ago with mild oedema (both feet), dysentery, fever, and a Z-score of less than −2. Lennox was given amoxicillin for 5 days. After this period he was still sickly and had fever. He also had a deep, persistent cough and some difficulty breathing. The physician suspected possible pneumonia and prescribed benzylpenicillin and gentamicin, which he has been given for 5 days.

Study parts of Lennox’s CCP and his most recent 24-hour food intake chart, which are given on the next pages. Then answer the questions below.

2a. What is Lennox’s weight gain in g/kg/day from Day 10 to Day 11? (Enter this on his CCP)

2b. Is Lennox making progress? If so, describe his progress.

2c. Are there problems? If so, describe the problems.

When you have finished this exercise, please discuss your answers with a facilitator.
**INITIAL MANAGEMENT**

**NAME:** Lennox  
**DATE OF BIRTH:** Unknown  
**AGE:** Approx 24 months  
**DATE OF ADMISSION:** 12/11/2017  
**TIME:** 08:30  
**HOSP. ID:** 563

**SIGNS OF SAM**
- Severe wasting? **Yes**  
- Bilateral pitting oedema? **No**  
- Dehydration? **No**  
- Weight (kg): **2**  
- Height / length (cm): **97**  
- WFH/L z-score: **< 2 MUAC (mm):** **112**  
- Temperature: **39 °C (rectal)**  
- Blood glucose (mmol/L): **5 mmol/L**

**SIGNS OF SHOCK**
- Lethargic / unresponsive  
- Cold hands  
- Slow capillary refill (> 3 seconds)  
- Weak or fast pulse

**BLOOD GLUCOSE**
- <3 mmol/L and alert, give 50 ml bolus of 10% glucose or sucrose orally or by NGT.  
- If <3mmol/L and lethargic, unconscious, or convulsing, give sterile 10% glucose 50 ml/kg IV.

**HAEMOGLOBIN (Hb) (g/l):**  
- Packed cell vol (PCV): **95**

**FEEDING**
- Begin feeding with F-75 as soon as possible.  
- If child is rehydrated, reweigh before determining amount to feed.

**NEWBORN**
- Amount for 2-hourly feedings: **90 ml F-75**

**MEASLES**
- Yes  
- No

**EYE SIGNS**
- None  
- Left  
- Right

**Pus/Inflammation**
- Biots spots

**Corneal clouding**
- Corneal ulceration

**Oral doses**
- <6 months: 50,000 UI  
- 6-12 months: 100,000 UI  
- >12 months: 200,000 UI

**ANTIBIOTICS**
- Gentamicin: IM  
- Ampicillin: IM

**Drug/Dose/Route**
- Gentamicin: Once daily for 7 days  
- Ampicillin: Every 6 hours for 2 days  
- Every 12 hours for 5 days

**DEHYDRATION**
- Wet/dry diarrhoea? **Yes**  
- In blood/soil? **No**  
- If diarrhoea, circle signs present:
  - Recent sunken eyes  
  - Recent irritability  
  - Leatharigc / unresponsive  
  - Thirty  
  - No tears

**Drug/Route**
- If administered, give ReSoMaL orally or by NGT tube if too ill every 30 minutes for first 2 hours and monitor every **2 hr**.

**RESPIRATORY RATE**
- Time of first fed: **09:00**

**HYDRATION SIGNS**
- Na+/Os/NH:
- Number of stools: **2**
- Number of vomiting:
- Amount taken (ml):
  - 39  
  - 39  
  - 39  
  - 76  
  - F-75  
  - 79  
  - F-75  

**Stop ReSoMaL if any sign of over-hydration:** Fast breathing, increase in pulse and res. rates, engorged jugular veins, puffing of eyelids.

**Drug/Route**
- gentamicin: Once daily for 7 days
### DAILY CARE

<table>
<thead>
<tr>
<th>Name: Lennox</th>
</tr>
</thead>
</table>

**NAME_________________________**
**M F DATE OF BIRTH________________ AGE _______ (months) DATE OF ADMISSION_______**
**HOSP. ID:______________________**

**DAILY CARE**

<table>
<thead>
<tr>
<th>DAYS IN HOSPITAL</th>
<th>Week 1</th>
<th>Week 2</th>
<th>Week 3</th>
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</thead>
<tbody>
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**Date**

|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|

**Daily weight (kg)**

| Weight gain (g/kg) | 8.0 | 8.1 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 |

**Bilateral pitting oedema**

| + ++ +++ | + | + | + | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**Diarrhoea (indicate number of loose stools)**

| D | D | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**Vomiting (indicate the frequency)**

| RESOMAL | ................. | mls |

### FEED PLAN:

**Type of feed**

<table>
<thead>
<tr>
<th>F-75</th>
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<th>F-100</th>
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<th>F-100</th>
<th>F-100</th>
</tr>
</thead>
</table>

**# daily feeds**

| 10 | 12 | 12 | 8 | 6 | 6 | 6 | 6 | 6 |

**Amount to give per feed (ml/packet)**

| 870 | 1040 | 1040 | 1050 | 1040 | 1040 | 1100 | 1210 | 1400 | 1400 |

**NG tube Yes/No**

| Yes | No |

**Breastfeeding Yes/No**

| Yes | No |

### ANTIBIOTICS AND OTHER DRUGS

**List prescribed antibiotics and other drugs in left column. Allow one row for each daily dose. Draw a box around days/times that each drug should be given. Sign your initials when given.**

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<th>Gentamicin</th>
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</table>

**Folic acid (if there is clinical anaemia)**

| / | / |

**VITAMIN A**

| / | / |

**Drug for worms**

| NONE |

**Type of worm**

| NONE |

**IRON 2X daily**

| NONE |

**Give iron in rehabilitation only if child is on RUTF. Do not give iron if child is on RUTF.**

**EYE PROBLEMS**

<table>
<thead>
<tr>
<th>Tetracycline ointment 3x daily or Chloramphenicol 1 drop 4x daily</th>
<th>Left</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dermatitis 0 ++ +++</td>
<td>After 7-10 days, when eye drops are no longer needed, shade boxes for eye drops</td>
<td></td>
</tr>
</tbody>
</table>

### 6. MONITORING AND PROBLEM SOLVING | TRAINING COURSE ON THE INPATIENT MANAGEMENT OF SEVERE ACUTE MALNUTRITION
Monitor respiratory rate, pulse rate, and temperature **every 4 hours** until after transition to RUTF or F-100. Then monitoring can be less frequent (e.g., twice daily).

<table>
<thead>
<tr>
<th>Time</th>
<th>Day 1</th>
<th>Day 2</th>
<th>Day 3</th>
<th>Day 4</th>
<th>Day 5</th>
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<td>35</td>
</tr>
<tr>
<td>05 09 13</td>
<td>38</td>
<td>38</td>
<td>38</td>
<td>38</td>
<td>38</td>
<td>38</td>
<td>38</td>
</tr>
<tr>
<td>17 21 01</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
</tr>
</tbody>
</table>

**Normal pulse:**
- 0 to 1 years: 100 to 160 beats/min
- 1 to 3 years: 90 to 150 beats/min
- 3 to 6 years: 80 to 140 beats/min

**Normal respiration rate:**
- <2 months: <60 breaths/min
- 2 to 11 months: <50 breaths/min
- 1 to 5 years: <40 breaths/min
Monitor respiratory rate, pulse rate, and temperature *every 4 hours* until after transition to RUTF or F-100. Then monitoring can be less frequent (e.g., twice daily).

### Respiration Rate

<table>
<thead>
<tr>
<th>Breaths/minute</th>
<th>33</th>
<th>33</th>
<th>33</th>
<th>33</th>
<th>30</th>
<th>30</th>
<th>30</th>
</tr>
</thead>
</table>

### Pulse Rate

<table>
<thead>
<tr>
<th>Beats/minute</th>
<th>100</th>
<th>100</th>
<th>100</th>
<th>90</th>
<th>90</th>
<th>90</th>
</tr>
</thead>
</table>

### Temperature

<table>
<thead>
<tr>
<th>Time</th>
<th>Day 8</th>
<th>Day 9</th>
<th>Day 10</th>
<th>Day 11</th>
</tr>
</thead>
<tbody>
<tr>
<td>21 01 05 17 05 17 05 17 05</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Danger Signs:* Watch for increasing pulse and respirations, fast or difficult breathing, sudden increase or decrease in temperature, rectal temperature below 35.5°C, and other changes in condition (see Monitoring Danger Signs during Inpatient Management of Severe Acute Malnutrition Job Aid).

<table>
<thead>
<tr>
<th>Normal Pulse:</th>
<th>0 to 1 years</th>
<th>100 to 160 beats/min</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 to 3 years</td>
<td>90 to 150 beats/min</td>
</tr>
<tr>
<td></td>
<td>3 to 6 years</td>
<td>80 to 140 beats/min</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Normal Respiration Rate</th>
<th>&lt;2 months</th>
<th>&lt;60 breaths/min</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2 to 11 months</td>
<td>&lt;50 breaths/min</td>
</tr>
<tr>
<td></td>
<td>1 to 5 years</td>
<td>&lt;40 breaths/min</td>
</tr>
</tbody>
</table>
NAME:______________    M    F    DATE OF BIRTH________AGE____(months) DATE OF ADMISSION_________ HOSP. ID:

WEIGHT CHART

Weight on admission: 8 kg

After rehydration

Height/length on admission: _________cm

MUAC on admission: _________ mm

Bilateral pitting oedema on admission: 0 ++ +++

Weight at discharge: _________kg

Enter likely range of weights on the vertical axis in an appropriate scale (e.g., each row representing 0.1 kg). Allow rows below the starting weight in case weight decreases; weight may decrease by as much as 30% if the child has severe oedema.
2.3 Determine cause(s) of failure to respond

The causes of a child’s failure to respond may be related to procedures, staff, equipment, or the environment throughout the ward, or they may be related only to the individual child. If many children are failing to respond, look for causes that affect the entire ward, such as incorrect feeding practices or poor hygiene; these types of causes will be discussed in section 5. If your investigation is focused on one child, consider such possible causes as the following.

- Insufficient food given:
  - Has the feeding plan been adjusted as the child gains weight?
  - Is the correct feed being given?
  - Is the correct amount offered at the required times?
  - Is the child being fed adequately at night?
  - Is the child being held and encouraged to eat?
  - Are leftovers recorded so the child’s recorded intake is accurate?
- Vitamin or mineral deficiency:
  - Is mineral mix added to the child’s food each day?
  - Is an appropriate multivitamin given?
- Insufficient attention given to child:
  - Do staff pay less attention to this child for some reason (for example, because they believe the child is “beyond help”)?
  - Is the mother present to assist in feeding and care of the child?
- Rumination: The child regurgitates food from the stomach to the mouth, then vomits part of it and swallows the rest. This usually happens when the child is not observed.
  - Is the child eating well but failing to gain weight?
  - Does the child smell of vomit or have vomit-stained clothes or bedding?
  - Does the child seem unusually alert and suspicious?
  - Does the child make stereotyped chewing movements?
- Unrecognized infection: Infections most commonly overlooked include pneumonia, urinary tract infection, ear infection, and tuberculosis. Others include malaria, dengue, viral hepatitis B, and HIV infection. Refer to the WHO Pocket book of hospital care for children.
  - Serious underlying disease (such as congenital abnormalities, cancer, immunological diseases).

Remember that there may be multiple causes of failure to respond. For example, a child may have an infection plus a vitamin deficiency. Try to find all of the causes.

2.4 Identify and implement solutions for the individual child

In some cases, the cause of a problem may require a specific medical solution.

If the child has an infection, a clinician will need to prescribe appropriate treatment as described in the WHO Pocket book of hospital care for children.

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If the child is ruminating, it is best to have experienced staff members give special attention to the child. They need to show disapproval whenever the child begins to ruminate, without frightening the child, and encourage less harmful behaviours.

In many cases the solution to a problem may seem apparent through “common sense”. For example, if the child is not being fed according to schedule, they must be fed according to schedule. If the mineral mix has not been added to the child’s food, it must be added. However, there may be underlying causes that are also important. Continue to ask “why?” until you reach the root causes of problems. The solutions to problems must address the root causes.

**Example of a problem with root causes**

Problem: A child becomes hypoglycaemic during her first night on the ward.

**Problem:** A child becomes hypoglycaemic during her first night on the ward

**One cause:** She was not fed at 02:00 and 04:00

**Root cause:** The child’s mother was too tired to wake up and feed her.

**Root cause:** There is no quiet time or place for mothers to rest during the day

**Root cause:** There are not enough night staff so mothers are expected to feed the children at night

**Solutions:** To solve this problem, it will be necessary to address all of the causes. Possible solutions include getting more night staff or finding a time and place for mothers to rest during the day. Night staff could also be asked to wake up the mothers and supervise night feeds, or help those mothers whose children require 2-hourly feeds.
In this exercise you will discuss causes and solutions to problems affecting Ceri and Lennox, two cases presented previously in Exercise A.

Case 1: Ceri

You remember that Ceri was failing to respond on Day 5. She had not lost her oedema and was not eating well. She had not progressed to F-100. You may wish to review the information about Ceri from Exercise A.

Write answers to the following questions as preparation for a group discussion.

1a. What are some possible causes of Ceri’s failure to respond? List at least three possible causes.

1b. How could you find out the real cause(s)? List several possible ways to investigate.

1c. While observing feeding in the ward, the senior nurse found that the staff paid very close attention to the children with intravenous (IV) drips and nasogastric (NG) tubes. They paid much less attention to the children feeding orally. Ceri did not appear as sick as many of the other children, and the nurses did not spend time with her encouraging her to eat.

   Based on the senior nurse’s observations, what is a possible cause of Ceri’s failure to respond?

1d. What is a possible solution appropriate for the cause identified in question 1c above?
Case 2: Lennox

You remember that Lennox was failing to respond on Day 10. He had a deep, persistent cough and some difficulty breathing. The physician had been treating Lennox for pneumonia with benzylpenicillin and gentamicin, which had been given for 5 days.

Since Lennox was not improving on benzylpenicillin and gentamicin, the physician did a complete examination. He obtained a chest X-ray, which showed a shadow on the lungs. The physician also learned that a relative who lives in Lennox’s household has tuberculosis.

2a. Lennox’s CCP (page 13 and following) shows no weight gain. Has Lennox been taking enough F-100?

2b. What is a possible cause of Lennox’s failure to respond?

Tell a facilitator when you are ready for the group discussion.
3. Monitor Overall Weight Gain During Transition and Rehabilitation

Section 2 discussed problem solving for individual patients. The remaining sections will discuss identifying and solving problems for the ward.

3.1 Compile Data on Weight Gain in the Ward

Once a month, review records for the ward for a given week (for example, the first week of the month) and compile data on a weight gain tally sheet for the ward. (See example below; there is a blank tally sheet in Web Annex A.)

To complete the tally sheet:
1. identify the children who were on RUTF or F-100 for the entire week (only children on RUTF or F-100 are expected to gain weight);
2. calculate the average daily weight gain for each of these children;
3. add the daily weight gains recorded on the child’s CCP for the 7 days of the week being reviewed, and divide the total by 7;
4. determine if the child’s average daily weight gain was poor, moderate, or good during that week;
5. record the child’s name in the appropriate column of the tally sheet;
6. when the process is complete for each child on RUTF or F-100, total the columns;
7. determine what percentage of the children on RUTF or F-100 had poor, moderate, or good weight gain.

Compare the results to tally sheets from similar weeks in other months. Use the tally sheets as a basis for discussion and problem solving with staff. If you cannot complete this review process every month, try to do it at least 4 times a year.

Example Weight Gain Tally Sheet for the Ward

<table>
<thead>
<tr>
<th>Week of: 9/2/18</th>
<th>Good weight gain: ≥ 10 g/kg/day</th>
<th>Moderate weight gain: 5 up to 10 g/kg/day</th>
<th>Poor weight gain: &lt; 5 g/kg/day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of children on RUTF or F-100 for entire week: 12</td>
<td>Jalika Isatou Nancy Amie</td>
<td>Ebrima Babu Fatemata Sainey Sainey Galo Momodou</td>
<td>Fatou Abdouraham</td>
</tr>
<tr>
<td>Totals</td>
<td>4</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>% of children on RUTF or F-100 in the ward</td>
<td>33%</td>
<td>50%</td>
<td>17%</td>
</tr>
</tbody>
</table>
3.2 Determine if there is a problem with weight gain on the ward

If the weight gain of 10% or more of the children on RUTF or F-100 is poor, there is a problem that must be investigated. If there is a negative change as compared to previous months, there may also be a problem. For example, if the percentage of children in the “moderate” column increases and the percentage in the “excellent” column decreases, investigate the reasons for this change.

3.3 State the problem specifically

Describe the problem as completely and specifically as possible. Determine if the children who are not gaining weight adequately have certain things in common. For example:

- How long have they been on the ward?
- What are their ages?
- Are they located in a certain area of the ward?
- Are they cared for by certain staff?
- Are they receiving food or drinks that interfere with prescribed feeds?

You may think of other questions to ask to determine common factors. If there are no apparent common factors, then assume that the problem is throughout the ward.

After determining common factors, state the problem specifically, for example: “Four out of five children whose mothers are not staying in the ward have poor weight gain.” If the problem is occurring throughout the ward, say so, for example: “25% of children throughout the ward have poor weight gain.”

Stating the problem specifically will help you look for the cause(s). Investigating causes by monitoring ward procedures, food preparation, and other factors will be discussed in section 5.
In this exercise you will review information on children who have been on F-100 for the past 7 days. You will use a tally sheet to determine whether there is a problem with weight gain on the ward. There will then be a group discussion.

**Information for the exercise**

Twenty children on the ward have been on F-100 for the past 7 days. For 17 of these children, the average daily weight gain for the past 7 days has been calculated. These children’s names have already been entered on the tally sheet on the next page.

CCP excerpts for three children are given on page 26. Follow the instructions below to complete the tally sheet. Check your tally sheet with a facilitator if you wish. Then answer the questions below the CCP excerpts.

**Instructions to complete the tally sheet**

*For each child whose CCP excerpt is given below:*

1. Calculate the average daily weight gain:
   - Add the daily weight gains recorded on the child’s CCP for the 7 days of the week being reviewed (dates: 13/4 to 19/4). Divide the total by 7.

2. Determine if the child’s average daily weight gain was poor, moderate, or good during that week.

3. Add the child’s name to the appropriate column of the tally sheet.

*When you have added all three children to the tally sheet:*

4. Total the columns on the tally sheet.

5. Determine what percentage of the children on F-100 had poor, moderate, or good weight gain. To do this:
   - divide total in each column by the total children on F-100
   - Express the result as a percentage.
# Weight gain tally sheet for ward

<table>
<thead>
<tr>
<th>Week of: 13/4</th>
<th>Good weight gain: ≥ 10 g/kg/day</th>
<th>Moderate weight gain: 5 up to 10 g/kg/day</th>
<th>Poor weight gain: &lt; 5 g/kg/day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of children on F-100 for entire week: 20 children</td>
<td>Prakash Winston Sulayman Fatem Karamo Simeh</td>
<td>Lamin Rohay Jainaba Tako Aramatoulie Ala Isaidu Kaddy</td>
<td>Sanu Marianna Lalita</td>
</tr>
</tbody>
</table>

| Totals | |
| % of children on F-100 in ward | |

## CCP excerpt 1: Aruni

<table>
<thead>
<tr>
<th>DAYS IN HOSPITAL</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>8/4</td>
<td>9/4</td>
<td>10/4</td>
<td>11/4</td>
<td>12/4</td>
<td>13/4</td>
<td>14/4</td>
<td>15/4</td>
<td>16/4</td>
<td>17/4</td>
<td>18/4</td>
<td>19/4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daily weight (kg)</td>
<td>4.6</td>
<td>4.5</td>
<td>4.55</td>
<td>4.6</td>
<td>4.63</td>
<td>4.65</td>
<td>4.7</td>
<td>4.8</td>
<td>4.85</td>
<td>4.9</td>
<td>5.0</td>
<td>5.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight gain (g/kg)</td>
<td>Calculate daily during transition</td>
<td>6.5</td>
<td>4.3</td>
<td>10.7</td>
<td>21.3</td>
<td>10.4</td>
<td>10.3</td>
<td>20.4</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## CCP excerpt 2: Kodeh

<table>
<thead>
<tr>
<th>DAYS IN HOSPITAL</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>6/4</td>
<td>7/4</td>
<td>8/4</td>
<td>9/4</td>
<td>10/4</td>
<td>11/4</td>
<td>12/4</td>
<td>13/4</td>
<td>14/4</td>
<td>15/4</td>
<td>16/4</td>
<td>17/4</td>
<td>18/4</td>
<td>19/4</td>
<td></td>
</tr>
<tr>
<td>Daily weight (kg)</td>
<td>5.9</td>
<td>5.8</td>
<td>5.9</td>
<td>5.9</td>
<td>6.0</td>
<td>6.0</td>
<td>6.0</td>
<td>6.0</td>
<td>6.10</td>
<td>6.15</td>
<td>6.10</td>
<td>6.20</td>
<td>6.25</td>
<td>6.20</td>
<td></td>
</tr>
<tr>
<td>Weight gain (g/kg)</td>
<td>Calculate daily during transition</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>0</td>
<td>16</td>
<td>8.2</td>
<td>–8.1</td>
<td>16.4</td>
<td>8.1</td>
<td>–8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## CCP excerpt 3: Sohna

<table>
<thead>
<tr>
<th>DAYS IN HOSPITAL</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>7/4</td>
<td>8/4</td>
<td>9/4</td>
<td>10/4</td>
<td>11/4</td>
<td>12/4</td>
<td>13/4</td>
<td>14/4</td>
<td>15/4</td>
<td>16/4</td>
<td>17/4</td>
<td>18/4</td>
<td>19/4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daily weight (kg)</td>
<td>7.7</td>
<td>7.7</td>
<td>7.7</td>
<td>7.8</td>
<td>7.8</td>
<td>8.0</td>
<td>8.1</td>
<td>8.15</td>
<td>8.22</td>
<td>8.2</td>
<td>8.3</td>
<td>8.3</td>
<td>8.35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight gain (g/kg)</td>
<td>Calculate daily during transition</td>
<td>–</td>
<td>25.6</td>
<td>12.5</td>
<td>6.17</td>
<td>8.6</td>
<td>–2.4</td>
<td>12.2</td>
<td>0</td>
<td>6.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Questions to answer and discuss

1. Does the tally sheet show that there is a problem with weight gain on the ward?

2. The senior nurse decided to look for common factors among the children who had poor weight gain. She found the following information:

   - Sanu - Arrived 21 days ago, age 2 years, orphan (no caregiver at the hospital), cared for by Nurse Rafia
   - Marianna - Arrived 18 days ago, age 19 months, no mother at hospital (aunt comes to visit), cared for by Nurse Anjuli
   - Lalita - Arrived 12 days ago, age 22 months, was on IV at admission and then NG but now takes feeds orally, moved yesterday to Nurse Rafia’s area, mother is present
   - Kodeh - Arrived 14 days ago, age 18 months, cared for by Nurse Amalia, orphan (parents died and a neighbour left Kodeh at hospital)

   What common factor(s), if any, are there among these children?

3. State the problem as specifically as possible using the information from the tally sheet and the information gathered by the senior nurse.

4. Do the common factors among the children with poor weight gain suggest a possible cause of the problem? If so, what is a possible cause? What further investigation may need to be done to investigate causes?

Tell a facilitator when you are ready for the group discussion.
4. MONITOR PATIENT OUTCOMES

4.1 Record each patient’s outcome on the CCP

The last page of the CCP has a space for recording patient outcomes. Record the outcome for the patient whether it is successful or not. Also record any relevant comments, such as circumstances and causes of adverse outcomes, and follow up closely or refer to supplementary feeding programmes.

### Successful outcomes

- **If outpatient programme on management of severe acute malnutrition in place:**
  - referral after regaining appetite, reduced oedema and good acceptance of RUTF

- **If no outpatient programme on management of severe malnutrition in place:**
  - discharge at weight-for-height Z-scores more than –2 SD

### Adverse outcomes

- **Death**
  - apparent cause of death
  - number of days after admission
  - time of day or night that death occurred
  - other relevant circumstances

- **Early departure or early discharge and circumstances**

- **Referral and circumstances**

### Example from CCP

<table>
<thead>
<tr>
<th>PATIENT OUTCOME</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Circle outcome:</strong></td>
</tr>
<tr>
<td>Discharge at weight-for-height Z-scores more than –2 SD</td>
</tr>
<tr>
<td>Early departure (against advice)</td>
</tr>
<tr>
<td>Early discharge</td>
</tr>
<tr>
<td>Referral</td>
</tr>
<tr>
<td>Death</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
4.2 Tag adverse outcomes on the CCP

Use a coloured tag or some other means to indicate records with adverse outcomes. The tag will make these records easy to find in the files when you are doing a review.

4.3 Review patient records for common factors in adverse outcomes

Periodically and whenever there is a death, review tagged records. Note common factors that would suggest areas where case management practices or ward procedures may need to be carefully examined and improved.

For example, note whether recent deaths have occurred within the first 2 days after admission or later. Deaths that occur within the first 2 days are often due to hypoglycaemia, overhydration, unrecognized or mismanaged septic shock, or other serious infection. Deaths that occur after 2 days are often due to heart failure; check to see if deaths are occurring during transition to RUTF or F-100.

An increase in deaths occurring during the night or early morning, or on weekends, suggests that care of children at these times should be monitored and improved. For example, if there are many early morning deaths, it is possible that children are not being adequately covered and fed during the night.

If many mothers are choosing to take their children home after only a few days, look for common reasons. Are the mothers unable to leave other children at home? Is the ward uncomfortable for them? Are the staff unfriendly? Early departures also suggest a need to monitor and improve ward conditions and procedures.

Review of patient records for adverse outcomes can provide a basis for staff to discuss and solve problems. A process for group problem solving is described in section 6 of this module.
Exercise D

In this exercise you will review excerpts from the CCPs of three children who died. You will review the circumstances of the deaths and determine whether there are common factors.

Study the CCP excerpts for Kofi, Vijay, and Luca on the following pages. Answer and be ready to discuss the following questions.

1. What are the circumstances of each child’s death?
   Kofi:
   
   Vijay:
   
   Luca:

2. Are there common factors among any of the three deaths? If so, what are they?

3. What areas of case management practices or ward procedures need to be monitored to find related problems and causes?

Tell a facilitator when you are ready for the group discussion.
6. Monitoring and Problem Solving | Training Course on the Inpatient Management of Severe Acute Malnutrition

**Name**: Kofi
**Date of Birth**: 28/02/17
**Age**: 15 (months)
**Date of Admission**: 05/06/2018
**Time**: 10.00
**Hosp. ID**: 678

**Initial Management**

Comments on pre-referral and/or emergency treatment already given: Was given normal saline IV in the emergency room.

**Signs of SAM**
- Severe wasting: Yes
- Bilateral pitting oedema: Yes
- Dermatosis: Yes
- Weight (kg): 6.3
- Height/length (cm): 71

**Signs of Shock**
- None
- Lethargic/unconscious
- Cold hands
- Slow capillary refill (3 seconds)
- Weak or fast pulse

**Blood Glucose** (mmol/L): 0

**Dehydration**:
- If <3 mmol/L and alert, give 50 ml of 10% glucose or sucrose orally or by NGT. If <3 mmol/L and lethargic, unconscious, or convulsing, give sterile 10% glucose 5ml/kg IV. Total amount = 5 ml x child’s wt in kg x ml. Then give 50 ml of 5% glucose.

**Monitoring and Problem Solving**

**If hypoglycaemic, feed ¼ of this amount every half hour for first 2 hours and monitor**.

**Time first fed**: 16.00

**If diarrohoea and/or vomiting, give ReSoMal orally for NG tube if too ill** every 30 minutes for first 2 hours and monitor.

**Amount**: 5 ml x child’s weight = ____ ml ReSoMal

**Antibiotics**
- Gentamycin
- Ampicillin

**Time of 1st Dose**: 10.30
**NAME**: Kofi  
**M**  
**DATE OF BIRTH**:  
**AGE**: 15 (months)  
**DATE OF ADMISSION**:  
**HOSP. ID**:  

### MONITORING RECORD

Monitor respiratory rate, pulse rate, and temperature **every 4 hours** until after transition to RUTF or F-100. Then monitoring can be less frequent (e.g., twice daily).

#### RESPIRATORY RATE

<table>
<thead>
<tr>
<th>Breaths/minute</th>
<th>DAY 1</th>
<th>DAY 2</th>
<th>DAY 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
</tbody>
</table>

#### PULSE RATE

<table>
<thead>
<tr>
<th>Beats/minute</th>
<th>DAY 1</th>
<th>DAY 2</th>
<th>DAY 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>94</td>
<td>95</td>
<td>115</td>
</tr>
</tbody>
</table>

#### TEMPERATURE

<table>
<thead>
<tr>
<th>Temperature</th>
<th>DAY 1</th>
<th>DAY 2</th>
<th>DAY 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>39.4</td>
<td>39.5</td>
<td>39.5</td>
<td>39.5</td>
</tr>
<tr>
<td>39.5</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>39.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>39.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>39.8</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>39.9</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>40.0</td>
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<td></td>
</tr>
<tr>
<td>40.1</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>40.2</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>40.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40.5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Danger Signs**: Watch for increasing pulse and respirations, fast or difficult breathing, sudden increase or decrease in temperature, rectal temperature below 35.5°C, and other changes in condition (see Monitoring Danger Signs during Inpatient Management of Severe Acute Malnutrition Job Aid).

**Normal pulse**:  
- 0 to 1 years: 100 to 160 beats/min  
- 1 to 3 years: 90 to 150 beats/min  
- 3 to 6 years: 80 to 140 beats/min

**Normal respiration rate**:  
- <2 months: <60 breaths/min  
- 2 to 11 months: <50 breaths/min  
- 1 to 5 years: <40 breaths/min
**NAME**: Kofi  
**M**  
**DATE OF BIRTH**: 28/2/17  
**AGE**: 15 (months)  
**DATE OF ADMISSION**: 04/06/18  
**HOSP. ID**: ______

**COMMENTS/OUTCOME**

**COMMENTS**

*IV fluids begun in the emergency room and continued until 16.00 on 4th June*

**COUNSELLING and TRAINING GIVEN TO PARENTS/CAREGIVERS**

**IMMUNISATIONS**

<table>
<thead>
<tr>
<th>Vaccination</th>
<th>At birth</th>
<th>First</th>
<th>Second</th>
<th>Third</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCG*</td>
<td>At birth</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>OPV</td>
<td>At birth</td>
<td>At 6 weeks</td>
<td>At 10 weeks</td>
<td>At 14 weeks</td>
</tr>
<tr>
<td>Penta**</td>
<td>—</td>
<td>At 6 weeks</td>
<td>At 10 weeks</td>
<td>At 14 weeks</td>
</tr>
<tr>
<td>PCV</td>
<td>—</td>
<td>At 6 weeks</td>
<td>At 10 weeks</td>
<td>At 14 weeks</td>
</tr>
<tr>
<td>Rotavirus</td>
<td>—</td>
<td>At 6 weeks</td>
<td>At 10 weeks</td>
<td>—</td>
</tr>
<tr>
<td>IPV</td>
<td>—</td>
<td>At 14 weeks</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Measles</td>
<td>—</td>
<td>At 9 months</td>
<td>At 15 months</td>
<td>—</td>
</tr>
</tbody>
</table>

**DISCHARGE OR FOLLOW UP INSTRUCTIONS**

**PATIENT OUTCOME (Rewrite this to reflect discharge to outpatient care)**

<table>
<thead>
<tr>
<th>Name of discharging officer</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>If TRANSFER to Outpatient Care, Name of facility:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OUTCOME (circle)</td>
<td>Date</td>
<td></td>
</tr>
<tr>
<td>Transferred</td>
<td>Weight: ________kg</td>
<td></td>
</tr>
<tr>
<td>(Transfer to outpatient care to continue treatment)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cured</td>
<td>Height: ________cm</td>
<td></td>
</tr>
<tr>
<td>(Discharge at full recovery)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Early Departed or Defaulted</td>
<td>MUAC: ________mm</td>
<td></td>
</tr>
<tr>
<td>(Absence against medical advice)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Referral</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-cured</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Death</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**4 June 2018**  
**Number of days after admission (circle):**  
< 24hrs  
1–3 days  
4–7 days  
> 7 days  
**Time of death:** 19.00  
**Day**  
**Night**  
**Did child receive IV fluids?** Yes  
No  
**Apparent cause(s) of death:**  
Unknown/severe malnutrition  

6. Monitoring and Problem Solving | Training Course on the Inpatient Management of Severe Acute Malnutrition
# Initial Management

**NAME:** Vijay  
**DATE OF BIRTH:** Unknown  
**AGE:** 24 (months)  
**DATE OF ADMISSION:** 05/10/2016  
**TIME:** 08.00  
**HOSP. ID:** 757

### Signs of SAM

- **Severe wasting?** Yes
- **Bilaterial/pitting oedema?** 0 +  + +
- **Dermatosis?** 0 +  + + (raw skin, fissures)
- **Weight (kg):** 8.1
- **Height / length (cm):** 78
- **Wt/H & z-score:** < -2
- **MUAC (mm):** 115

### Signs of Shock

- **Lethargic/unconscious?** No
- **Cold hands?** No
- **Slow capillary refill (>3 seconds)?** No
- **Weak or fast pulse?** No

**If lethargic or unconscious, cold hands, plus either slow capillary refill or weak or fast pulse, give oxygen. Give IV glucose as described under Blood glucose (mEq/L).**

**If the child is unconscious or convulsing, give sterile 10% glucose 5ml/kg IV.**

If heart rate decreases below 120 beats/minute or if the child is not awake, transfuse 10 ml/kg whole fresh blood (or 5-7 ml/kg packed cells) slowly over 3 hours. Amount: ___________ Time started: ___________ Time ended: ___________

**If Hb <40 g/l or PCV <12%, transfuse 10 ml/kg whole fresh blood (or 5-7 ml/kg packed cells) slowly over 3 hours. Amount: ___________ Time started: ___________ Time ended: ___________**

**If Hb <40 g/l or PCV <12%, transfuse 10 ml/kg whole fresh blood (or 5-7 ml/kg packed cells) slowly over 3 hours. Amount: ___________ Time started: ___________ Time ended: ___________**

### Blood Glucose (mEq/L)

If <3 mmol/L and alert, give 50 ml bolus of 10% glucose or sucrose orally or by NGT. If <3 mmol/L and lethargic, unconscious, or convulsing, give sterile 10% glucose 5ml/kg IV. Total amount = 5 ml x ___________ kg (child’s wt.) = ___________ ml. Then give 50 ml bolus NGT.

**Time glucose given:** Oral
**NET IV**

### Haemoglobin (Hb) (g/dl)

- **Packed cell vol (PCV):** ___________

**If Hb <40 g/l or PCV <12%, transfuse 10 ml/kg whole fresh blood (or 5-7 ml/kg packed cells) slowly over 3 hours. Amount: ___________ Time started: ___________ Time ended: ___________**

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### MEASLES

- **Yes**
- **No**

### Eye Signs

- **Pus/Inflammation?** None
- **Biot’s spots?** Yes
- **Corneal clouding?** Yes
- **Corneal ulceration?** Yes

### MEASLES

- **Yes**
- **No**

### Biot’s spots

- **Yes**
- **No**

### Corneal clouding

- **Yes**
- **No**

### Corneal ulceration

- **Yes**
- **No**

**If eye signs, give vitamin A & atropine immediately. Record below and on Daily Care page.

- **Oral doses:**
  - 0-6 months: 50,000 UI
  - 6-12 months: 100,000 UI
  - >12 months: 200,000 UI\n
### Antibiotics

<table>
<thead>
<tr>
<th>Antibiotics</th>
<th>Drug/Route</th>
<th>Dose/Frequency/Duration</th>
<th>Time of 1st Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cefixime</td>
<td>Oral</td>
<td>7 ml qid for 5 days</td>
<td>09.00</td>
</tr>
</tbody>
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### MEASLES

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- **No**

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<td>Rotavirus</td>
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<td>Measles</td>
<td>—</td>
<td>At 9 months</td>
<td>At 15 months</td>
<td>—</td>
</tr>
<tr>
<td>Measles</td>
<td>—</td>
<td>At 9 months</td>
<td>At 15 months</td>
<td>—</td>
</tr>
<tr>
<td>Measles</td>
<td>—</td>
<td>At 9 months</td>
<td>At 15 months</td>
<td>—</td>
</tr>
</tbody>
</table>

**OUTCOME (circle)**

- Transferred (Transfer to outpatient care to continue treatment)
- Cured (Discharge at full recovery)
- Early Departed or Defaulted (Absence against medical advice)
- Referral
- Non-cured
- Death

**PATIENT OUTCOME (Rewrite this to reflect discharge to outpatient care)**

- Name of discharging officer
- If TRANSFER to Outpatient Care, Name of facility:

<table>
<thead>
<tr>
<th>OUTCOME (circle)</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transferred</td>
<td></td>
</tr>
<tr>
<td>Cured</td>
<td></td>
</tr>
<tr>
<td>Early Departed</td>
<td></td>
</tr>
<tr>
<td>Referral</td>
<td></td>
</tr>
<tr>
<td>Non-cured</td>
<td></td>
</tr>
<tr>
<td>Death</td>
<td>6 Oct 2016</td>
</tr>
</tbody>
</table>

**Discharge or follow up instructions**

- Number of days after admission (circle):
  - < 24 hrs
  - 1–3 days
  - 4–7 days
  - > 7 days

- Time of death: 09.00
- Did child receive IV fluids? Yes No
- Apparent cause(s) of death:
  - Potassium was low, oedema ++, albumin low
**INITIAL MANAGEMENT**

**NAME** Luca  **M**  **F**  **DATE OF BIRTH** 28/08/16  **AGE** 18 (months)  **DATE OF ADMISSION** 25/02/2018  **TIME** 09:00  **HOSP. ID** 106

**SIGNS OF SAM**
- Severe wasting? **Yes**  **No**
- Bilateral pitting oedema? 0 0 + ++
- Dermaesthesia? 0 0 + ++(raw skin, fissures)
- Weight (kg): 6.8
- Height/length (cm): 74
- W/H/L z-score: -3
- MUAC (mm): 110

**TEMPERATURE** 35.2°C  **rectal**  **axillary**

**BLOOD GLUCOSE** (mmol/l): 6.8

**HAEMOGLOBIN** (Hb) (g/l): 90

**SIGNS OF SHOCK**
- Lethargic/unconscious
- Cold hands
- Slow capillary refill (>3 seconds)
- Weak or fast pulse

**IF LETHARGIC OR UNCONSCIOUS, SLOW HANDS, PLUS EITHER SLOW CAPILLARY REFILL OR WEAK OR FAST PULSE**

- Give oxygen. Give IV glucose as described under Blood Glucose (left).
- Then give IV fluids. Amounts IV fluids per hour: 15 ml (child's wt) = ml

**IF NO IMPROVEMENT AFTER 1 HOUR**

- If improvements after 1 hour (respiratory and pulse rates are slowed), repeat same amount IV fluids for second hour and alternate ReSoMAL and F75 for up to 10 hours. If no improvement after 1 hour, treat for septic shock (temperature whole fresh blood, see Haemoglobin), give maintenance IV fluids (4 ml/kg/hour) while waiting for blood.

**FEEDING**

- Begin feeding with F-75 as soon as possible. (If child is rehydrated, weigh before determining amount to feed.
- **New weight:** 6.9 (kg)
- Amount for 2-hourly feedings: 75 ml F-75
- Time first fed: 12.30

**EYE SIGNS**
- None
- Left
- Right

**SIGNS OF DEHYDRATION**
- Watery diarrhoea? **Yes**  **No**
- Blood in stool? **Yes**  **No**
- If diarrhoea, circle signs present:
  - *Lethargic/irritable*
  - *Thirsty*
- Vomiting? **Yes**  **No**

**MEASLES**
- Yes
- No

**SIGNS OF DEHYDRATION**

<table>
<thead>
<tr>
<th>Time</th>
<th>09:30</th>
<th>10:00</th>
<th>10:30</th>
<th>11:00</th>
<th>11:30</th>
<th>12:00</th>
<th>12:30</th>
<th>13:30</th>
<th>14:30</th>
<th>15:30</th>
<th>16:30</th>
<th>17:30</th>
<th>18:30</th>
<th>19:30</th>
<th>20:30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory rate (breaths/minute)</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
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<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>30</td>
</tr>
<tr>
<td>Pulse rate (beats/minute)</td>
<td>95</td>
<td>95</td>
<td>95</td>
<td>95</td>
<td>95</td>
<td>95</td>
<td>95</td>
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<td>95</td>
<td>95</td>
<td>95</td>
<td>95</td>
<td>90</td>
</tr>
<tr>
<td>Passed urine (yes/no)</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
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<td>Y</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Number of stools</td>
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<td>0</td>
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<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Number of vomits</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
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<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

**Initial dose of F75**

- Amount taken (ml): 34

**Antibiotics**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Route</th>
<th>Dose/Frequency/Duration</th>
<th>Time of 1st Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amebocillin</td>
<td>Oral</td>
<td>7 ml syrup every 12 hours for 5 days</td>
<td>09:30</td>
</tr>
</tbody>
</table>
NAME: Luca

DATE OF BIRTH: 25/2
AGE: 26/2 (months)
DATE OF ADMISSION: 27/2
HOSP. ID: 

DAILY CARE

DAYS IN HOSPITAL

<table>
<thead>
<tr>
<th>Week 1</th>
<th>Week 2</th>
<th>Week 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Date</td>
<td>Date</td>
</tr>
<tr>
<td>15/2</td>
<td>16/2</td>
<td>17/2</td>
</tr>
<tr>
<td>Daily weight (kg)</td>
<td>Daily weight (kg)</td>
<td>Daily weight (kg)</td>
</tr>
<tr>
<td>8.3</td>
<td>8.5</td>
<td>8.6</td>
</tr>
</tbody>
</table>

Weight gain (g/kg) Calculate when on RUTF/F-100

Bilateral pitting oedema

<table>
<thead>
<tr>
<th>0 + + + +</th>
<th>0 + + + +</th>
<th>0 + + + +</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
</tbody>
</table>

Diarrhoea (indicate number of loose stools)

<table>
<thead>
<tr>
<th>V</th>
<th>V</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Vomiting (indicate the frequency)

<table>
<thead>
<tr>
<th>DR</th>
<th>DR</th>
<th>DR</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

RESOMAL.................mls

FEED PLAN:

Type of feed

<table>
<thead>
<tr>
<th>F-75</th>
<th>F-75</th>
<th>F-75</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>

Amount to give per feed (ml/packet)

<table>
<thead>
<tr>
<th>730</th>
<th>750</th>
</tr>
</thead>
</table>

Total amount taken (ml/packet)

<table>
<thead>
<tr>
<th>730</th>
<th>750</th>
</tr>
</thead>
</table>

NG tube Yes/No

Breastfeeding Yes/No

ANTIBIOTICS AND OTHER DRUGS

List prescribed antibiotics and other drugs in left column. Allow one row for each daily dose. Draw a box around days/times that each drug should be given. Sign your initials when given.

Folic acid (if there is clinical anaemia)

<table>
<thead>
<tr>
<th>0.00</th>
<th>1.00</th>
</tr>
</thead>
</table>

Vitamin A

Give at the end of rehabilitation routinely unless evidence of dose in past month and no eye sign. Give Day 1, Day 2 and end of rehabilitation if child admitted with eye sign or recent measles.

Multivitamin (if not in feed)

Drug for worms

Type of worm

IRON 2X daily

Begin iron after 2 days on F-100

Do not give iron if child is on RUTF.

EYE PROBLEMS

Erythromycin ointment 3x daily or Chloramphenicol 1 drop 4x daily

NONE

Left: Right

Atropine 1 drop 3 x daily

Dermatosis 0 + + + +

Bathing, 0.01% potassium permanganate or zinc oxide

Other

6. MONITORING AND PROBLEM SOLVING | TRAINING COURSE ON THE INPATIENT MANAGEMENT OF SEVERE ACUTE MALNUTRITION
**IMMUNISATIONS**

<table>
<thead>
<tr>
<th>Vaccination</th>
<th>At birth</th>
<th>First</th>
<th>Second</th>
<th>Third</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCG*</td>
<td>At birth</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>OPV</td>
<td>At birth</td>
<td>At 6 weeks</td>
<td>At 10 weeks</td>
<td>At 14 weeks</td>
</tr>
<tr>
<td>Penta**</td>
<td>—</td>
<td>At 6 weeks</td>
<td>At 10 weeks</td>
<td>At 14 weeks</td>
</tr>
<tr>
<td>PCV</td>
<td>—</td>
<td>At 6 weeks</td>
<td>At 10 weeks</td>
<td>At 14 weeks</td>
</tr>
<tr>
<td>Rotavirus</td>
<td>—</td>
<td>At 6 weeks</td>
<td>At 10 weeks</td>
<td>—</td>
</tr>
<tr>
<td>IPV</td>
<td>—</td>
<td>—</td>
<td>At 15 months</td>
<td>—</td>
</tr>
<tr>
<td>Measles</td>
<td>—</td>
<td>At 9 months</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

**COMMENTS/OUTCOME**

**COMMENTS**

**DISCHARGE OR FOLLOW UP INSTRUCTIONS**

**COUNSELLING and TRAINING GIVEN TO PARENTS/CAREGIVERS**

**IMMUNISATIONS**

**PATIENT OUTCOME (Rewrite this to reflect discharge to outpatient care)**

<table>
<thead>
<tr>
<th>Name of discharging officer</th>
</tr>
</thead>
</table>

**If TRANSFER to Outpatient Care, Name of facility:**

<table>
<thead>
<tr>
<th>OUTCOME (circle)</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transferred</td>
<td></td>
</tr>
<tr>
<td>(Transfer to outpatient care to continue treatment)</td>
<td></td>
</tr>
<tr>
<td>Cured</td>
<td></td>
</tr>
<tr>
<td>(Discharge at full recovery)</td>
<td></td>
</tr>
<tr>
<td>Early Departed or Defaulted</td>
<td></td>
</tr>
<tr>
<td>(Absence against medical advice)</td>
<td></td>
</tr>
<tr>
<td>Referral</td>
<td></td>
</tr>
<tr>
<td>Non-cured</td>
<td></td>
</tr>
</tbody>
</table>

**Number of days after admission (circle):**

- < 24hrs
- 1-3 days
- 4-7 days
- > 7 days

**Time of death:**

- 04:00
- Day
- Night

**Did child receive IV fluids?**

- Yes
- No

**Apparent cause(s) of death:**

- Milk curds coming out of the mouth, possibly choked on vomit.

**Weight:** ________ kg

**Height:** ________ cm

**MUAC:** ________ mm
4.4 Calculate a case-fatality rate for the ward

In a big ward (for example, with 100 admissions per month), calculate the case-fatality rate once each month if possible. Also calculate the case-fatality rate monthly in any ward where the current rate is poor or unacceptable. This will allow improvements to be seen rapidly.

In a small ward (for example, 10 cases per month), or in a ward where the case-fatality rate is moderate or better, the case-fatality rate may be calculated less often (for example, every 3 months).

To calculate the case-fatality rate:
1. Determine the number of patients admitted to the severe acute malnutrition ward in the past month(s).
2. Determine the number of those patients who died. (Wait to count deaths until the outcomes for the patients are known. For example, wait until mid-November to count deaths among patients admitted in October.)
3. Divide the number of deaths by the number of patients and express the result as a percentage.

For the purposes of this training course, a case-fatality rate of:
- > 20% is unacceptable
- 11–20% is poor
- 5–10% is moderate
- < 5% is acceptable

Carefully review the circumstances of deaths and identify and solve related problems in order to reduce the case-fatality rate.

The objective of a severe acute malnutrition ward should be to achieve a case-fatality rate of less than 5%.
Calculate the case-fatality rates for the severe acute malnutrition wards described below. State whether the rate is unacceptable, poor, moderate, or acceptable.

1. The severe acute malnutrition ward at Central Hospital is small. Over the past 3 months, there have been 32 admissions. Five of these children died.
   
The death rate is ______________________

2. City Hospital had 98 admissions with severe acute malnutrition in October. Three of these children died.
   
The death rate is ______________________

3. a. Mercy Hospital had 28 admissions to the severe acute malnutrition ward in June and July. Two of these children died.
   b. In the next 2 months, August and September, Mercy Hospital had 36 admissions to the severe acute malnutrition ward. Four of these children died.
   c. How does the rate for August and September compare with the previous two months? Is there a problem?

Check your own answers to this exercise by comparing them to the answers given on page 50 at the end of the module.
5. AS NEEDED, MONITOR PRACTICES AND PROCEDURES

Periodically, or to investigate causes of problems, you may need to monitor:
• case management practices
• food preparation
• ward procedures
• hygiene.

Suggestions for monitoring are provided in this section. Monitoring checklists for use during ward visits are provided in Web Annex B. Any “No” answer to a question on the checklist indicates a problem that needs to be corrected.

5.1 Monitor case management practices

Deaths during initial case management are often the result of well intentioned but incorrect practice. Monitor to ensure that all clinicians are following the recommended case management practices, particularly during initial treatment. Ensure that emergency room personnel are also following appropriate practices for severely malnourished children. Two wall charts are provided in the participants support materials in order to help staff from the malnutrition ward and from the emergency room to follow appropriate practices. No checklist is given for monitoring case management, as it would be too lengthy. However, some examples of common incorrect practices to look for are described below.
### Common incorrect practices in initial treatment that may cause death

<table>
<thead>
<tr>
<th>Incorrect Practice</th>
<th>Correct Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child not fed at night</td>
<td>During initial management, ensure that the child is fed every 2 hours at night. Feeding is never less frequent than every 4 hours</td>
</tr>
<tr>
<td>IV fluids given even though child is not in shock</td>
<td>Give IV only if there are signs of shock (cold hand plus slow capillary refill or weak/fast pulse)</td>
</tr>
<tr>
<td>IV albumin/amino acids given</td>
<td>Do not give albumin/amino acids</td>
</tr>
<tr>
<td>Diuretics given to treat oedema</td>
<td>Do not give diuretics. Oedema will resolve with correct initial treatment using F-75 with correct minerals and vitamins</td>
</tr>
<tr>
<td>High protein diet given immediately</td>
<td>Give F-75 until the child stabilizes then start RUTF or F-100</td>
</tr>
<tr>
<td>Antibiotics not given because no clinical signs of infection</td>
<td>Presume infection and give antibiotics to all children with severe acute malnutrition even in the absence of clinical signs of infection or medical complications</td>
</tr>
<tr>
<td>Standard oral rehydration solution (ORS) used instead of rehydration solution for malnutrition (ReSoMal)</td>
<td>Give ReSoMal to severely malnourished children with watery diarrhoea (except profuse watery diarrhoea)</td>
</tr>
<tr>
<td>Child left uncovered at night</td>
<td>Provide blanket and ensure that the child is covered and warm at night</td>
</tr>
<tr>
<td>Anaemia treated with iron from admission</td>
<td>Wait to start iron until the child has been on F-100 for 2 days. If child is on RUTF, do not give additional iron because RUTF contains iron</td>
</tr>
</tbody>
</table>

### 5.2 Monitor food preparation

Problems such as poor weight gain on the ward may be due to problems with food preparation. Periodically, or whenever you suspect that there is a problem, carefully observe preparation of feeds. Monitor the following:

- Are ingredients for the recipes available?
- Is the correct recipe used for the ingredients that are available?
- Are ingredients stored appropriately and discarded at appropriate times?
• Are containers and utensils kept clean?
• Do kitchen staff (or those preparing feeds) wash their hands with soap before preparing food?
• Are the recipes for F-75 and F-100 followed exactly? (If changes are made due to lack of ingredients, are these changes appropriate?)
• Are measurements made exactly with proper measuring utensils (e.g., correct scoops)?
• Are ingredients thoroughly mixed (and cooked, if necessary)?
• Is the appropriate amount of oil mixed in (i.e., not left stuck in the measuring container)?
• Is mineral mix added correctly?
• Is correct amount of water added to make up a litre of formula? (Staff should not add a litre of water, but just enough to make a litre of formula.)
• Is food served at an appropriate temperature?
• Is the food consistently mixed when served (i.e., oil is mixed in, not separated)?
• Are correct amounts put in the dish for each child?
• Is leftover prepared food discarded promptly?

5.3 Monitor ward procedures

Problems such as inadequate weight gain on the ward, early departures, or even deaths may be due to inadequate ward procedures. Whenever you suspect that there is a problem related to ward procedures, observe staff as they do those procedures, or review relevant records. Procedures to monitor include the following.
Feeding

• Are correct feeds served in correct amounts?
• Are feeds given at the prescribed times, even on nights and weekends?
• Are children held and encouraged to eat (never left alone to feed)?
• Are children fed with a cup (never a bottle)?
• Is food intake (and any vomiting or diarrhoea) recorded correctly after each feed?
• Are leftovers recorded accurately?
• Are amounts of F-75 kept the same throughout the initial phase, even if weight is lost?
• After transition, are amounts of RUTF or F-100 given freely and increased as the child gains weight?

Warming

• Is the room kept between 28°C to 32°C (to the extent possible)?
• Are blankets provided and children kept covered at night?
• Are safe measures used for rewarming children?
• Are temperatures taken and recorded correctly?

Weighing

• Are scales functioning correctly? Are they standardized weekly? (Check scales as described in Module 5 on daily care.)
• Are children weighed at about the same time each day, 1 hour before a feed (to the extent possible)?
• Do staff adjust the scale to zero before weighing children?
• Are children consistently weighed without clothes?
• Do staff correctly read weight to the nearest division of the scale?
• Do staff immediately record weights on the child’s CCP?
• Are weights correctly plotted on the weight chart?

Giving antibiotics and other medications and supplements

• Are antibiotics given as prescribed (correct dose at correct time)?
• When antibiotics are given, do staff immediately make a notation on the CCP?
• Is vitamin A given according to schedule?
• After children are on F-100 for 2 days, is the correct dose of iron given daily and recorded on the CCP?
Ward environment

- Are surroundings welcoming and cheerful?
- Are mothers offered a place to sit and sleep?
- Are mothers taught and encouraged to be involved in care?
- Are staff consistently courteous?
- As children recover, are they stimulated and encouraged to move and play?

5.4 Monitor hygiene

Good hygiene is extremely important because children with severe acute malnutrition are highly susceptible to infection. Whenever you suspect that a problem may be related to hygiene, or periodically, visually inspect hygiene in the ward. Monitor such items as the following.

Handwashing

- Are there working handwashing facilities in the ward?
- Do staff consistently wash hands thoroughly with soap?
- Are their nails clean?
- Do they wash hands before handling food?
- Do they wash hands between each patient?

Mothers’ cleanliness

- Do mothers have a place to bathe, and do they use it?
- Do mothers wash hands with soap after using the toilet or changing diapers?
- Do mothers wash hands before feeding children?

Bedding and laundry

- Is bedding changed every day or when soiled or wet?
- Are diapers, soiled towels and rags, etc., stored in a bag, then washed or disposed of properly?
- Is there a place for mothers to do laundry?
- Is laundry done in hot water?
**General maintenance**

- Are floors swept?
- Is waste disposed of properly?
- Is the ward kept as free as possible of insects and rodents?

**Food storage**

- Are ingredients and food kept covered and stored at the proper temperature?
- Are leftovers discarded?

**Dishwashing**

- Are dishes washed after each meal?
- Are they washed in hot water with soap?

**Toys**

- Are toys washable?
- Are toys washed regularly, and after each child uses them?

### 5.5 Who should monitor?

Monitoring can be done by trained health care providers from the hospital or trained nutrition officers from the ministry of health supported, if needed, by trained public health nutrition officers from other institutions (e.g. the World Health Organization, the United Nations Children’s Fund, or nongovernmental organizations).

### 5.6 How often to monitor?

Usually 3 days are needed to monitor practices and procedures in a malnutrition ward, including the on-site problem-solving sessions (section 6). The frequency of visits for monitoring purposes needs to be discussed at other levels of the system.
6. SOLVE PROBLEMS

There are some problems that require individual solutions and should be handled privately. For example, if you find that a particular staff member is doing a procedure incorrectly or dangerously, correct that person privately.

On the other hand, some problems may be solved by working with staff members as a group to discuss the causes and possible solutions. Some examples of problems that could be reviewed as a group might include:

- a diarrhoea outbreak in the ward
- an increasing case-fatality rate
- procedural problems involving all or many of the staff.

Staff may have useful information to contribute on the causes of problems and creative ideas for solutions. They are also more likely to work together towards a solution if they are involved in decision-making that affects them.

Process for problem solving in a group

When conducting a problem-solving session with a group, use the following process as a guide.

1. Welcome everyone to the meeting and explain the purpose. Be careful not to sound like you are threatening or blaming anyone. Stress that you need their ideas to understand the causes of the problem and how to solve it.

2. State the facts of the problem as clearly and completely as possible. Include when, where, and with whom the problem is occurring.

3. Discuss causes of the problem that you have discovered through monitoring. Ask the staff if they know of other causes. Ask questions to try to find the “root” causes of the problem. Causes may include:
   - obstacles (such as lack of time, insufficient staff, or lack of equipment)
   - lack of motivation (for some reason, staff are not motivated to do a task correctly)
   - lack of skill or information (staff do not know what to do or how to do it).

The group must avoid blaming particular staff or having the discussion degenerate into a complaint session. It may be helpful to write down causes identified on a flipchart or large paper.

4. Ask the staff to help you think of solutions appropriate for the causes. Different causes require different solutions. For example, if there is a problem due to lack of supplies, a solution is to obtain more supplies. If a task is done poorly because staff members do not enjoy it, a solution may be to rotate that task.
so that everyone takes a turn, but no one has to do it too often. If staff forget how to do a certain task, the solution may be to make a job aid and post it on the wall.

Ask staff to think of solutions that they believe will work. Discuss the steps needed to implement the solutions, i.e., who will do what after the meeting.

5. Thank the staff for their ideas. Review what was decided in the meeting.

After the meeting it is important to implement the solutions as quickly as possible. Be sure to give feedback to staff on how the solutions are working. They will want to know if the problem is decreasing or is solved.

Tell a facilitator when you have reached this point in the module.
This exercise will be a role play of a problem-solving session in a severe acute malnutrition ward. Your facilitator will assign you a role such as one of the following:

- physician in charge
- senior nurse on duty in the morning (matron)
- senior nurse on duty in the afternoon
- night nurse
- junior auxiliary nurse
- hospital administrator.

You will be given a card describing your knowledge and attitude about the situation being discussed.

One participant (the “physician in charge”) will lead the discussion using the process described in the module. Another will assist by recording on the flipchart. Others will participate in the discussion according to their assigned roles.

The objective is to describe the problem clearly, discuss possible causes and identify the most likely causes, and identify possible solutions.
Answers to short answer exercises

Answers, page 3

1. b
2. b
3. a
4. b

Answers, page 8

1. 7.30 kg − 7.25 kg = 0.05 kg
   0.05 kg × 1000 = 50 grams gained
   50 grams ÷ 7.25 = 6.90 g/kg/day

2. 6.25 kg − 6.22 kg = 0.03 kg
   0.03 kg × 1000 = 30 grams gained
   30 grams ÷ 6.22 = 4.8 g/kg/day

3. 7.5 kg − 7.6 kg = −0.1 kg
   −0.1 kg × 1000 = −100 grams gained (or 100 grams lost)
   −100 grams ÷ 7.6 = −13.16 g/kg/day

Answers, page 40

1. 5/32 = 0.156 = 15.6% poor
2. 3/98 = 0.031 = 3.1% acceptable
3. a. 2/28 = 0.071 = 7.1% moderate
   b. 4/36 = 0.111 = 11.1% poor
   c. The case-fatality rate is worse. It has gone from moderate to poor. This is a problem.
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