

TRAINING FOR IMPROVED PRACTICE: Public Health and Nutrition in Emergencies

Management and Treatment of Severe Malnutrition

© Michael Golden & Yvonne Grellety

UNICEF Core Corporate Commitments Training In collaboration
with:

**Feinstein
International
Famine Center,
Tufts University**

**Mailman School of
Public Health,
Columbia University**

**International Emergency and
Refugee Health Branch,
Centers for Disease Control**

CCCs and Treatment of Severe Malnutrition

#4: ...”based on rapid assessments and agreed roles and responsibilities among key partners, initiate and support therapeutic feeding.....”

Who might UNICEF’s partners be?

Overview

- Practical Guidelines
- Treatment protocols: 10 STEPS & 2 PHASES
 - Admission
 - Phase 1 including complications
 - Transition phase
 - Phase 2
 - Discharge and follow-up
- Monitoring effectiveness
- Challenges and risks of TFP

Acknowledgements: Mike Golden and Yvonne Grellety

Need, Size and Structure

- The need and size determined from a survey and/or from admission at health facilities (30-50% coverage)
- A local health structure, (clinic, hospital) usually named “*unit*” or “*service*” can treat ~ 20 to 50 patients
- Above this number, a specific structure “*therapeutic feeding centre*” should be constructed
 - near the local structure
 - closed as soon as the acute phase is over
 - Integrated into local health structure

Ten Steps and Two Phases (WHO)

PHASE ONE Stabilization (Initial & transition)

1. Hypoglycaemia *Days 1 – 2*
2. Hypothermia *Days 1 – 2*
3. Dehydration *Days 1 – 2*
4. Electrolyte Imbalance *Days 1 – 7*
5. Infection *Days 1 – Week 6*
6. Micronutrients *Days 1 – Week 6*
7. Initiate Feeding *Days 1 - 7*

Ten Steps and Two Phases (WHO)

PHASE TWO Rehabilitation/ Recovery

Weeks 2 - 6

- | | |
|---------------------------------------|--------------------|
| 8. Begin Feeding
(Catch-up Growth) | <i>Weeks 2 – 6</i> |
| 9. Sensory stimulation | <i>Weeks 1 - 6</i> |
| 10. Prepare for discharge | <i>Weeks 2 - 6</i> |

Admission: Individual Card

THERAPEUTIC TREATMENT FICHE FOR SEVERE MALNUTRITION

Registration No.....	Country.....	Major problems	Date of admission / /	Date of discharge / /					
Sheet No.....	Centre.....	1.....	Hour.....am/pm	Cured <input type="checkbox"/>	Abandon <input type="checkbox"/>	Cause			
Parent's Name.....	Care hosp-w d/hosp-SNU/TFC/	2.....	Readmission.....	Dead <input type="checkbox"/>	hour.....am/pm				
First Name.....	Day-care/Day-care-non-res	3.....	From.....	Med transfer <input type="checkbox"/>	To.....				
Address.....	Age (yy/mm/dd)		Old Reg Nos.....	Nut referral <input type="checkbox"/>	To.....				
	Birth date / /			Follow-up by					
Distance to house.....	Status.....	Breastfeeding.....	Complementary feeding.....						

ANTROPOMETRIC CHART	Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
	Height (cm)																						
	Weight Kg)																						
	Wt for Ht (% or Z)																						
	Muac (mm)																						
	Oedema (0 to +++)																						

WEIGHT CHART	weight to reach																						
 (% , Z)																						

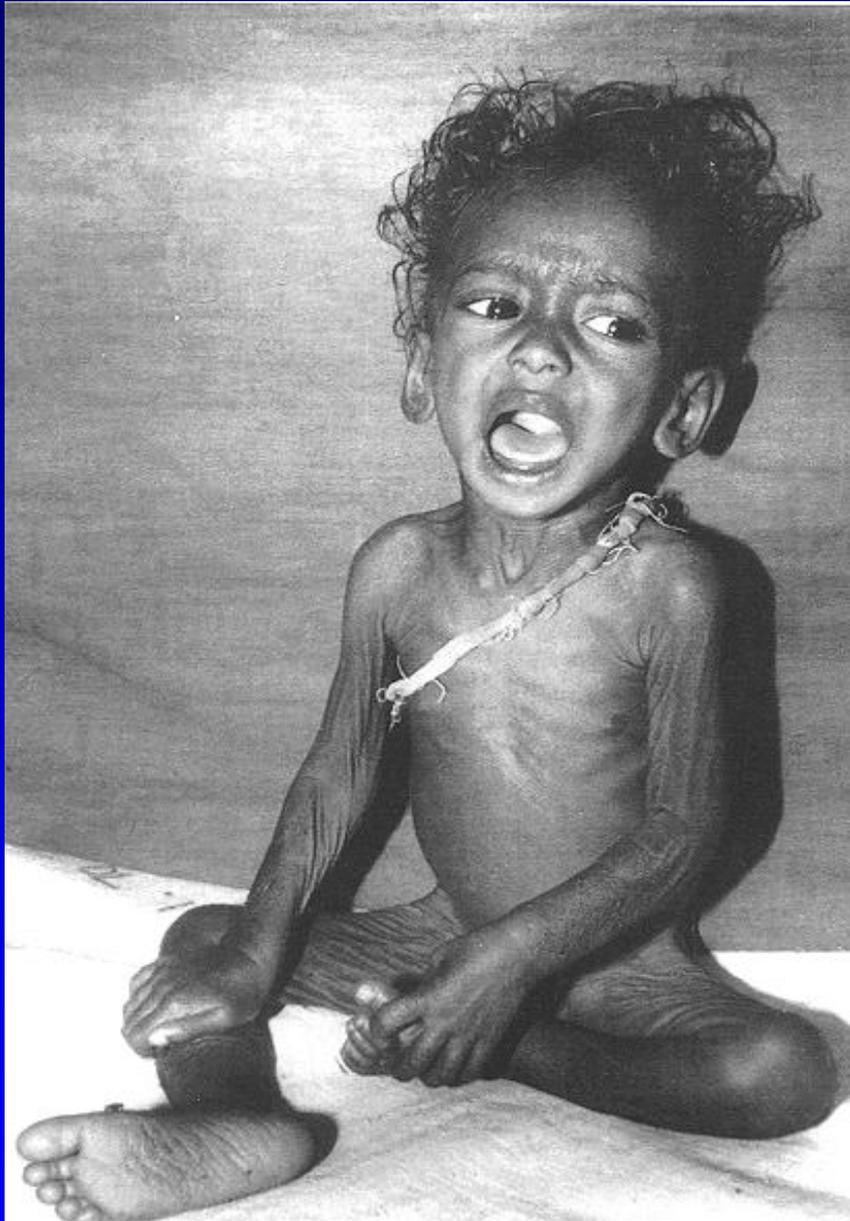
Admission and Discharge

ADMISSION:

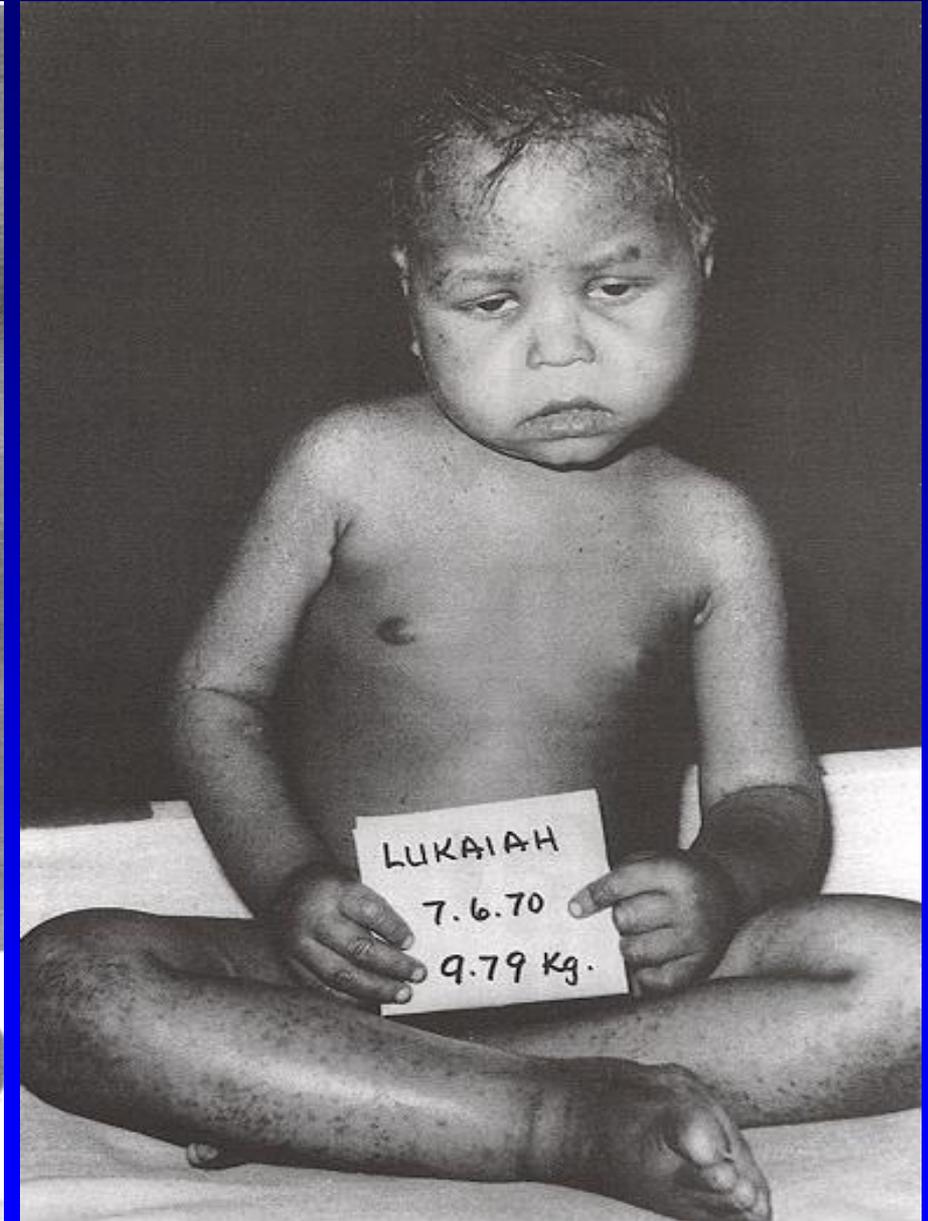
- W/H index $<70\%$ of the median
- OR bilateral oedema
- OR MUAC $<110\text{mm}$ for children from 75cm ($>12\text{months}$)
- Adults BMI <16 or bilateral oedema
- *NCHS tables up to 130 cm, then ACC/SCN extended for adolescent*

DISCHARGE:

- W/H $\geq 85\%$ and MUAC $\geq 12\text{cm}$ (if Length $\geq 75\text{cm}$)
- or BMI ≥ 17.5
- **AND** no oedema for 10 days
- Education has been completed
- Immunisation is up-to-date
- Adequate arrangements have been made for follow-up



Picture 1: Marasmic child



Picture 2: Kwashiorkor

Admission Examination sheet

Reg. N°..... Parent's name:..... First name:..... Age.....d/m/y Sex

Date of examination:/...../..... Examiner's name..... Status

Who is giving the history? *patient/mother/father/sister/grandmother/aunt/other*.....

Is this person the main **caretaker** for the patient at home? *yes/no* If not, who is the **caretaker**?.....

History of present illness

How long has the patient been ill?h/ d/ wk/ mo/ yr

What are the **complaints** - in the patients own words - and how long has each been present?

1..... h/ d/ wk/ mo/ yr

2.....h/ d/ wk/ mo/ yr

3..... h/ d/ wk/ mo/ yr

4.....h/ d/ wk/ mo/ yr

Describe the details of the complaints, how they have progressed, and the factors associated with each one

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Systematic questions (give additional details of abnormalities above)

Appetite *hungry/ normal/ poor/ very poor* **Weight is** *decreasing/ steady/ increasing*d/ wk/ mo

Swelling: *none/ feet/ legs/ face/ all over*.....d/ wk/ mo **Eyes** *sunken no/ recent/ longstanding*

Diarrhoea *N Y*.....h/d/wk/mo stools per day *Normal/ watery/ soft/ blood/ mucus/ green/ pale*

Vomiting *N Y*.....h/d/wk/mo. No per day..... Repeated episodes of Diarrhoea *N Y*

Breathing: *normal/fast/ noisy/ difficult* forh/d/wk **Cough:** *N Y* - for.....d/wk/mo

Fever *N Y* **Convulsions** *N Y* **Unconsciousness** *N Y*

Treatment: Patient has already seen *Dr/ Clinic/ Hospital/ Traditional healer*times for this illness.

Treatment given

Past and social history

Past diseases: describe.....

Mother / father absent *N Y* reason..... wk/mo/yr **Patient:** *twin/ fostered/ adopted/ orphan*

Gestation: *early/ normal* or.....wk/ mo **Birth weight:** *large/ normal/ small* orKg/Lb

Mother's ageyr n° live births n° Living children

Family eating together: n° adults..... n° children.....

Resources (food income crops livestock).....

Diet history

breast feed alone forwk/ mo age stopped breast feeding.....wk/mo

Food before ill *breast/ milk/ porridge/ family plate/ fruit/ leaves/ drinks/ other*

Food since ill *breast/ milk/ porridge/ family plate/ fruit/ leaves/ drinks/ other*

Last 24h -describe

Age . N°..... Parent's name:..... First name:.....

Age..... d/m/y Sex

General does the patient look: not -ill/ ill/ very ill/ comatose
 Mood and behaviour normal/apathetic/ inactive/ irritable/repeated movements
 Development/regression Patient can: sit/crawl/stand/walk

Ear Nose & Throat

Eyes normal/conjunctivitis/xerosis/keratomalacia mild/mod/severe
 Mouth normal/sore/red/smooth tongue/candida/herpes/angular stomatitis
 Membrane Colour : normal/pale/jaundiced/cyanosed Gums normal/bleeding
 Ears normal/discharging Teeth number -| - normal/caries/plaque

Respiratory system & Chest

Breathing normal/noisy/asymmetrical/laboured/wheeze/indrawing
 Rate /min or more/less than 50/60 Chest normal/asymetric/pigeon/sulcus

Cardiovascular system & Hydration

Oedema none/+/++/+++/uncertain feet/pretibial/hands/face/generalised
 Hydration normal/dehydrated/shock/uncertain Passing urine N Y
 Eyes normal/sunken/staring Peripheries normal/warm/cold
 Pulse rate /min normal/strong/weak Heart sounds normal/gallop/murmur

Gastro-Intestinal

Stool not seen/normal/soft/watery/green/pale/mucus/blood /
 Abdomen: normal/distended/tender/visible peristalsis
 bowel sounds : normal/active/quiet/absent splash N Y
 Liver..... cm below costal margin normal/firm/hard smooth/irregular
 Spleen not felt/felt/large - normal/firm/hard - tender/painless

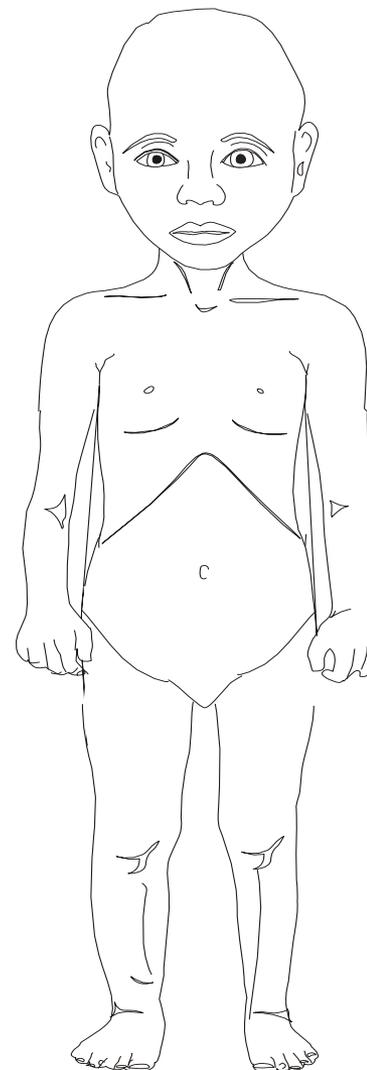
Nervous system

Tone normal/stiff/floppy
 Meninges normal/stiff neck/Brunzinski/fontanelle bulging
 Reflexes normal/increased/decreased/absent

Skin Hair Bone Lymph Nodes

Skin change none/mild/mod/severe peeling/raw/ulcers infection/cuts/bruises
 Perineum normal/rash/raw/candida Purpura N Y
 Hair black/brown/red/blond normal/easily plucked/bald/ding
 Scabies none/local/generalised Eyelash normal/long
 Lymph nodes none/groin/axilla/neck Tender/painless Soft/firm/hard/fixed
 Rib ends normal/swollen/displaced Gynecomastia N Y

Describe abnormalities below and draw on diagram



.....

Registration book

Serial #	Registration #	First name	Name	Adress	Birth Date	Age	Sex

Admission							Discharge						Outcome	
Date	Weight	Height	W/H	Oedema	MUAC	Diagnosis	Date	Weight	Height	W/H	Oedema	MUAC		

PRACTICAL EXERCISE (1)

Is the criteria for admission respected for Ana and Halima?

Important Steps

Admission

- Criteria of admission

Phase 1 (acute phase, initial)

Transition Phase

Phase 2 (recovery phase, rehabilitation,
rapid weight gain)

Discharge

- Criteria of discharge

Follow-up

PHASE - I
ACUTE PHASE

Phase 1: Initial Phase

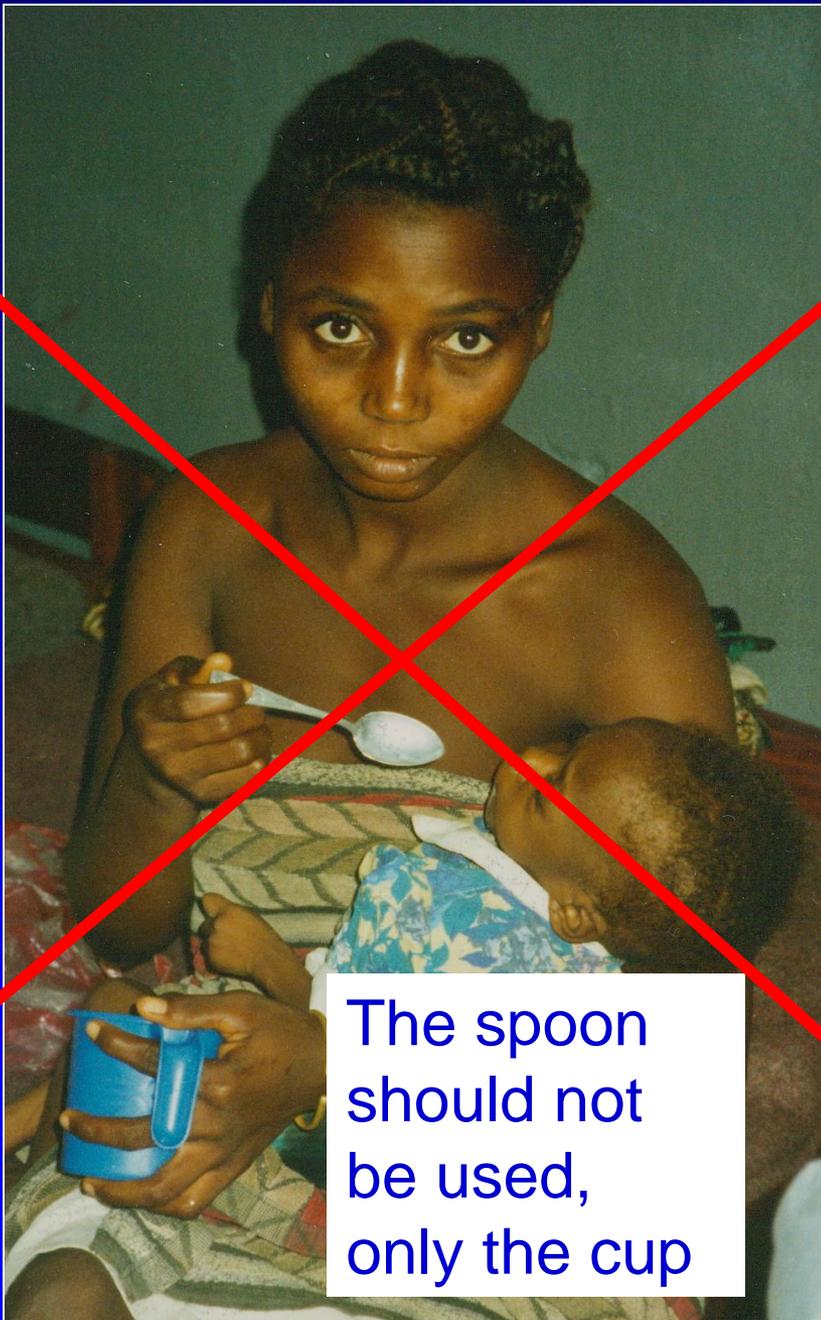
- Dietary Treatment - F75
- Routine medicines
- Prevent, diagnose and treat complications:
 - hypoglycaemia
 - hypothermia
 - dehydration
 - heart failure
 - severe anaemia
 - septic shock
 - infection
- Daily monitoring

Phase 1: Dietary Treatment

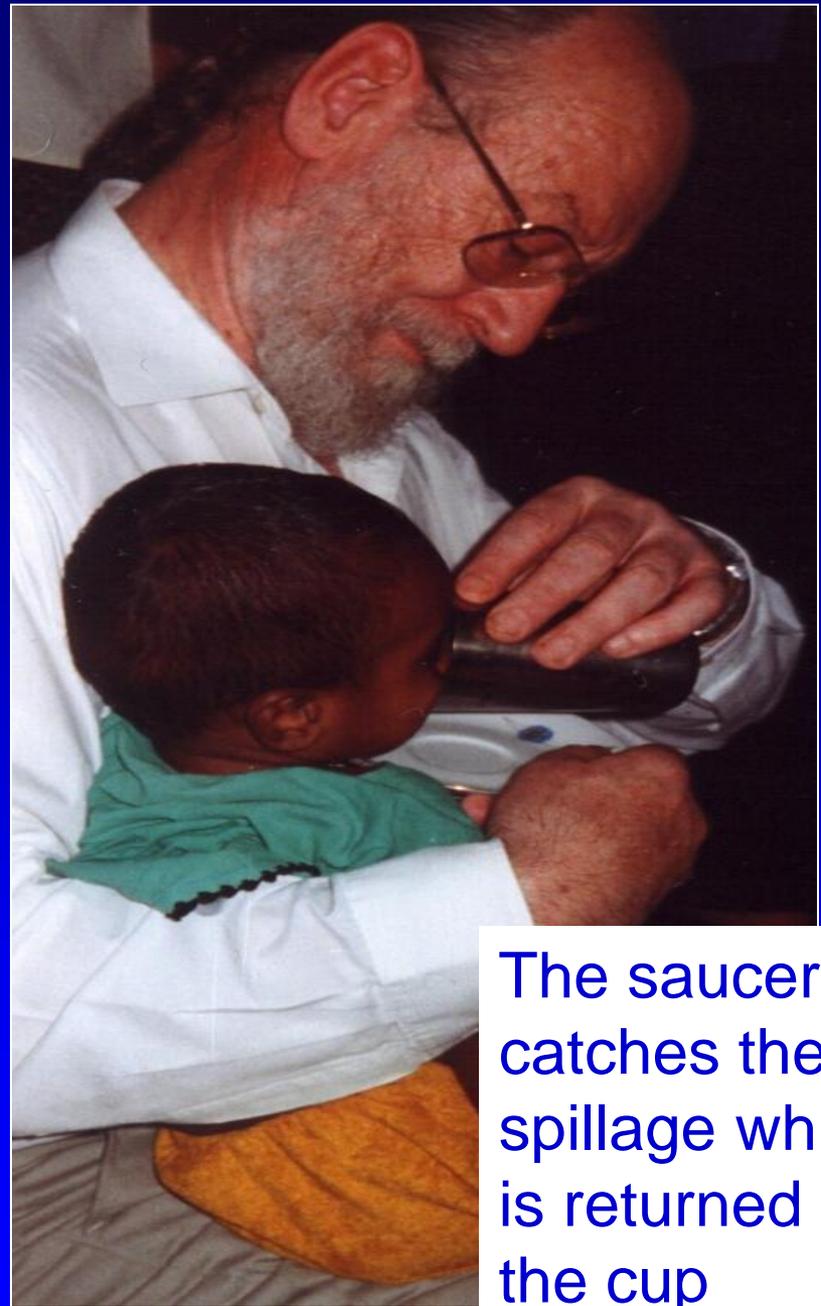
- F75: 75kcal/100ml
 - F75 has less sodium, proteins, fat, lower osmolarity and renal load than F100
 - It is less energy dense.
- Quantities: 100kcal/130ml/kg/d for children
- Feed by cup & saucer or NG-tube (*not spoon*)

Use NG tube when:

- Taking less than 75% of prescribed diet in phase 1
- pneumonia with a rapid respiration rate
- painful lesions of the mouth
- cleft palate or other physical deformity
- disturbances of consciousness.



The spoon should not be used, only the cup



The saucer catches the spillage which is returned to the cup

PRACTICAL EXERCISE (2)

Calculate the amount of F-75 in each meal for Phase I (8 feeds per day) for Ama and Halima.

Check in the look-up tables in the Technical Notes and also the WHO manual.

Ama (7.8kg)

- Every 3 hrs (8 feeds): 127ml

Halima (6.6kg)

- Every 3 hours (8 feeds): 107ml

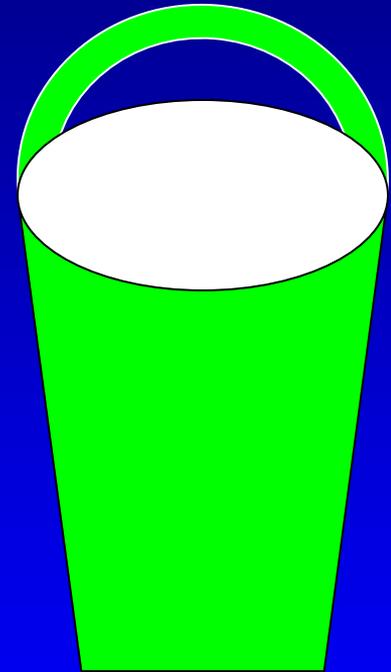
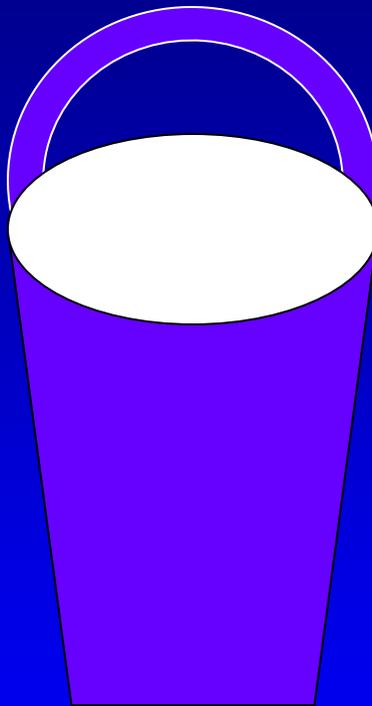
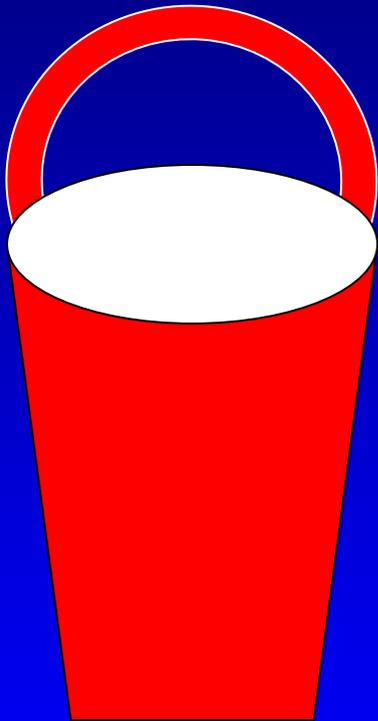
PHASE 1

Look-up table for volume of F75 to give per feed



Class of Weight (kg)	MI for each feed (8 feeds/day)	MI for 24hrs
2.0 – 2.1	40	320
2.2 - 2.4	45	360
2.5 - 2.7	50	400
2.8 – 2.9	55	440
3.0 - 3.4	60	480
3.5 – 3.9	65	520
4.0 – 4.4	70	560
4.5 – 4.9	80	640
5.0 – 5.4	90	720
5.5 – 5.9	100	800
6 – 6.9	110	880
7 – 7.9	125	1000
8 – 8.9	140	1120
9 – 9.9	155	1240
10 – 10.9	170	1360
11 – 11.9	190	1520
12 – 12.9	205	1640
13 – 13.9	230	1840
14 – 14.9	250	2000
15 – 19.9	260	2080
20 – 24.9	290	2320
25 – 29.9	300	2400
30 – 39.9	320	2560
40 – 60	350	2800

Colour Coding Buckets



Phase 1

Transition

Phase 2

PHASE 1



Phase 1: Routine medicines

- Vitamin A on Day 1, 2, 14
 - 6 to 11 months: 100,000IU
 - 12 months (or 8 kg) and more: 200,000IU
- Folic acid 5 mg single dose
- Broad spectrum antibiotics during phase 1 + 4 days
 - 1st line: amoxicillin 20mg/kg/d tid
 - 2nd line: chloramphenicol 25mg/kg/d tid or gentamycin (7.5mg/kg/d once a day)
- Malaria treatment
- Measles vaccine

Phase 1: Diagnosis and Treatment of Complications

- Hypoglycaemia
- Hypothermia
- Dehydration
- Septic Shock
- Heart failure
- Other associated conditions;
 - Anaemia
 - Eye problems
 - Dermotosis of kwashiorkor
 - Continuing diarrhoea
 - Tuberculosis

Diagnosis and treatment of Hypothermia

- Check the T of the patient: T rectal $<35^{\circ}$ - T axi. $<35.5^{\circ}$ C
- Check the temperature (T) of the room (28 - 32°C)
- Check that the child sleeps with his/her mother

- Warm the patient using the “kangaroo technique” for children with a caretaker
- Put a hat on the child and wrap mother and child together
- Give hot drinks to the mother (hot water is sufficient) to warm her skin.
- Monitor body temperature during re-warming.
- Treat for hypoglycaemia and give second-line antibiotic treatment.
- Do not wash severely ill children!

Diagnosis: dehydration in severe malnutrition

Eyes Sunken

Not recent

Recent onset

Not dehydrated

Conscious

Unconscious

Sleeping

Awake

Eyes not closed

Eyes closed

Eye-lid retracted

Eye-lid normal

Eyes not closed

Eyes closed

Dehydration or Hypoglycaemia

Dehydration or Hypoglycaemia

Dehydration or hypoglycaemia



Treatment of Dehydration

- *ReSoMal*: Rehydration solution for malnutrition
- Compared with WHO ORS, ReSoMal is low in sodium, and pre-mixed electrolytes (potassium, magnesium, zinc, copper, selenium, iodine)
 - 5 ml/ kg/ every 30 minutes for first two hours
 - Then 5-10 ml/kg/hour for the next 4-10 hours
- Give orally except in the case of shock
- Monitor carefully – Be alert for signs of overhydration
 - may lead to heart failure

Diagnosis: Heart Failure

- Physical deterioration with ***a gain in weight***
- **Increasing respiratory rate**
- *“Grunting respiration”* during each expiration –
 - *sign of “stiff lungs”*.
- An increase in liver size
- Tenderness over the liver
- Crepitations in the lungs
- Prominent superficial and neck veins
- Heart sounds: development of triple rhythm
- Increasing or reappearance of oedema during treatment
- A fall in Hb concentration

Phase 1: Daily Monitoring Recorded on the Multi-Chart

- Weight
- The degree of oedema (0 to +++) each day.
- Body temperature (twice per day)
- Stool, vomiting, dehydration, cough, respiration rate, liver size, each day.
- Height after 21 days
- Food intake

TRANSITION
PHASE

Move from Phase 1 to Transition Phase: Criteria

- At least the beginning of the loss of oedema
AND
- The return of a good appetite
AND
- No NGT, infusions, no severe medical problems

Transition Phase

- Feeding frequency, monitoring, drugs and treatment similar to Phase 1
- Change from F75 to F100(100kcal/100ml)
- Increase feeds by 10 ml/kg/day until 200 ml/kg/day is reached.
- Gradual transition is important to avoid heart failure
- Expected weight gain is 6g/kg/d if no oedema

PHASE-II

Phase 2:

Rehabilitation or Recovery Phase

'Catch-up growth'

- No serious medical problems or complications
- And a good appetite.
- Continue with F100 and include porridges and traditional food
- Phase 2 can be undertaken in a Nutrition Unit/TFC, with day-care or with take-home treatment

Phase 2- Recovery or Rehabilitation



Class of weight (kg)	ml per feed 5 feeds /24 h	MI / 24 h
Less than 3kg	<i>Full strength F100 is NOT used at this weight</i>	
3.0 - 3.4	130	650
3.5 - 3.9	150	750
4.0 - 4.9	180	900
5.0 - 5.9	200	1000
6.0 - 6.9	250	1250
7.0 - 7.9	300	1500
8.0 - 8.9	330	1650
9.0 - 9.9	360	1800
10.0 - 11.9	420	2100
12.0 - 14.9	520	2600
15.0 - 19.9	650	3250
20.0 - 24.9	780	3900
25.0 - 30.9	900	4500
30.0 - 39.9	1000	5000
40.0 - 60.0	1200	6000

Phase 2: Routine medicines

- Iron sulphate is added to the diet (1 tab 200mg for 2 liters of F100)
- De-worming: mebendazole or albendazole at the start of phase 2
- Third dose of Vitamin A at day 14

Important Steps

Admission

- Criteria of admission

Phase 1 (acute phase, initial)

Transition Phase

Phase 2 (recovery phase, rehabilitation,
rapid weight gain)

Discharge

- Criteria of discharge

Follow-up

Admission and Discharge

ADMISSION:

- W/H index <70% of the median
- OR bilateral oedema
- OR MUAC <110mm for children from 75cm (>12months)
- Adults BMI<16 or bilateral oedema

DISCHARGE:

- W/H $\geq 85\%$ and MUAC $\geq 12\text{cm}$ (if Length $\geq 75\text{cm}$)
- or BMI ≥ 17.5
- **AND** no oedema for 10days
- Education has been completed
- Immunisation is up-to-date
- Adequate arrangements have been made for follow-up

Follow-up after Discharge

- 2- 4 months follow-up in the Supplementary Feeding Center
- Special register if possible, otherwise integrate



Practical Exercise (3)

Interpretation of Individual Progress

1) Calculate Ana's:

- What is her target/discharge W_t ?
- Her length of stay?
- Rate weight gain g/kg/day? $\frac{W_2 - W_1}{W * (T_2 - T_1)}$

$$W * (T_2 - T_1)$$

$W_t 1 = wt$ on entry of second phase in grams

$W_t 2 = W_t$ at day 15 or on exit of second phase (in grams)

$W = W_t$ on entry of second phase in kg

$(T_2 - T_1) =$ number of days between W_1 and W_2

2) Comment on the progress of Ana and Halima

Monitoring Effectiveness

- Review Percent of Exits:
 - » Recovered
 - » Defaulters
 - » Died
 - » Transfers
- Average weight gain average length of stay
- Coverage
- Analysis of causes of malnutrition
- Analysis of mortality (age-specific, timing etc)
Compilation and analysis of monthly records
in consultation with staff

M & E of TFP - Standard Monthly Report

Monthly report

Name Province District

Opening Date

Month/year...../.....

Class of Age	Total beginning of the month (A)	Admissions (B)					Discharge					TOTAL end of the month (I)	
		wh<70% bmi<16 Muac<110m m	OEDEMA	Relapses		OTHERS (To be specified)	TOTAL (B)	CURED (D)	DEATH (E)	DEFAULTER (> 2 Days of absence) (F)	MEDICAL TRANSF (G)		TOTAL (H)
Mar	Kw			Hosp.	Others								
< 6months													
6-59months													
60months – 10yrs													
Adolescents 11 – 17yrs													
Adults 18 and more													
TOTAL													
							%	%	%	%			

Others Indicators

Rate of weight gained (RWG) (1) – Length of stay (2) Cured 6 – 59 months

Marasmus

Kwashiorkor

Mean of the RWG g/kg/d:

=

Mean of the RWG g/kg/d :.....

=

Mean of the length of stay:.....

=

Mean of the Length of stay:

=

(1) Definition of the RWG g/kg/d [Discharged Weight (g) – Min weight (g)]/[Min weight (kg)*length of stay from the min weight]

(1) & (2) Definition of the mean of the RWG and length of stay = Sum / # 6-59m cured

Assessing Effectiveness

Minimum Standards Sphere project

	Acceptable	Alarming
• Recovery	>75%	<50%
• Death	<10%	>15%
• Defaulter	<15%	>25%
• Weight gain(g/kg/d)	>=8g	<8g
• Length of stay(weeks)	<4	>6

Monthly report

Name of the facility TFC Macenta..... Province Guinea forestiere Supervisor

Date of opening Month/year March / 1996.....

Class of age	Total beginning of the month (A)	Admissions (B)					Discharges					Total end of the month (I)
		W/H<70% BMI<16 MUAC<11cm	OEDEMA	RE-ADMISSION		TOTAL (B)	CURED (D)	DEATH (E)	ABSCONDED (> 2days of absence) (F)	MEDICAL TRANSF (G)	TOTAL (H)	
				Mar	Kw							
< 6month	3	1	0	0	0	1	0	1	0	0	1	3
6-59months	27	10	3	0	2	15	3	2	1	1	7	35
60months – 10yrs												
Adolescents												
Adults 18 +										0		
TOTAL	30	11	3	0	2	16	3	3	1	1	8	38
							37.5%	37.5%	12.5%	12.5%		

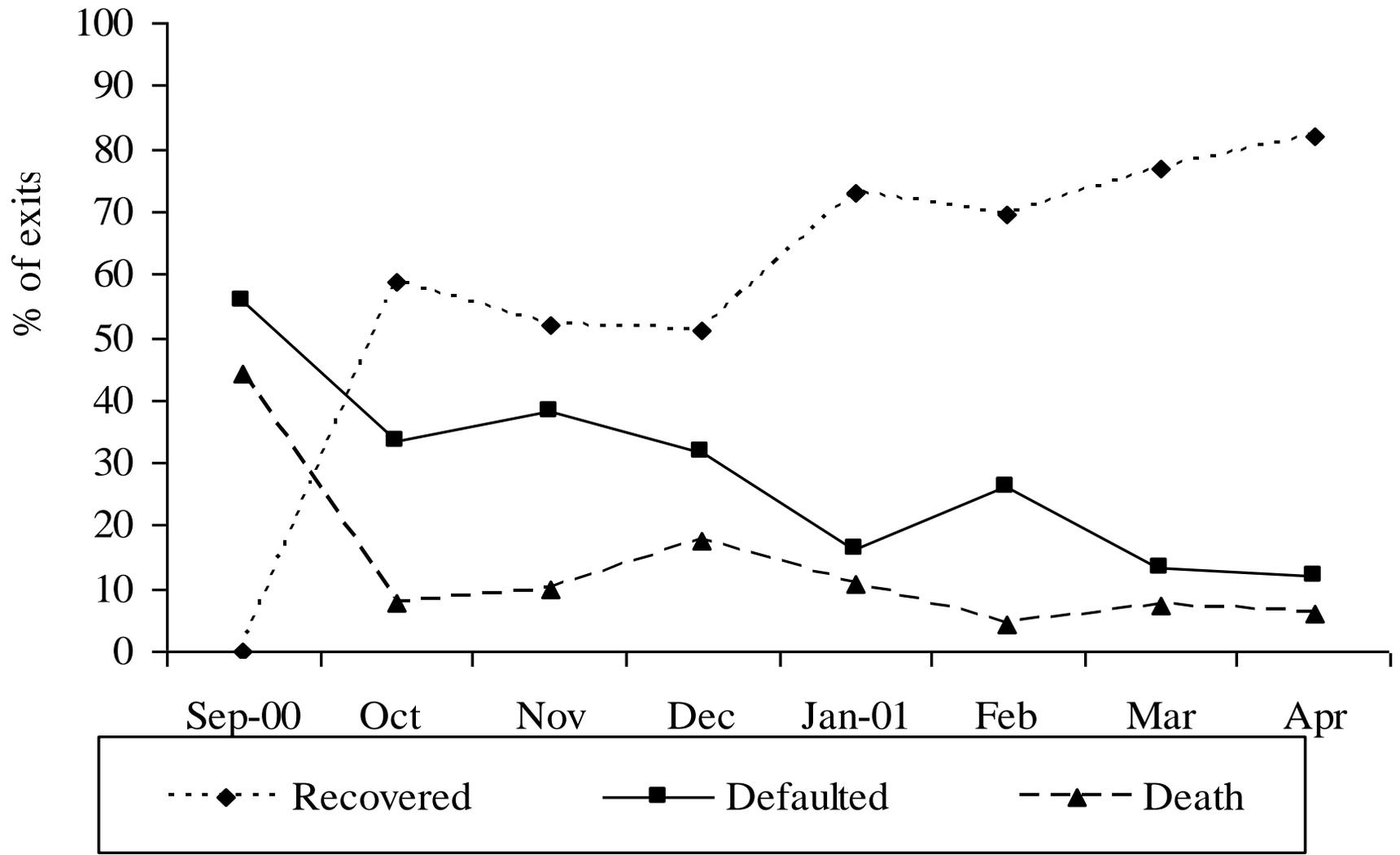
Others indicators

Rate of weight gain (RWG) (1) - Length of stay (2) Cured 6 - 59months			
Marasmus		Kwashiorkor	
Mean RWG (g/kg/d).....	No = 0	Mean RWG g/kg/d...17.6.....	No = 3
Mean Length of stay.....	No = 0	Mean Length of stay ...22d.	No = 3

Cured 6 – 59 months: RWG: $(28.3 + 13.7 + 10.8)/3 = 17.6\text{g/kg/d}$

L. of stay: $(18+17+31)/3=22\text{days}$

Exits from TFC, Wajir, Kenya



Role of UNICEF to Support Best Practice

- Role of Government/UNICEF co-ordination of information for:
 - Quality control & identify which centres are not meeting targets
 - Further standardization of methods
 - Identification of further training needs
 - Ordering supplies and budget planning
 - Indication of a problem or deterioration in nutritional situation
- Sustainability and capacity issues in the longer-term?

Challenges for Design of TFPs in Emergencies

- Other severely malnourished population groups
 - Adults and adolescents
 - Infants less than 6 months
- Severely malnourished unaccompanied children; creating a caring environment
- HIV or chronically ill patients; community network

Severely Malnourished Infants

Option 1:

- Recommendation by WHO is relactation, but this doesn't allow the child to catch achieve rapid catch-up growth.

Option 2:

- Supplement the child with special diets (F100 diluted) but this usually depresses milk production and, even further, the child loses the protection it had before admission.

Severely Malnourished Infants



“Suckling
supplementer”
technique

Malnutrition and breastfeeding: “Supplementer Suckling Technique”

Breastfeeding:

- Breastfeeding every 3 hours or more
- Nutritional support and fluids for mother
- Breastfeeding continued and increased

Supplement:

- F100 diluted
- Given through nasogastric tube while breastfeeding
- Volume gradually decreased
- Medical treatment

What are the constraints and challenges of organizing TFPs?

- High costs (specialized products and staff resources)
- Negative impact on local health structures
- Low coverage, particularly in pastoralist communities
- Low acceptability
- Increased risk of cross-infection
- Siblings remain without carer
- Population displacement
- Decrease in household economic production

Review Quiz!!!!!!

Review

- Universally accepted best practice protocols (WHO, ACF, Golden/Grellety)
- High success rates can be achieved with good management and adherence to protocols
- Resource intensive
- Major challenges in relation to design and effectiveness in emergency contexts

Products for Treatment of Severe Malnutrition

F -75	Lower energy content (75kcal/100ml) Lower fat and protein, mineral and vitamins Phase I
F- 100	Enriched with minerals and vitamins Phase II
ReSolMal	Lower sodium (Na +) and higher potassium (K+)
RUTF	For home /overnight treatment. Same formula as F100





