Course 3: Management of malnutrition

- 🕐 :4 hrs 30 min
- 📖: National Guidelines for integrated management of acute malnutrition
- 🗒: Power point handouts
- 🛠 Case studies: Management of malnutrition: OTP and in patient care
- 📝: Reductive adaptation notes

MANAGEMENT OF MALNUTRITION

- Content overview
  - definitions
  - patho - physiology of malnutrition
  - causes of malnutrition
  - categories of malnutrition
  - diagnosis of acute malnutrition
  - nutrition education and counseling
  - nutrient – based interventions

Objective

- To equip health service providers with knowledge and skills through:
  - enhancing understanding on best practices
  - prevention of malnutrition by early identification
  - Effective management of malnutrition in order to improve treatment outcomes including morbidity and mortality

Course 3a : Introduction to Management of acute malnutrition

Definitions

- **Malnutrition** is defined as any nutritional disorder. It may result from an unbalanced, insufficient, or excessive diet or from impaired absorption, assimilation, or use of foods
- **Over-nutrition** – a condition of excess nutrient and energy intake over time. Over nutrition may be regarded as a form of malnutrition when it leads to morbid obesity.
- **Obesity** – an abnormal increase in the proportion of fat cells, mainly in the visceral and subcutaneous tissues of the body.
- **Under-nutrition** – malnutrition caused by an inadequate food supply or an inability to use the nutrients in food.

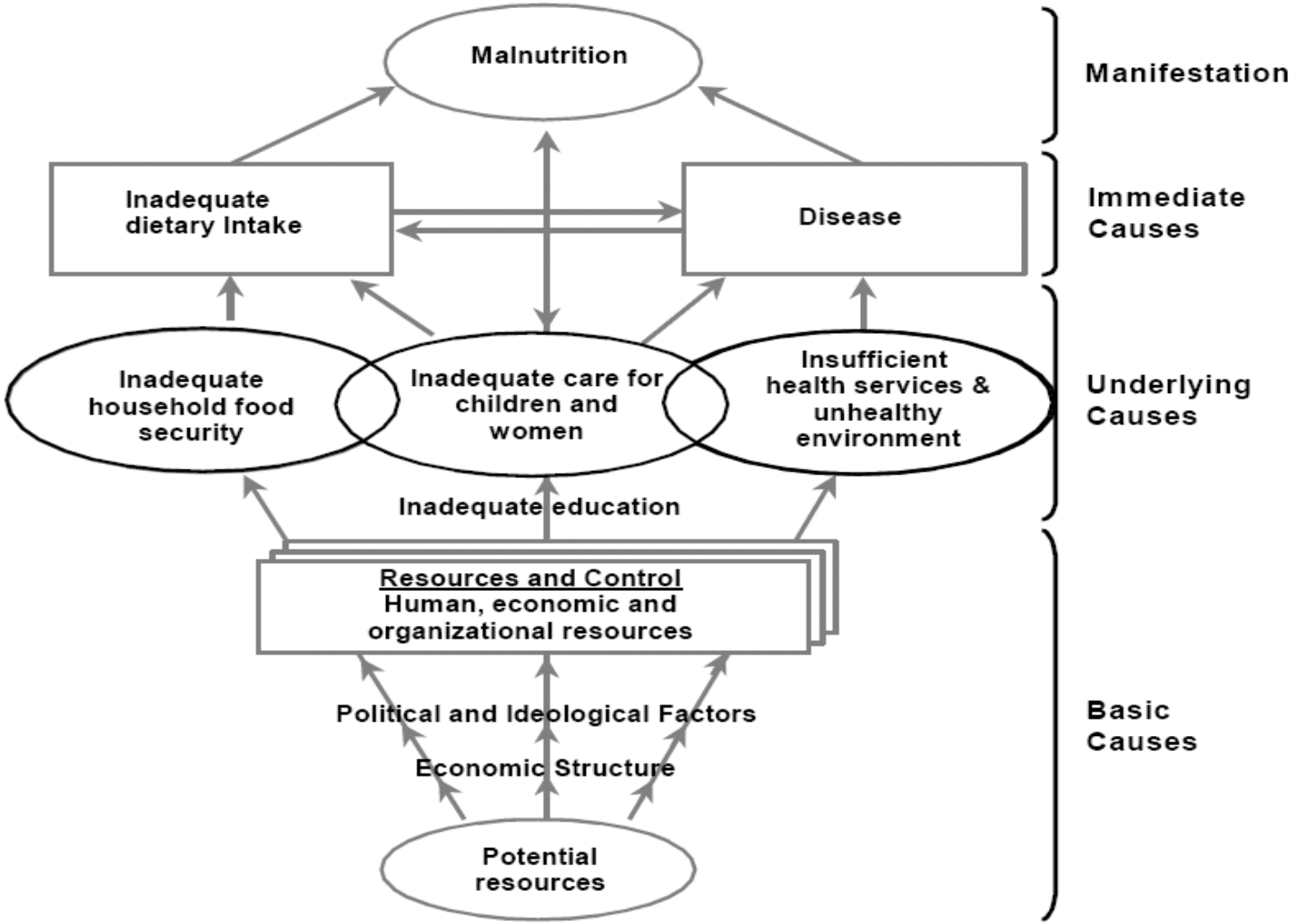
Continued…

- **Oedema** – the abnormal accumulation of fluid in the interstitial spaces of tissues such as the pericardial sac, intra-pleural sac, peritoneal cavity, or joint capsules.
- **Food security** refers to physical and economic access to food of sufficient quality and quantity
- **Nutrition security** refers to secure access to food coupled with sanitary environment, adequate health services, and knowledgeable care to ensure healthy life.
- **Z score** – a normalized value created from a member of a set of data by expressing it in terms of standard deviations from the median.

Causes of malnutrition

- **Food:** Inadequate household food security (limited access or availability of food)
- **Nutrition:** Inadequate access to food coupled with unsanitary environment, inadequate health services, and lack of knowledgeable care to ensure healthy life.
- **Health:** Limited access to adequate health services and/or inadequate environmental health conditions.
- **Care:** Inadequate social and care environment in the household and local community, especially in regard to women and children.

Conceptual framework of malnutrition (UNICEF 1991)



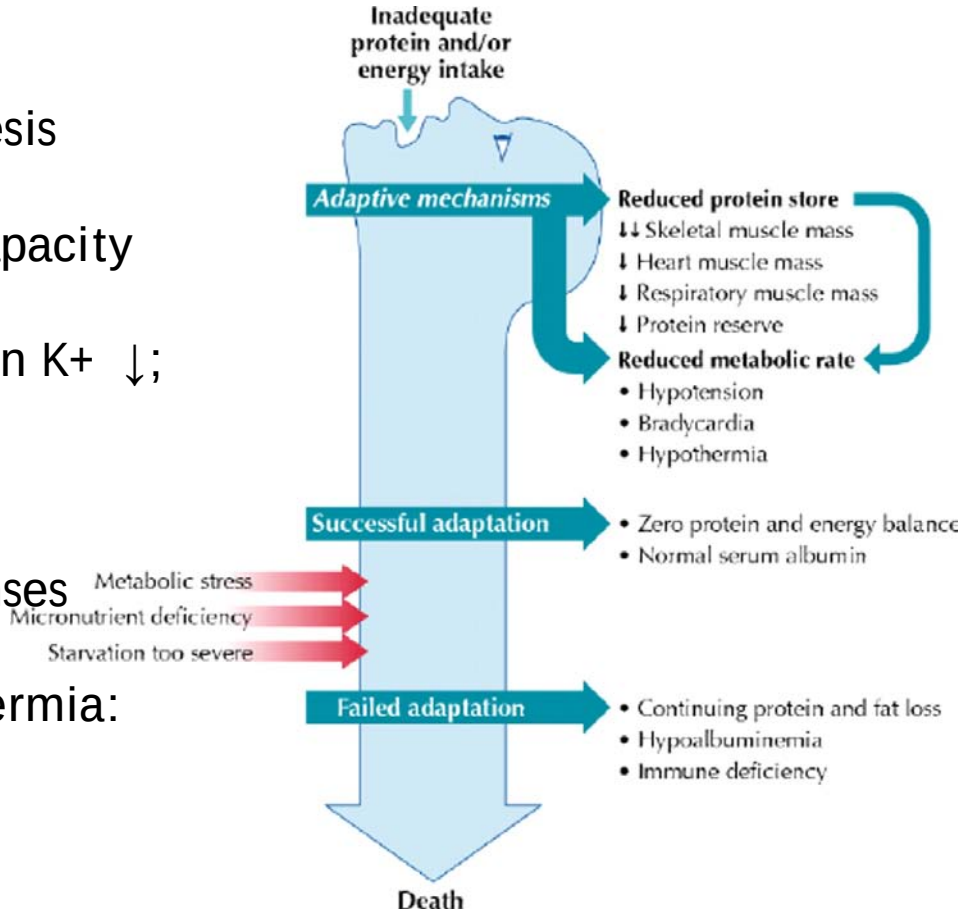
Pathophysiology of Undernutrition

Reductive adaptation

Reductive adaptation is defined as the physiological response of the body to under nutrition i.e. Systems slow down and do less in severe acute under nutrition in order to allow survival on limited nutrient resources especially calories.

Pathophysiology of undernutrition

- reduced cellular metabolism
- reduction of protein/enzymes synthesis
- reduced cardiac output
- reduced kidney function - Limited capacity of excretion,
- Electrolyte imbalance - Concentration K+ ↓; Na+ ↑
- Iron - anaemia
- low transferrin
- Immune system-Inflammatory responses absent or severely weakened
- Thermoregulation altered; poikilothermia: hypothermia/pyrexia



INTRODUCTION TO PATHO-PHYSIOLOGY OF MALNUTRITION

PHYSIOLOGICAL BASIS FOR TREATMENT OF MALNUTRITION

Cardiovascular system (1)

- Cardiac output and stroke volume are
- reduced
- Infusion of saline may cause an
- increase in venous pressure
- Any increase in blood volume can easily produce acute heart failure;
- Any decrease will further compromise tissue perfusion

Cardiovascular system (2):

- Blood pressure is low
- Renal perfusion and circulation time

are reduced

- Plasma volume is usually normal and
- red cell volume is reduced

LIVER (1)

- Synthesis of all proteins is reduced
- Abnormal metabolites of amino acids are produced c
- Capacity of liver to take up, metabolize and excrete toxins is severely reduced
- Energy production from substrates such as galactose and fructose is much slower than normal

LIVER (2)

- Gluconeogenesis is reduced, which increases the risk of hypoglycaemia during infection
- Bile secretion is reduced

GENITOURINARY SYSTEM (1)

- Glomerular filtration is reduced
- Capacity of kidney to excrete excess acid or a water load is greatly reduced
- Urinary phosphate output is low
- Sodium excretion is reduced
- Urinary tract infection is common.

GASTROINTESTINAL SYSTEM (2)

- Production of gastric acid is reduced
- Intestinal motility is reduced
- Pancreas is atrophied and production of digestive enzymes is reduced
- Small intestinal mucosa is atrophied; secretion of digestive enzymes is reduced
- Absorption of nutrients is reduced

IMMUNE SYSTEM (1)

- All aspects of immunity are diminished
- Lymph glands, tonsils and the thymus are atrophied

  Cell-mediated (T-cell) immunity is severely depressed
- IgA levels in secretions are reduced
- Complement components are low
- Phagocytes do not kill ingested bacteria efficiently

IMMUNE SYSTEM (2)

- Tissue damage does not result in inflammation or migration of white

  cells to the affected area
- Acute phase immune response is diminished
- Typical signs of infection, such as an increased white cell count and fever,

  are frequently absent
- Hypoglycaemia and hypothermia are both signs of severe infection and are

  usually associated with septic shock

ENDOCRINE SYSTEM

- Insulin levels are reduced and the child has glucose intolerance
- Insulin growth factor 1 (IGF-1) levels

  are reduced
- Growth hormone levels are increased
- Cortisol levels are usually increased

CIRCULATORY SYSTEM

- Basic metabolic rate is reduced by about 30%.
- Energy expenditure due to activity is very low
- Both heat generation and heat loss are impaired; the child becomes hypothermic in a cold environment and hyperthermic in a hot environment

CELLULAR FUNCTION

- Sodium pump activity is reduced and cell membranes are more permeable than normal,
- which leads to an increase in intracellular sodium and a decrease in intracellular potassium and magnesium
- Protein synthesis is reduced

SKIN,MUSCLES AND GLANDS

- THE skin and subcutaneous fat are and glands atrophied, which leads to loose folds
- Many signs of dehydration are unreliable; eyes may be sunken because of loss of subcutaneous fat in the orbit
- Many glands, including the sweat, tear and salivary glands, are atrophied; the child has dryness of the mouth and eyes and sweat production is reduced
- Respiratory muscles are easily fatigued; the child is lacking in energy

Categories of Under nutrition

- Acute and Chronic under nutrition.
- Children can have a combination of both acute and chronic under nutrition.
- Acute under nutrition is categorized into Moderate and Severe acute under nutrition, determined by the clients degree of wasting (*is an indicator of acute undernutrition, the result of more recent food deprivation or illness*).
- All cases of bi-lateral oedema are categorized as severe acute under nutrition.

Categories of under nutrition continued…

- Chronic under nutrition is determined by a patient's degree of stunting (the result of prolonged food deprivation and/or disease or illness), i.e. when a child has not reached his or her expected height for a given age.
- To treat a patient with chronic under nutrition requires a long-term focus that considers household food insecurity in the long run; home care practices (feeding and hygiene practices); and issues related to public health.

Assessment

- **A**nthropometry
- **B**iochemical
- **C**linical
- **D**ietary
- **E**conomic (social-economic status)

Indicator	Severe acute under nutrition	Moderate acute under nutrition	Mild acute under nutrition
Children 6 months to 59 months			
Weight for height / Length Z scores	< - 3 Z score	Between – 3 to < -2 Z score	Between -2 to < -1 Z score
Weight for height / Length % of median	< 70% W/H	Between 70 – 80 % W/H	Between 80 – 90%
MUAC	< 11 cm (under 5s)	11 –13 cm (under 5 s)	
Bilateral pitting Oedema	Oedema (+) present	Oedema absent	Oedema absent
Children 5 – 9 years			
BMI for age Z scores	< - 3 Z score	Between – 3 to < -2 Z score	Between -2 to < -1 Z score
MUAC	< 13.5 cm	Between 13.5 – 14.5 cm	
Bilateral pitting Oedema	Oedema (+) present	Oedema absent	Oedema absent
Adolescents 10 – 17 years			
BMI for Age Z score	< - 3 Z score	Between -3 and -2 Z score	Between -2 to < -1 Z score
MUAC	<16 cm	Between 16 – 18.5cm	
Bilateral pitting Oedema	Oedema (+) present	Oedema absent	Oedema absent
Adults 18 years and above			
BMI	< 16 cm	Between 16 – 17 kg/m²	Between 17 – 18.5 kg/m²
MUAC	- <16 cm - 16-18.5cm plus one of the following: 1. Inability to stand 2. Apparent dehydration	16 - 18.5cm with no relevant clinical signs. Few relevant social criteria	
Oedema	Oedema (+) present	Oedema absent	
Pregnant or postpartum women			
MUAC	< 22 cm	Between 22 - 23 cm	Between 23 – 24 cm
Oedema	Oedema (+) present	Oedema absent	

Course 3b: Severe malnutrition 1–

recognition and early treatment

Objectives

- Learn to recognise severe malnutrition
- Learn to manage ALL the problems present in these children
- Understand new approaches to feeding and recognise it as the primary treatment.

Definitions of Severe PEM (1)

WHO Classification:

	+ Oedema	No oedema
(WHZ <-3)	Severe wasting + oedema*	Severe wasting

*** If there is severe oedema the weight may appear reasonable initially.**

Definitions of Severe PEM (2)

WHO Classification:

	+ Oedema	No oedema
WHZ <-3	Severe wasting + oedema*	Severe wasting

Two simple signs are useful for classification

Clinical Diagnosis / Definition

- Presence of visible severe wasting
  - Buttocks, thighs, shoulders
- Presence of symmetrical oedema with supporting evidence for kwashiorkor:
  - Skin changes
  - Hair changes
- Weight for age (Road to Health Card Chart)
- Should be the minimum form of assessment

Clinical Diagnosis

Source: KEMRI /Wellcome Trust

But you have to look…..it is often missed

Why is detecting malnutrition important?

- In many hospitals the commonest reason for death of a child in hospital is PEM
- Case fatality of severe malnutrition in hospital in Africa is 30-40% (3 or 4 out of 10 die in hospital)
- If it is not recognised it is not treated properly and deaths are not prevented.

Kwashiorkor – where logic fails

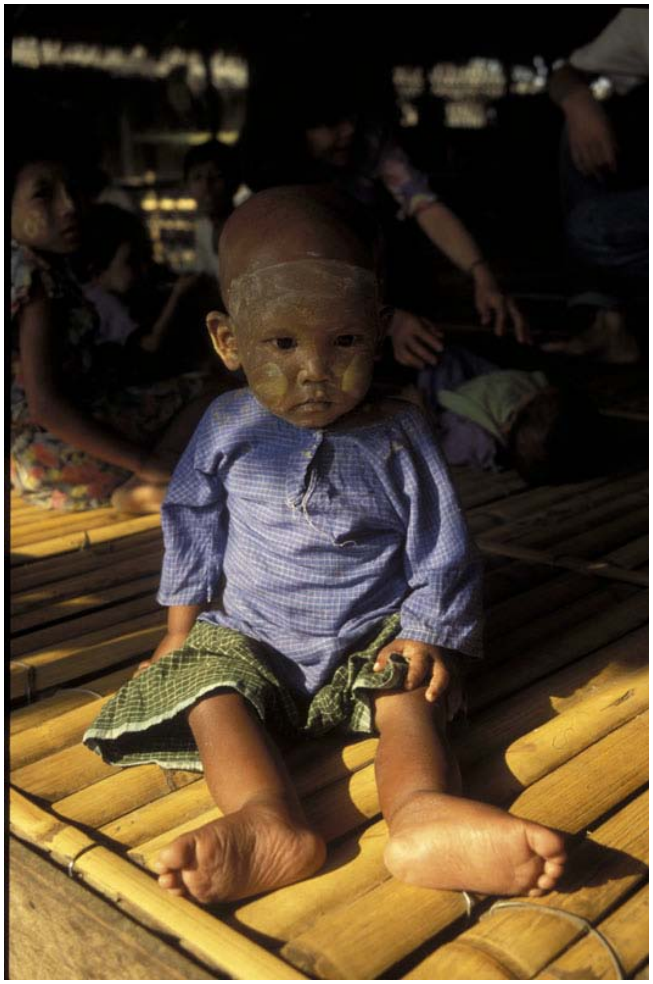
Source: KEMRI /Wellcome Trust

Protein deficiency

↓

Treatment with a high protein diet

Kwashiorkor – where logic fails



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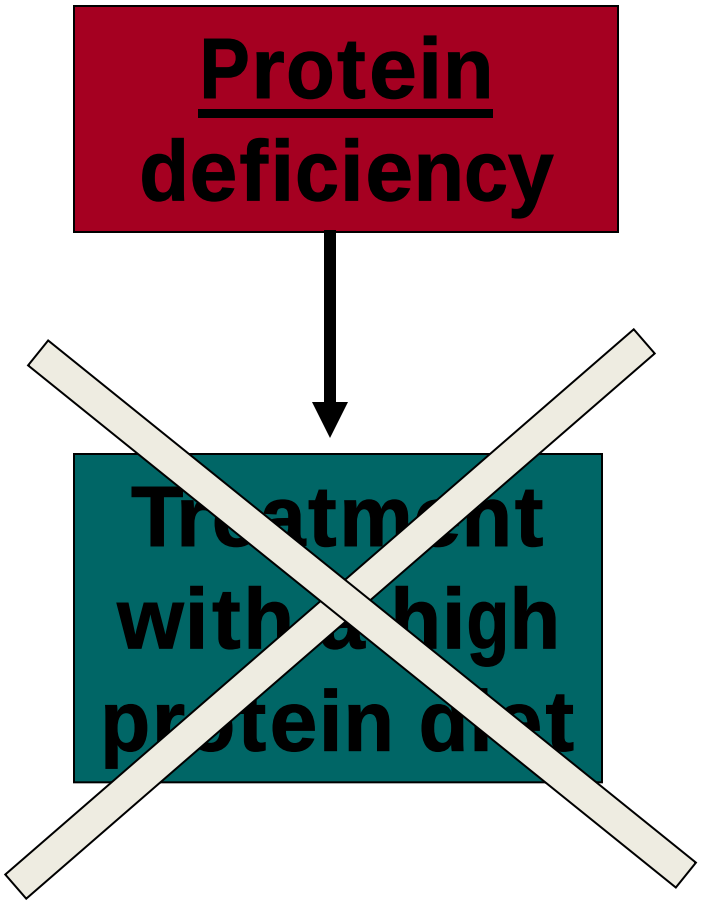
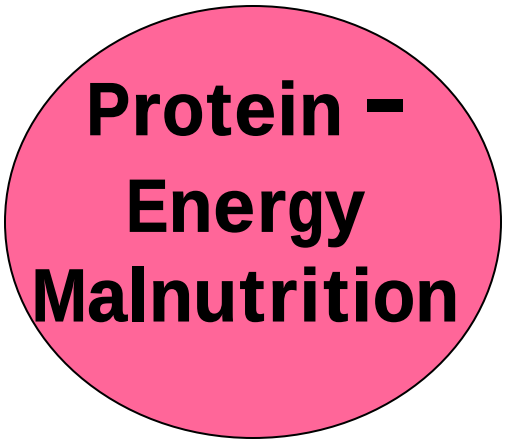
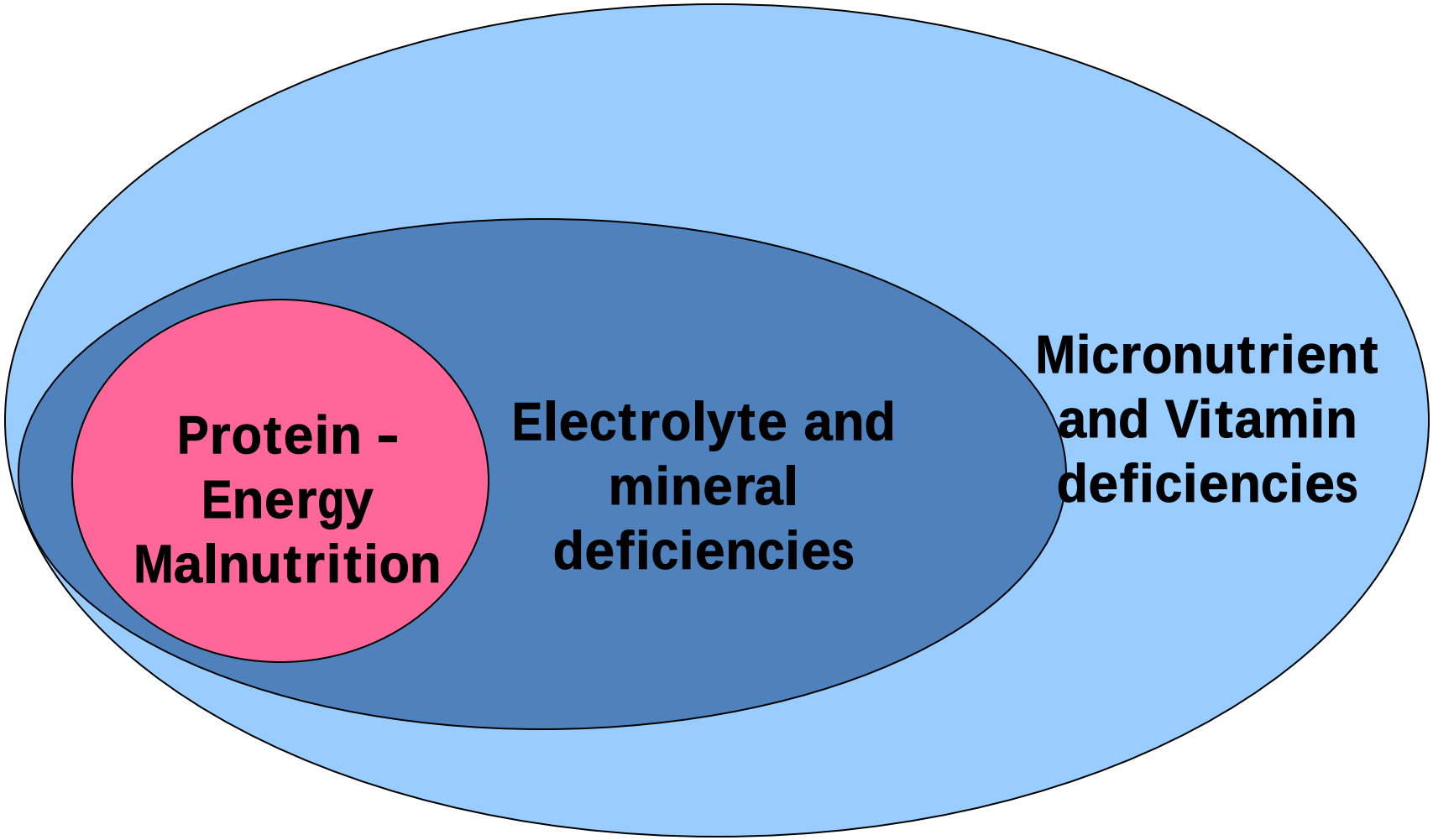


Severe malnutrition



Severe malnutrition



Electrolyte / Mineral Deficiencies

- Potassium:
  - Potassium supplements help reduce oedema
  - Muscle weakness / apathy
  - Reduced cardiac output.
- Magnesium (convulsions / arrhythmias)
- Zinc (diarrhoea / skin disease)
- Copper (anaemia)
- Selenium (heart failure)

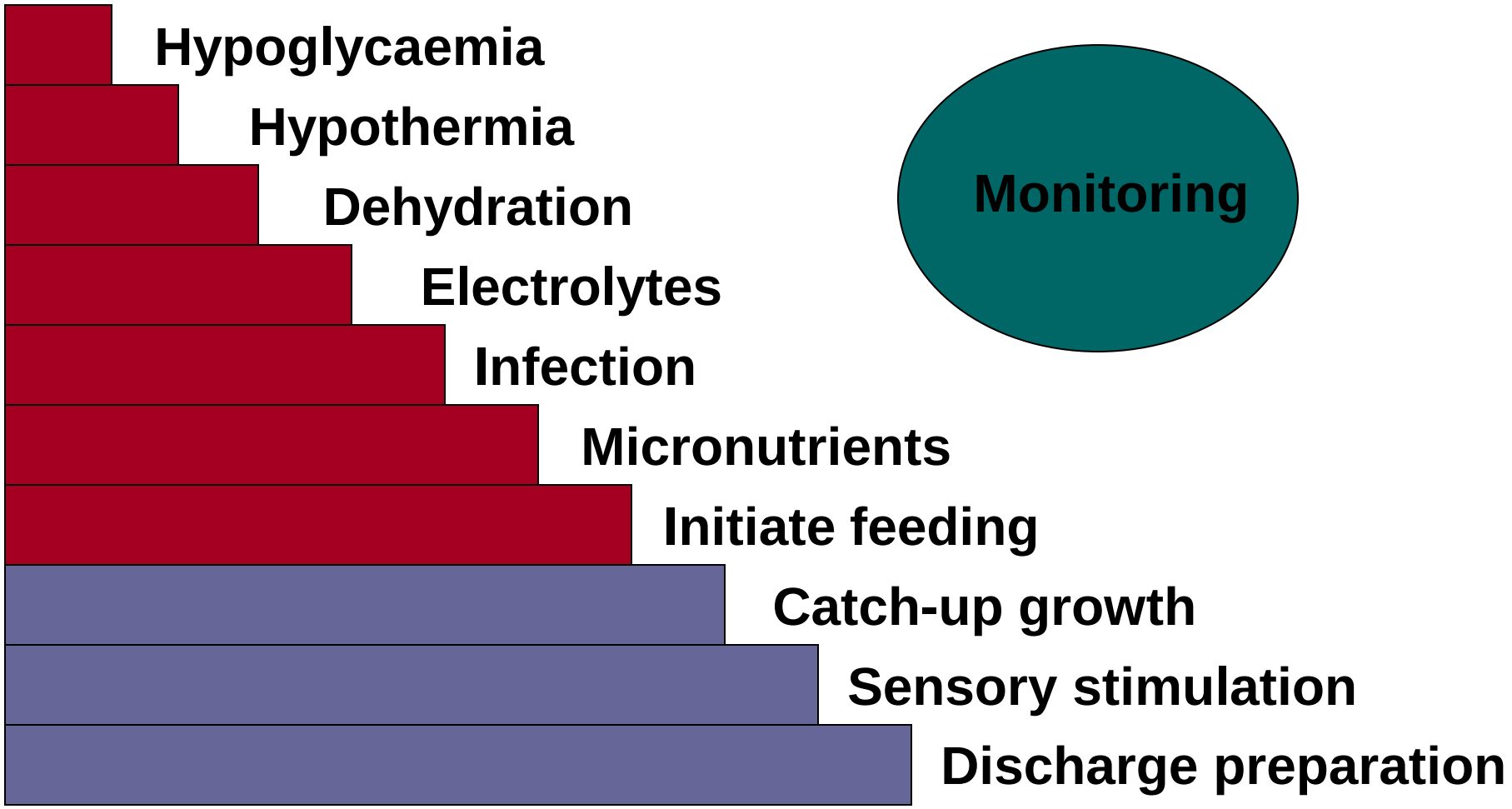
Source: KEMRI /Wellcome Trust

Electrolytes / Minerals – What about Sodium?

- Total body sodium is often increased
  - Expansion of extracellular fluid volume
  - Leakage of sodium into cells – sick cell syndrome
- Giving sodium (iv fluids / salty foods) can be dangerous

What other problems do these children commonly have?

10 Step Approach



Hypoglycaemia and Hypothermia

- All new admissions with malnutrition should be kept warm until there are signs of recovery.
- iv or ngt glucose for those who are unconscious or very severely ill with no glucose measurement.
- Immediate ngt feeding for conscious children with blood glucose < 3mmol/l

Dehydration

- Shock is treated with special fluid plans and Half-Strength Darrow's with 5% dextrose.
- Oral rehydration is with ReSoMal.
- Feeding must be started by 12 hours.

Oral re-hydration in Severe Malnutrition.

All concentrations are in mmol/l	Na^+	K^+	Osmolarity Glucose	Osmolarity
New WHO / UNICEF ORS	75	20	111	
Rehydration Solution for Malnutrition – **ReSoMal*.**	45	40	~ 200 Glucose &saccharose	

Add 2 WHO ORS '500ml' sachets to 2 litres water rather then 1 litre, then add 50g (5 teaspoons) sugar and 60 mmols Potassium Chloride (3 10ml iv vials of strong potassium, 20mmols/10mls)

Composition of RESOMAL

- Note use of 2 liters of water

Oral re-hydration in Severe Malnutrition

- Resomal 5ml/kg every 30 mins for 2 hours.
- Use an ngt early.
- Then 5 – 10 mls/kg each hour for a maximum of 10 hours
  - Give 10 if the child thirsty / severe dehydration, 5 if not.
- Introduce starter milk (F-75) at 4 hours and slowly replace Resomal with starter milk over 12 hours.
- Continue breast feeding throughout.

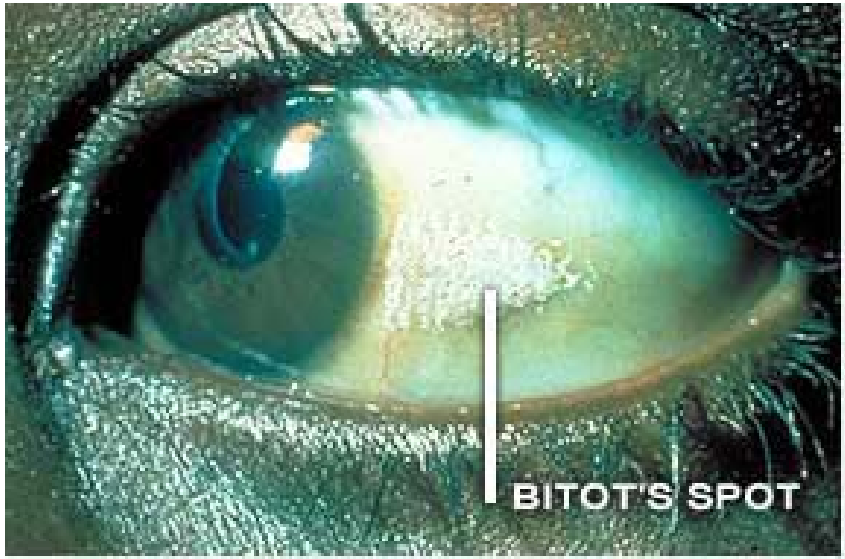
Electrolytes & Minerals

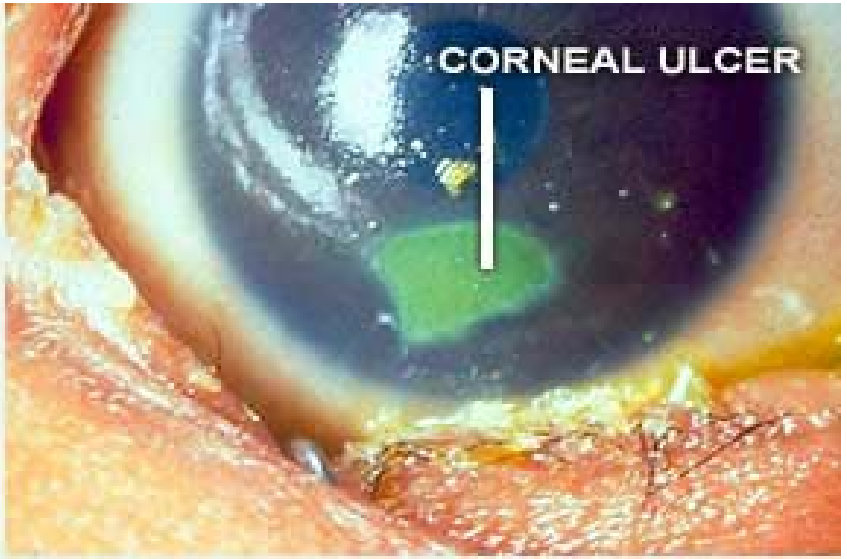
- All severely malnourished children have potassium deficiency.
- All should receive an extra 4mmol/kg/day of oral potassium (after stopping ReSoMal).
- Ideally should receive Mg, Zn, Cu and Se as part of mineral mix – added to milk feed.

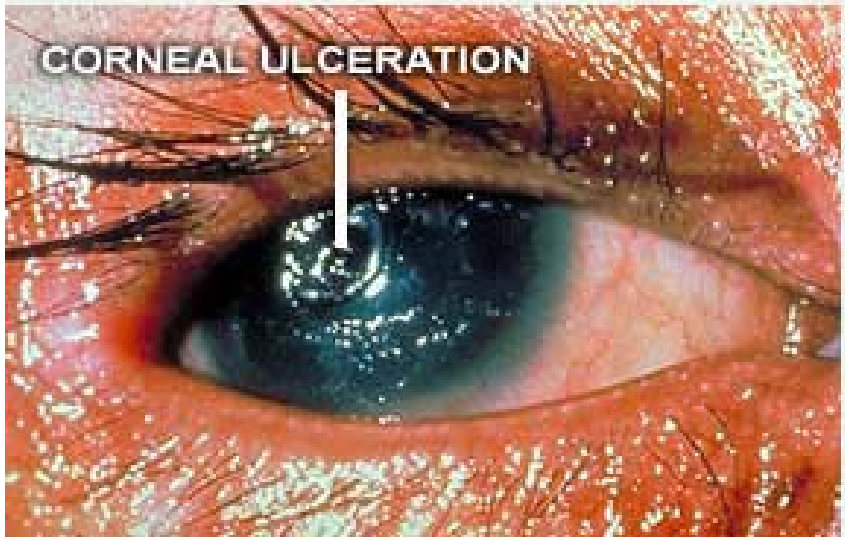
Infection

- Up to 1/3rd children with malnutrition who die have septicaemia / bacteraemia
- Fever and other signs of infection are not helpful in identifying these children when there is severe malnutrition.
- ALL children with severe malnutrition sick enough to be in hospital should be started on Penicillin (or Ampicillin) and Gentamicin for at least 5 days.
- In addition they receive oral metronidazole and treatment for thrush if present.

Vitamin A deficiency







Source: KEMRI /Wellcome Trust

Vitamins

- Vitamin A:
  - With Eye signs: 200,000 iu on admission, on Day 2 and on Day 14 (100,000 iu if aged < 12 months).
  - Without Eye signs: stat dose appropriate for age
- Multivitamins – 1 tablet twice daily for 14 days.

First feeding.

- Feeds need to be prescribed – they are treatment!

Questions?

Course 3c: Severe malnutrition 2-

nutritional treatment

Objectives

- Understand the link between observed pathophysiological abnormalities and treatment.
- Consider the priorities and aims of immediate nutritional management.
- Non-nutritional management is considered elsewhere.

What are the problems faced in providing acute nutritional therapy?

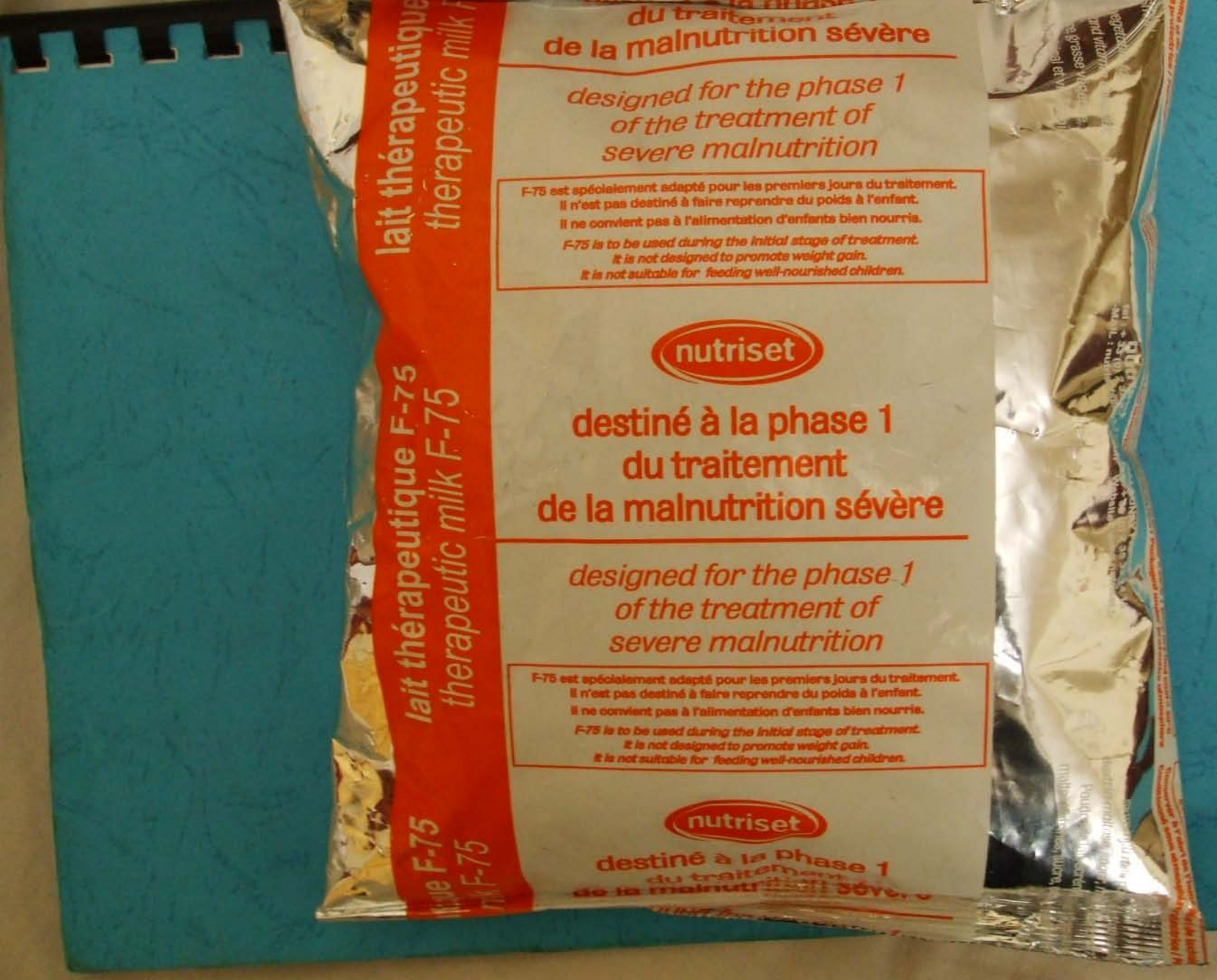
Source: KEMRI /Wellcome Trust

- Reduced appetite and willingness to feed
- Fatty liver with reduced synthetic functions
- Absorption of nutrients is probably adequate but may be reduced by diarrhoea and small bowel bacterial overgrowth
- Reduced renal ability to excrete sodium
- Impaired cardiac contractility

A state of physiological 'standby' – awaiting gentle re-awakening

Gentle nutritional rescue – the process of feeding

- Immediate feeding
- Small volume / frequent feeding because of small stomach capacity and precarious physiology
- Vomiting is NOT a contraindication to feeding
- Routine insertion of a naso-gastric tube should be considered
- Feeds are the ‘drug’ to cure malnutrition, they are a priority (after correction of dehydration if required).


lait thérapeutique F-75
therapeutic milk F-75
du traitement
de la malnutrition sévère
designed for the phase 1
of the treatment of
severe malnutrition
F-75 est spécialement adapté pour les premiers jours du traitement.
Il n'est pas destiné à faire reprendre du poids à l'enfant.
Il ne convient pas à l'alimentation d'enfants bien nourris.
F-75 is to be used during the initial stage of treatment.
It is not designed to promote weight gain.
It is not suitable for feeding well-nourished children.
nutriset
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nutriset

Un sachet représente la quantité de produit à ajouter et à mélanger à 2 litres d'eau bouillie pour obtenir 2,4 litres d'un lait dont la valeur nutritionnelle moyenne est :

Each sachet contains the quantity of product to be added and mixed with 2 litres of boiled water to obtain 2.4 litres of milk for which the average nutritional value is :

poids net : 410 g
net weight :

Eléments	/100 g de produit sec	/litre de lait F-75	Eléments	/100 g de produit sec	/litre de lait F-75
Energie	446 kcal	750 kcal	Biotine	60 µg	100 µg
Protéines	5 % de l'énergie		Ac. pantothénique	3 mg	5,1 mg
Lipides	31 % de l'énergie		Vitamine K	24 µg	40 µg
Vitamine A	0,9 mg	1500 µg	Sodium	< 87 mg	< 150 mg
Vitamine D	18 µg	30 µg	Calcium	560 mg	950 mg
Vitamine E	20 mg	34 mg	Phosphore	330 mg	560 mg
Vitamine C	59 mg	100 mg	Magnésium	50 mg	85 mg
Vitamine B1	0,5 mg	0,8 mg	Zinc	12,2 mg	20,5 mg
Vitamine B2	1,2 mg	2,7 mg	Iode	100 µg	170 µg
Niacine	5 mg	8,5 mg	Potassium	775 mg	1320 mg
Vitamine B6	0,6 mg	1 mg	Cuivre	1,7 mg	2,8 mg
Ac. folique	200 µg	340 µg	Sélénium	30 µg	47 µg
Vitamine B12	1,6 µg	2,7 µg	Fer	< 0,3 mg	< 0,5 mg

ref : Management of severe malnutrition: a manual for physicians and other senior health workers. World Health Organisation, Geneva 1999.

Contents of F-75. Note that this is

The feed content – 1 litre of F75

Ingredient	Amount
Dried skimmed milk	25g
Sugar	100g
Vegetable Oil	27mls
Mineral solution	20mls
Water	make up to 1000mls

Mineral solution ideally contains minerals and trace elements – if not available at least add 40mmols potassium (2x 10mls iv KCl vials) to each 1000mls of feed

The feeding plan – a prescription

- What is the weight?
- Marasmus
  - 130 ml/kg/day start-up feed
- Kwashiorkor / marasmic kwashiorkor:
  - 100 mls/kg/day start-up feed
- Ideally given in 12 two hourly feeds, or, if not possible, 8 three hourly feeds
- ***…..this means at night too!***

What would this provide?

	Marasmus 130 mls/kg/day	Kwashiorkor 100 mls/kg/day
Calories	100 kcal/kg/day	75 kcal/kg/day
Protein	1 – 1.5 g/kg/day	0.75 – 1.3 g/kg/day

Why do we not give more?

- The body really cannot tolerate more
- Too vigorous re-feeding has been associated with increased mortality.
- Too much sugar can cause an osmotic diarrhoea
- Higher protein contents are usually associated with higher sodium contents that can make oedema worse and precipitate heart failure.

Feeding this child? – 10kg

- Total 24 hour feeds?
- 3 hourly feed volume?

Feeding this child? – 10kg

- Total 24 hour feeds?
  - 1300 mls
- 3 hourly feed volume?
  - 165 mls

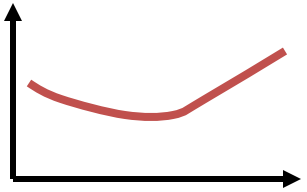
Standard initial nutritional prescription…age 3 yrs, 10 kg

F-75	165 mls 3 hourly
Potassium chloride 5mmol tabs (crushed in feed)	*2 tabs qds*
Vitamin A (has eye signs)	200,000 iu stat, on day 2 and day 14
Multivitamin	1 tab twice daily

When to change from rescue feeding?

- Return of appetite:
  - 2 to 3 days after admission in those with no oedema and modest levels of activity
  - 5 to 7 days after admission in those with severe lethargy / severely ill at admission
- Oedema:
  - You do not have to wait for resolution of oedema before changing to recovery feeding if the child has a good appetite.
- Feed with cup / cup and spoon

Weight gain in the first week



- Rescue feeding is usually NOT associated with weight gain
- Weight loss may even occur in children whose oedema is improving
- Do not panic!
  - Ensure at least 100 mls/kg/day of starter feed has been given.
  - Early recovery involves loss of body water (reducing weight) and increases in cellular mass (increasing weight)
- Appetite and activity level denote recovery in the first week, not weight change.


the treatment of
severe malnutrition
F-100 ne convient pas à l'alimentation prolongée d'enfants bien nourris
F-100 is not suitable for long term feeding of well-nourished children
nutriset
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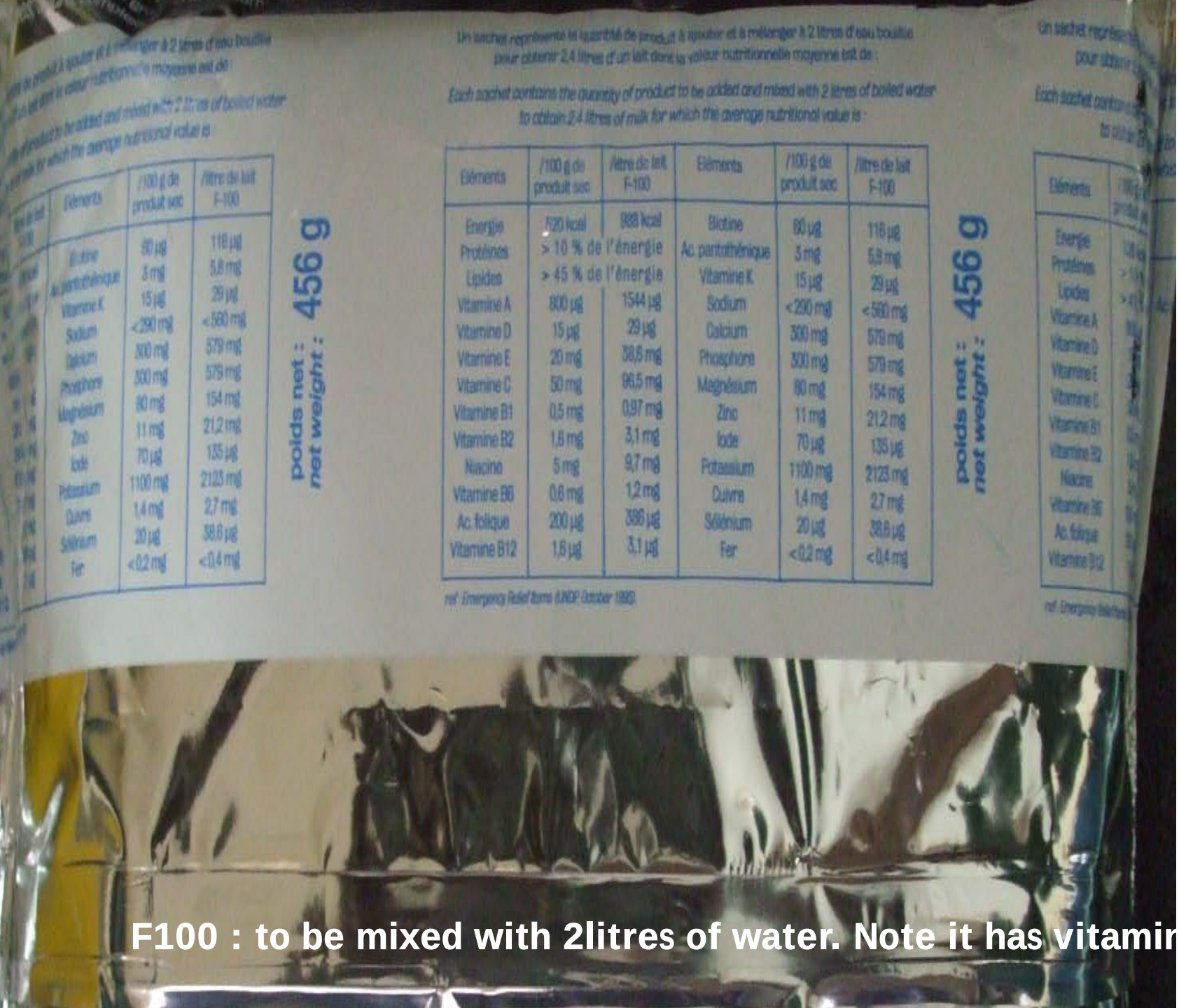


F100 : to be mixed with 2litres of water. Note it has vitamin

Contains peanut paste, vegetable fat, dry skimmed milk, dry whey, sugar minerals & vitamin complex

F100 in spread form *

Ready-to-Use Therapeutic Food

Plumpy'nut® is suitable for all people (children from 6 months upwards or adults) suffering from severe or moderate malnutrition (follow the WHO* protocol)

Plumpy'nut® does not need any prior cooking or dilution. Just open the sachet and eat the contents.

- Plumpy'nut® can be kept for up to 24 months.
- It is recommended that plumpy'nut® be stored in a cool, dry place, at a temperature below 30°C.
- Plumpy'nut® packaging can be disposed of by burning.

Content: Vegetable fat, peanut paste, dry skimmed milk, whey powder, malto-dextrin, sugars, minerals and vitamins.

Average nutritional value per sachet of 500 kcal (92 g):
Proteins: 12.5 g. Lipids: 32.6 g.

Vitamins: A (840 µg), D (15 µg), E (18.4 mg), C (49 mg), B1 (0.55 mg), B2 (1.66 mg), B6 (0.55 mg), B12 (1.66 µg), K (19.3 µg), biotin (60 µg), folic acid (193 µg), pantothenic acid (2.85 mg), niacin (4.88 mg).
Minerals: calcium (276 mg), phosphorus (276 mg), potassium (1022 mg), magnesium (84.6 mg), zinc (12.9 mg), copper (1.6 mg), iron (10.6 mg), iodine (100 µg), sodium (<266 mg), selenium (27.60 µg).

RUTF: plumpy'nut® complies with the definition of RUTF: Ready to Use Therapeutic Food that requires no prior preparation, dilution or reconstitution.

* corresponds to F-100 therapeutic milk, recommended by WHO (WHO,1999 Management of severe malnutrition: a manual for physicians and other senior health workers).

plumpy'nut® is a Nutriset product

The feed content – 1 litre of F100

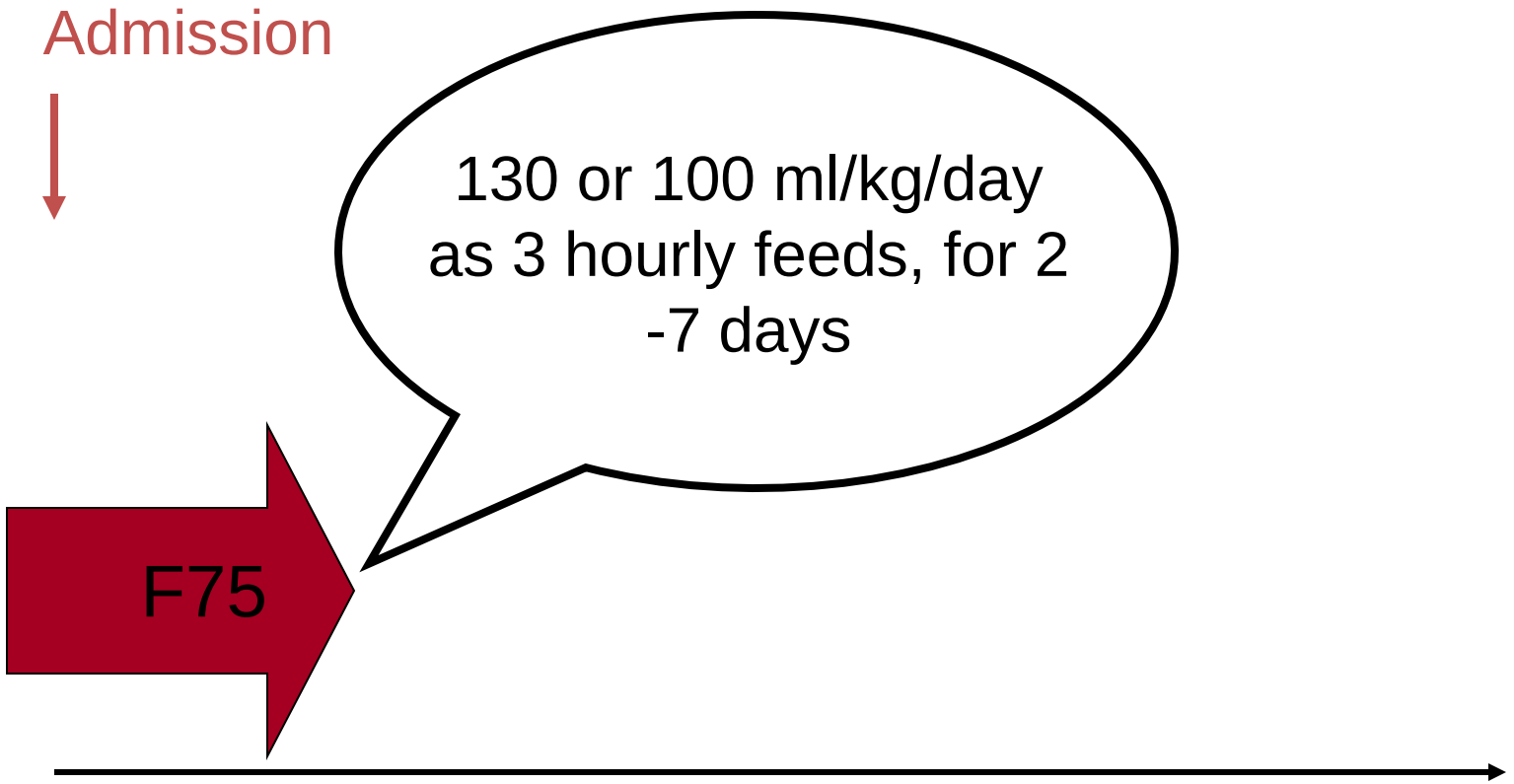
Ingredient	Amount
Dried skimmed milk	80g
Sugar	50g
Vegetable Oil	60mls
Mineral solution	20mls
Water	make up to 1000mls

Mineral solution ideally contains minerals and trace elements – if not available at least add 40mmols potassium (2x 10mls iv KCl vials) to each 1000mls of feed

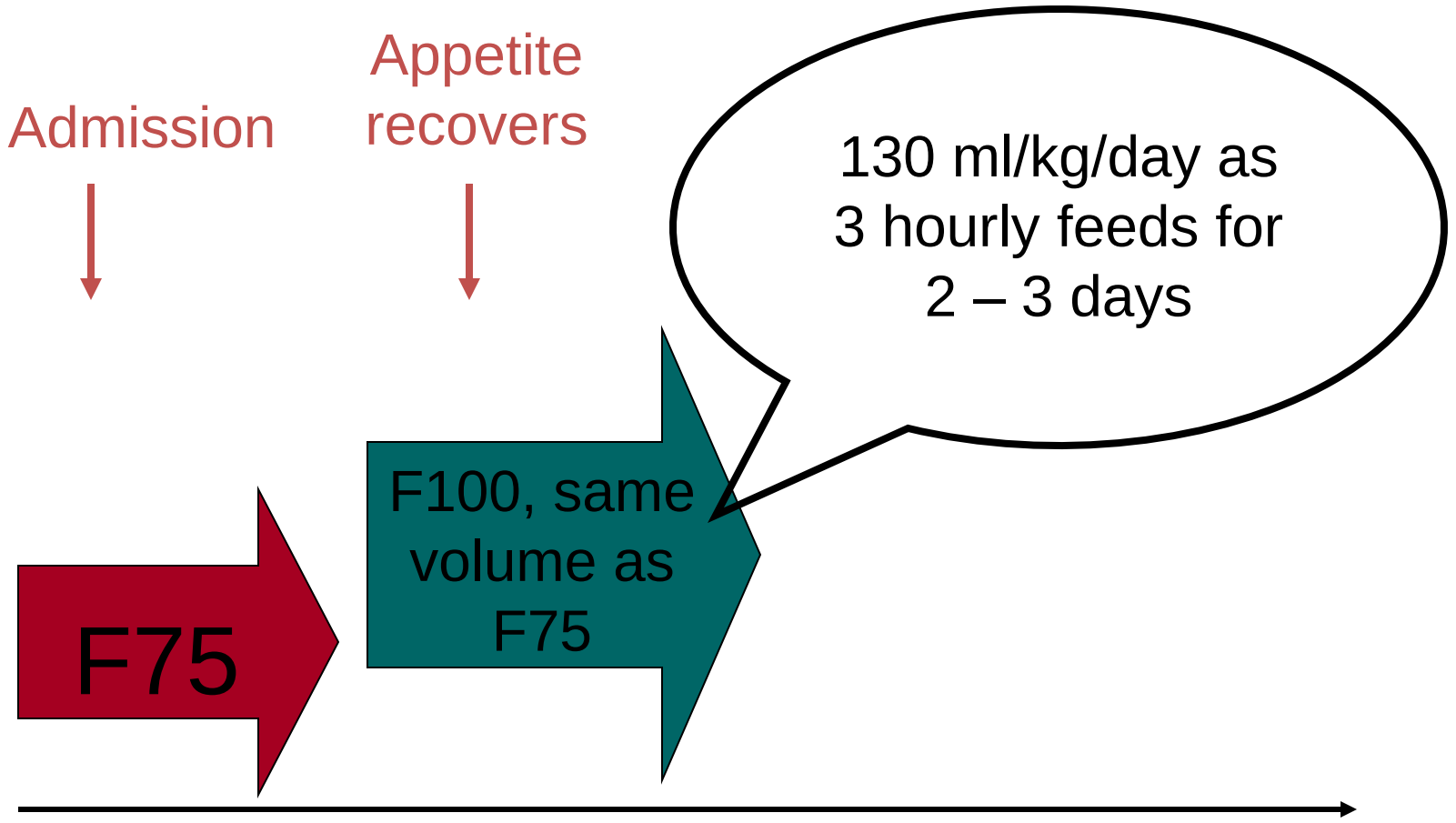
What would this provide?

	F75 – Starter 100mls	F100 – Catch-up 100mls
Calories	75 kcal	100 kcal
Protein	0.9 g	3g

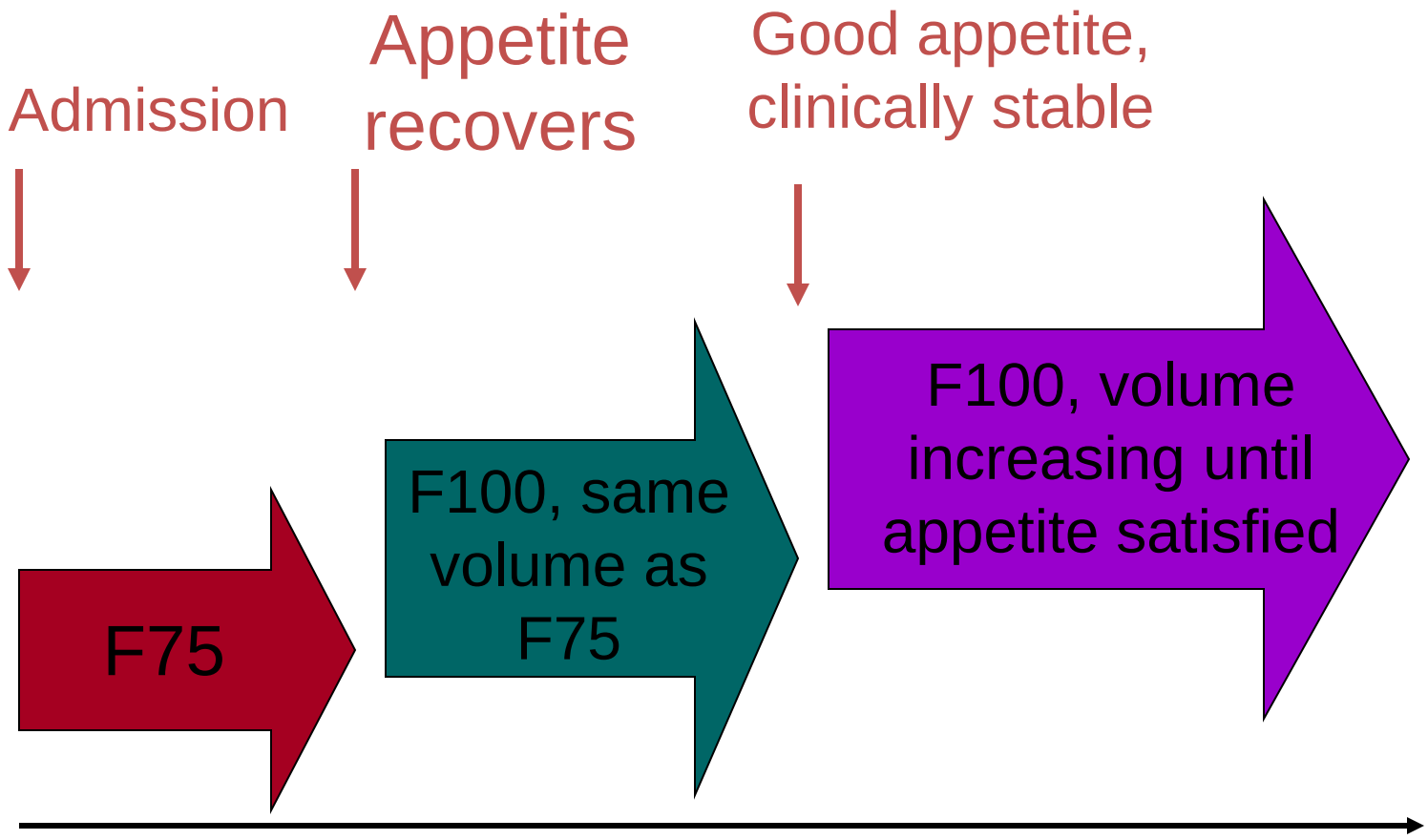
A feeding plan



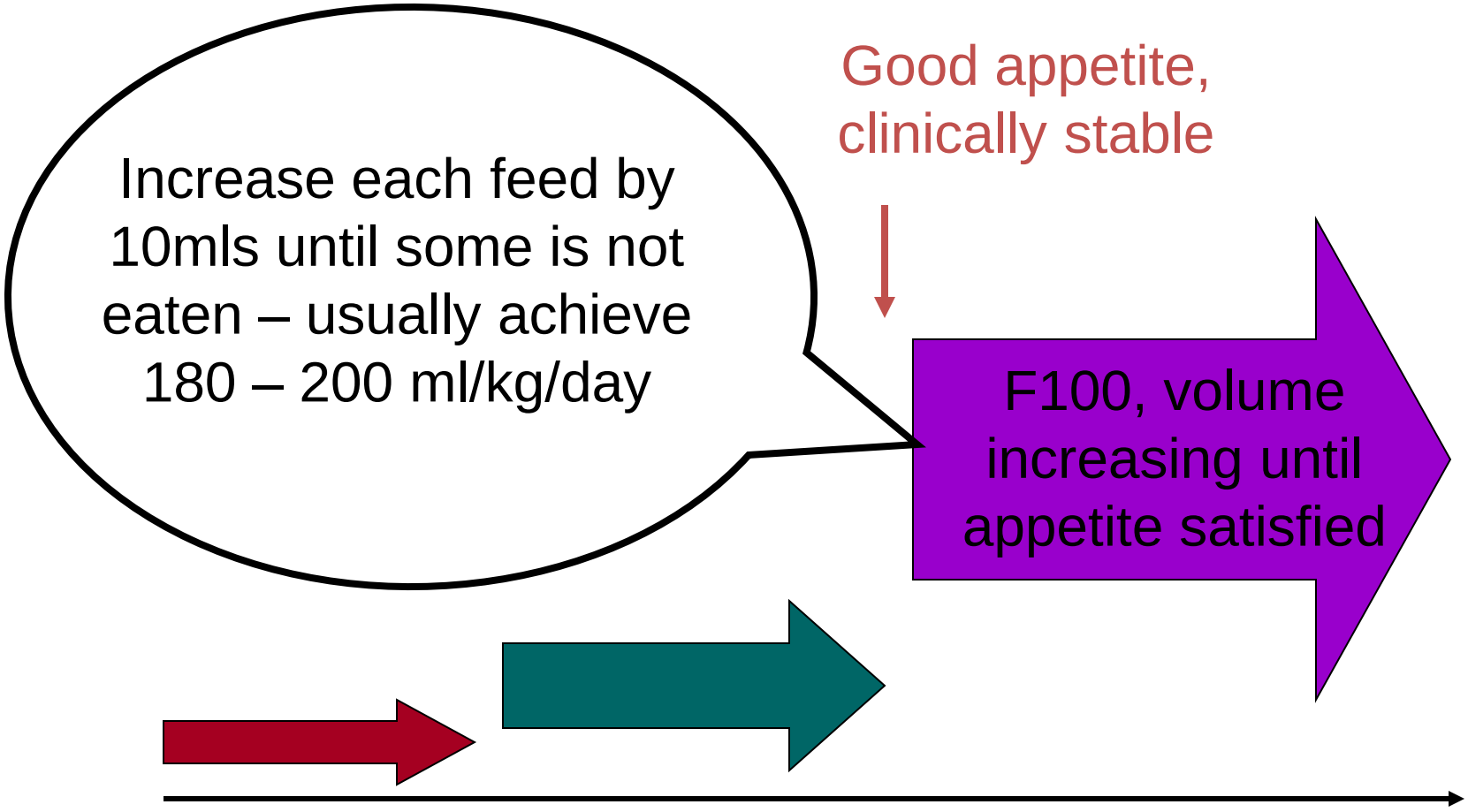
A feeding plan



A feeding plan



A feeding plan



Preparation of small quantities of resomal,F75 AND F100 therapeutic milk

OBJECTIVES

Be able to:

- Adequately reconstitute small quantities of ReSoMal,F75 and F100 therapeutic milk
- Use appropriate household measures while measuring volumes of ReSoMal,F75 and F100

You can use the NUTRISET measuring scoop to measure the right quantity of powder to prepare small quantities of ReSoMal,F75 and F100

WARNING

The following data is ONLY valid with the NUTRISET measuring scoop

Nutriset measuring scoops are easily recognisable.They are RED with the NUTRISET logo embossed on the handle

PREPARATION OF RESOMAL

- Mix 1 level scoopful of ReSoMal into 140ml of water

PREPARATION OF F-75 THERAPEUTIC MILK

Mix 1 level scoopful of F-75 therapeutic milk powder into 20ml of water

PREPARATION OF F-100

- Mix 1 level scoopful of F100 therapeutic milk powder into 18 ml of water

Prescribing RUFT

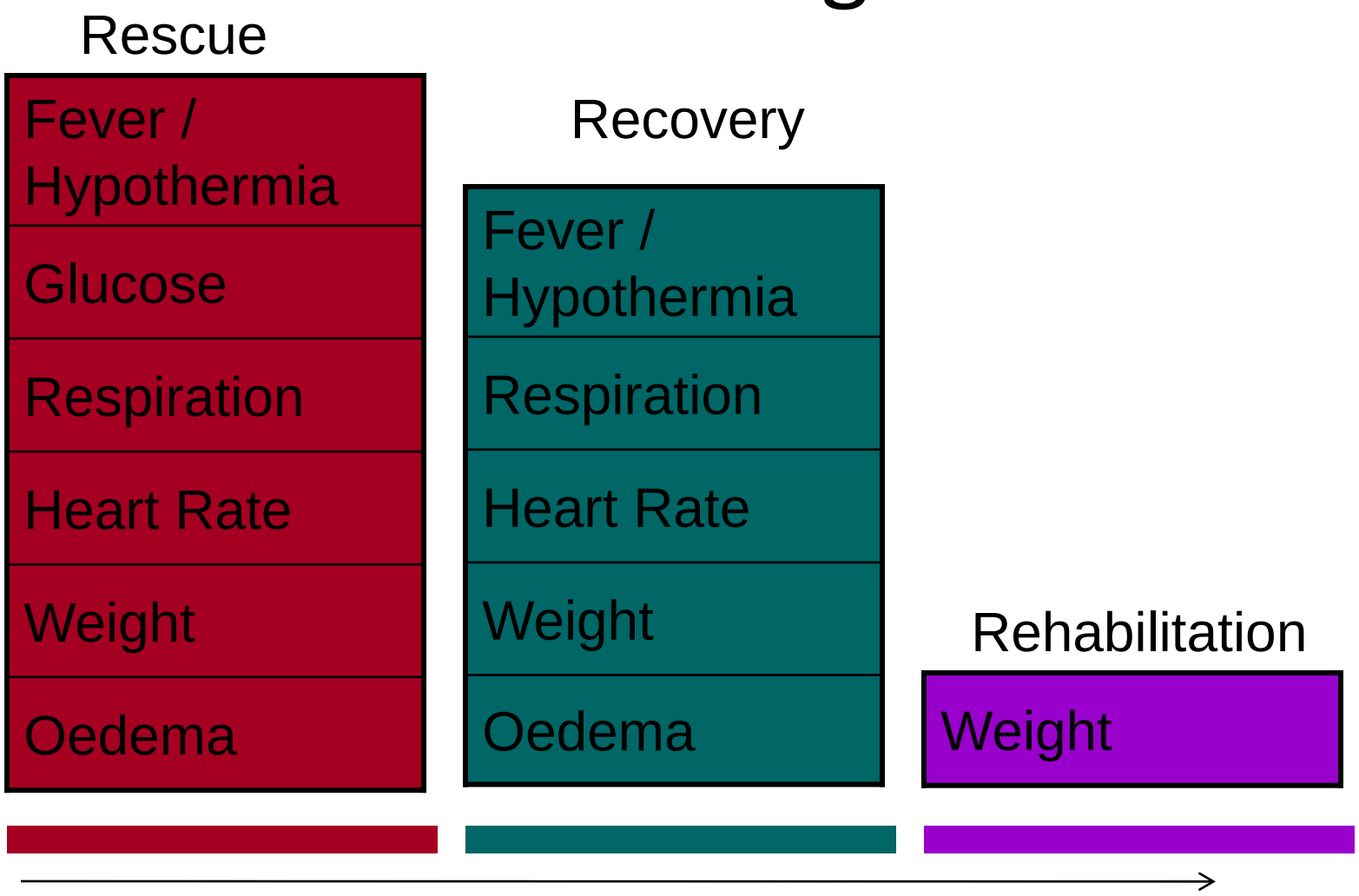
- How many packets would you give a two years old who weighs 10kg and has kwashiorkor and is in the translation period?

Then what?

Rehabilitation

- Introduce solid foods and increase to 5 appropriate meals a day.
- Continue snacks in between
- Continue breast feeding
- Continue mineral supplements for 2 weeks
- Start oral iron and mebendazole therapy after 1 week
- Monitor progress
- Provide stimulation / play
- Educate the family and prepare for discharge

Monitoring 1



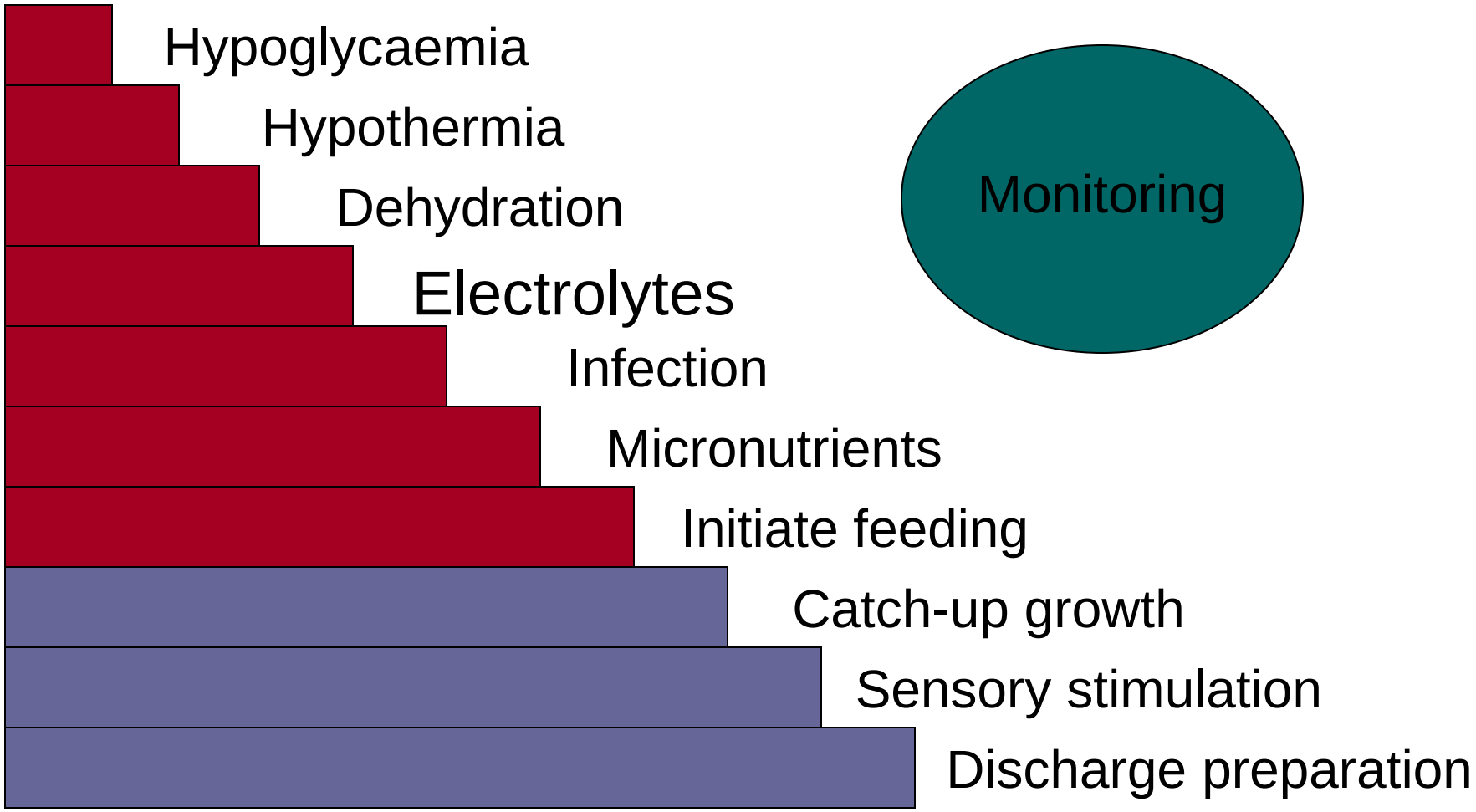
Monitoring 2

- Intake of feed should be monitored throughout
- If there is concern for heart failure (↑HR, ↑RR) in the rescue phase reduce feed volumes for 24 hours.
- Weight gain in recovery / rehabilitation phases:
  - Poor, <5g/kg/day, full re-assessment
  - Moderate, 5 – 10g/kg/day, check intake adequate, is there untreated infection
  - Good, >10g/kg/day

When to discharge?

- Completed antibiotics
- Good appetite and gaining weight
- Lost any oedema
- Appropriate support in the community or home
- Mother / carer:
  - Available
  - Understands child's needs
  - Able to supply needs

10 Step Approach



Questions?

Summary

- The rescue phase of nutritional support requires gentle introduction of calories and small amounts of protein.
- Potassium, vitamins and ideally other minerals should routinely be given
- Recovery feeding starts as the appetite returns and is gradually scaled up.

- You are asked to see a 2 year old boy in OPD who is said to have severe wasting and look very unwell.

What do you do?

Rx -1

1. Oxygen 1-2 l/min via nasal prongs.
2. IV HSD in 5%Dextrose120mls in 1 hr- 70 drops per min.
3. IV 10% dextrose 35 mls over 5min
4. Keep warm.
5. KCl 10mmol added in tds feed
6. IV X-pen 700,000 IU 6 hrly.
7. IV Chloramphenicol 175 mg 6 hrly.
8. IM Quinine 105mg stat then 70 mg 12hrly.

Rx- 2

8. Vit A 200,000IU stat. Eye changes ???
9. Multivit 1 tab BD for 2 weeks.
10. Folic acid 2.5 mg on alt days.
11. Zinc 20 mg OD for 2 weeks.
12. F75; 910 mls in 24 hrs – 115 mls 3hrly

Fluid plan -Resomal 70mls hourly

Resomal 0800hrs – 70mls
Resomal 0900hrs- 70 mls
Resomal 1000hrs-70 mls

F75 1100hrs – 70 mls

Resomal MD – 70mls
Resomal 1300hrs- 70 mls
Resomal 1400hrs-70 mls

F75 1500hrs – 70 mls

Resomal 1600hrs- 70mls

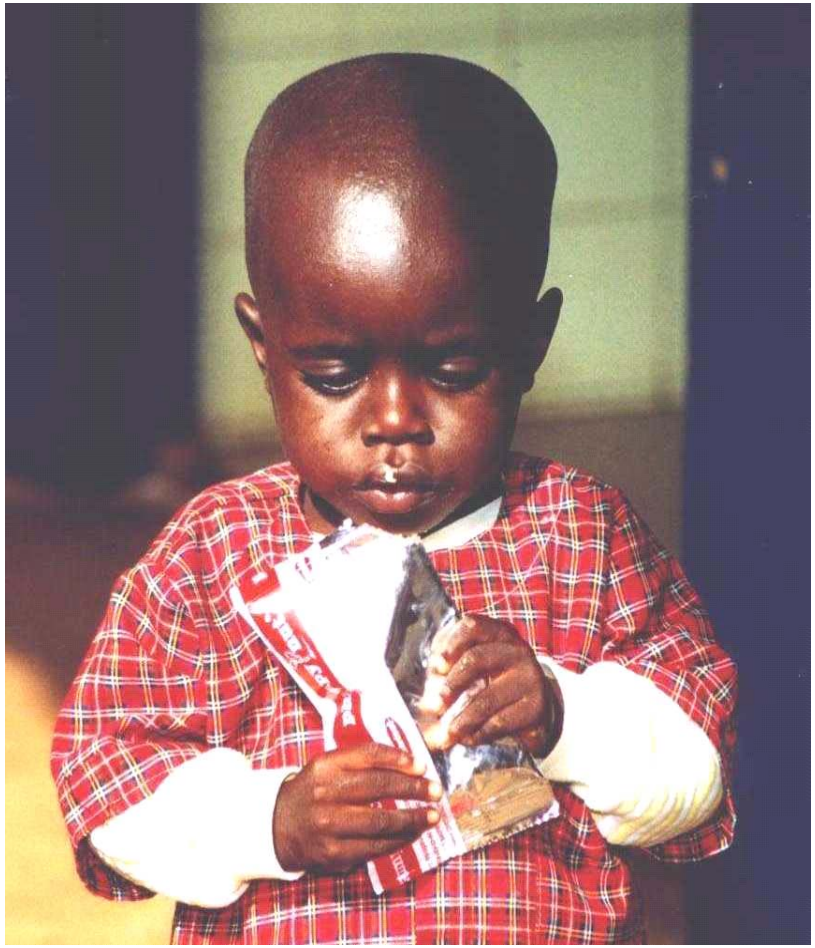
Then F75; 115mls every 3 hrs

Resomal 70mls after every loose stool

Summary.

- The risk of death in children with severe malnutrition is very high.
- The children have many problems and each needs treating.
- The 10 steps approach allows each problem to be treated
- Feeding should not be a high protein diet.

OUT PATIENT CARE….



OBJECTIVES

- Increase coverage and access to treatment
- Timeliness: Case finding and treatment before malnutrition escalate
- Appropriate care: effective treatment for those who can be treated at home

WHO IS ELIGIBLE?

- Those with severe acute malnutrition (SAM) with no medical complications are treated at OTP and are given RUTF and routine medicines to take home.

- Only applicable in a setting where OTP has been established and RUTF available

TRIAGE…ADMISSION CRITERIA

MEDICAL EXAMINATION AND APPETITE TEST

SAM <u>with complications</u>

- Nutritional oedema ++,+++

OR

- Marasmic Kwashiorkor

(WHZ<-3 OR/MUAC<115mm with any grade of oedema)

OR

- WHZ<-3(OR WHM<70%)
- MUAC<115mm
- Nutritional oedema +

AND

No appetite and /or complications(IMCI danger signs)

<u>Infants</u>

6months unable to suckle or visibly wasted

In Patient Care

SAM <u>without complications</u>

- WHZ<-3

OR

- MUAC<115mm

OR

- Nutritional oedema +

AND

- Appetite
- Clinically well
- Alert

Out Patient Care

Moderate Acute malnutrition <u>without complications</u>

WHZ>-3 and <-2

Or

MUAC >115mm and <125mm

Supplementary Feeding

APPETITE TEST (1)

Why to conduct one?

- Major medical complications lead to loss of appetite

- It is mainly metabolic malnutrition that causes death. Often the only sign of severe metabolic malnutrition is a reduction in appetite

→ A poor appetite means that the child has a significant infection or a major metabolic abnormality such as liver dysfunction, cell membrane damage, electrolyte imbalance. These children are at immediate risk of death and neeed inpatient care.

APPETITE TEST (2)

How to conduct one?

- In a separate area
- Explain to care giver how
- Care giver washes hands
- Care giver offers RUTF
- Child need to be offered plenty of water

APPETITE TEST (3)

Result of the appetite test

A child who takes the minimum amount for their weight as indicated in the table has passed

A child that does not take at least the amount of RUTF indicated in the table has failed

Kg	Sachets
<4	1/8 to ¼
4-6.9	¼ to 1/3
7-9.9	1/3 to ½
10-14.9	½ to ¾
15-29	¾ to 1
>30	>1

FOOD RATIONS (1)

Ready-to-Use Therapeutic Food (RUTF)

- This is a specialized food that is:
- developed specifically for the recovery of severe malnutrition at home.
- energy-dense, mineral/vitamin-enriched product equivalent to F100 with added iron.
- It contains the required energy and micronutrients to meet the nutritional needs of the severely malnourished child.
- oil-based, ready-to-use product that has a low risk of contamination. It provides approximately 530Kcal per 100g.
- Used for nutrition rehabilitation in the community and is effective when the patient receives a weekly supply of take home RUTF. Why?
-

FOOD RATIONS (2)

Ration

- The ration given to a severely malnourished child is based on the intake requirement of between 150-200 kcal/kg/day.

- The amount of RUTF to be consumed per day is based on the weight of the child

FOOD RATIONS (3)

Class of weight (kg)	RUTF	
	sachet per **day**	sachet per **week**
3.5 - 3.9	1 .5	11
4.0 - 5.4	2	14
5.5 - 6.9	2.5	18
7.0 - 8.4	3	21
8.5 - 9.4	3.5	25
9.5- 10.4	4	28
10.5 - 11.9	4.5	32
≥ 12	5	35

ROUTINE MEDICATION

Medication	Direct admission to out-patient community nutrition care
Vitamin A	One (1) dose on the fourth week (fourth visit)
Folic Acid	One (1) dose at health facility on admission, if signs of anaemia
Amoxicillin	Give first dose at the health facility **and** give remainder of treatment to the parent/caregiver with instructions to give twice daily for seven days at home
Malaria	According to national protocol
Measles (children 6 months and older)	1 vaccine on the fourth week (fourth visit)
Iron	None: sufficient iron is in RUTF
De-worming (children >1 year old)	1 dose on the second week (second visit)

MONITORING

Task	Frequency
Patient attends health facility	weekly
Patient receives replacement RUTF	weekly
Health worker checks weight	weekly
Health worker checks MUAC	weekly
Health worker checks height	monthly
Health worker checks vital signs: temperature, pulse & respiration rate	weekly
Health worker conducts Appetite Test	weekly
Health worker does medical check	weekly
Health worker fills in patient card and ration card	weekly

HOME CARE

Community health workers and Care givers are playing a key role in the recovery of the child (!!!)

- Ensure food eaten (only RUTF)
- Give safe water to drink
- Wash hands
- Do not share RUTF with other members
- Seek CHW if concerned with patient's condition
- Give routine medicine
- Attend health facilities for weekly visits
- Keep child warm

TRANSFER TO INPATIENT CARE

If the outpatients develops any of the following, the patient is transferred to the in-patient facility:

- Failure of appetite test
- Increase or develop oedema
- Re-feeding diarrhea that leads to weight loss
- Weight loss for 3 consecutive weighing, or 2 weeks
- Weight loss of more than 5% of body weight at any visit
- Static weight for 3 consecutive weighing
- Fulfilling any criteria of ‘failure to respond’ (next slide)

FAILURE TO RESPOND

Out Patient Community Nutrition Care	
Criteria for failure to respond	After
Primary failure to respond	
Failure to gain any weight (non-oedematous children)	21 days
Failure to start to lose oedema	14 days
Oedema still present	21 days
Weight loss since admission to program (non-oedematous children)	14 days
Secondary failure to respond	
Failure of Appetite test	At any visit
Weight loss of 5% of body weight	At any visit
Weight loss for two successive visits	14 days

POSSIBLE CAUSE OF FAILURE

- Community care is inappropriate for patients to go directly to out-patient care
- Poorly conducted appetite test
- Inadequate instructions given to mothers
- Inaccurate quantity of RUTF dispensed to child
- Health facility long distance
- Share of food with siblings…or caregivers
- Micronutrients deficiency
- Mal-absorption
- Unwilling or too busy care giver

DISCHARGE CRITERIA FROM OTP TO SFP

Cured	☐ W/H >80% (where there is SFP) or W/H >85% (in the absence of SFP) for two consecutive measurements and ☐ MUAC >11.0cm and ☐ No oedema for two consecutive visits. ☐ W/H -2 Z-score (where there is SFP) ☐ W/H -1 Z-score where there is no SFP ☐ Children admitted on MUAC, or stabilised from an in-patient facility, are discharged from the outpatient community nutrition care after a minimum of two months.
Defaulted	Absent for two consecutive visits
Died	Died while registered in the out-patient community nutrition care
Non-recovered	Has not achieved discharge criteria within four months. Link the child to other programmes e.g. IMCI, OVC, HBC, ART Clinics, or targeted food distributions.