

Management of Children with Severe Acute Malnutrition



WHO



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Definitions: Forms of malnutrition

- Stunting: Refers to a child who is too short for his/her age
- Wasting: Refers to a child who is too thin for his/her height
- Underweight: Refers to a child who is too thin for his/her age

These 3 children are of the same age



Severe Acute Malnutrition in numbers

World: 667 million children under 5

Wasting prevalence: 7.4 = 49.8 million (2015)

Children with SAM: 2.5% = 16.5 million (2015)

World: U5 mortality: 5.9 million

About 45% of all child deaths are linked to malnutrition

Approx 4% deaths are specifically due to SAM (> 235,000 child deaths)

South Asia: 174 million children under 5

Wasting prevalence : 14.7% = 25.5 million

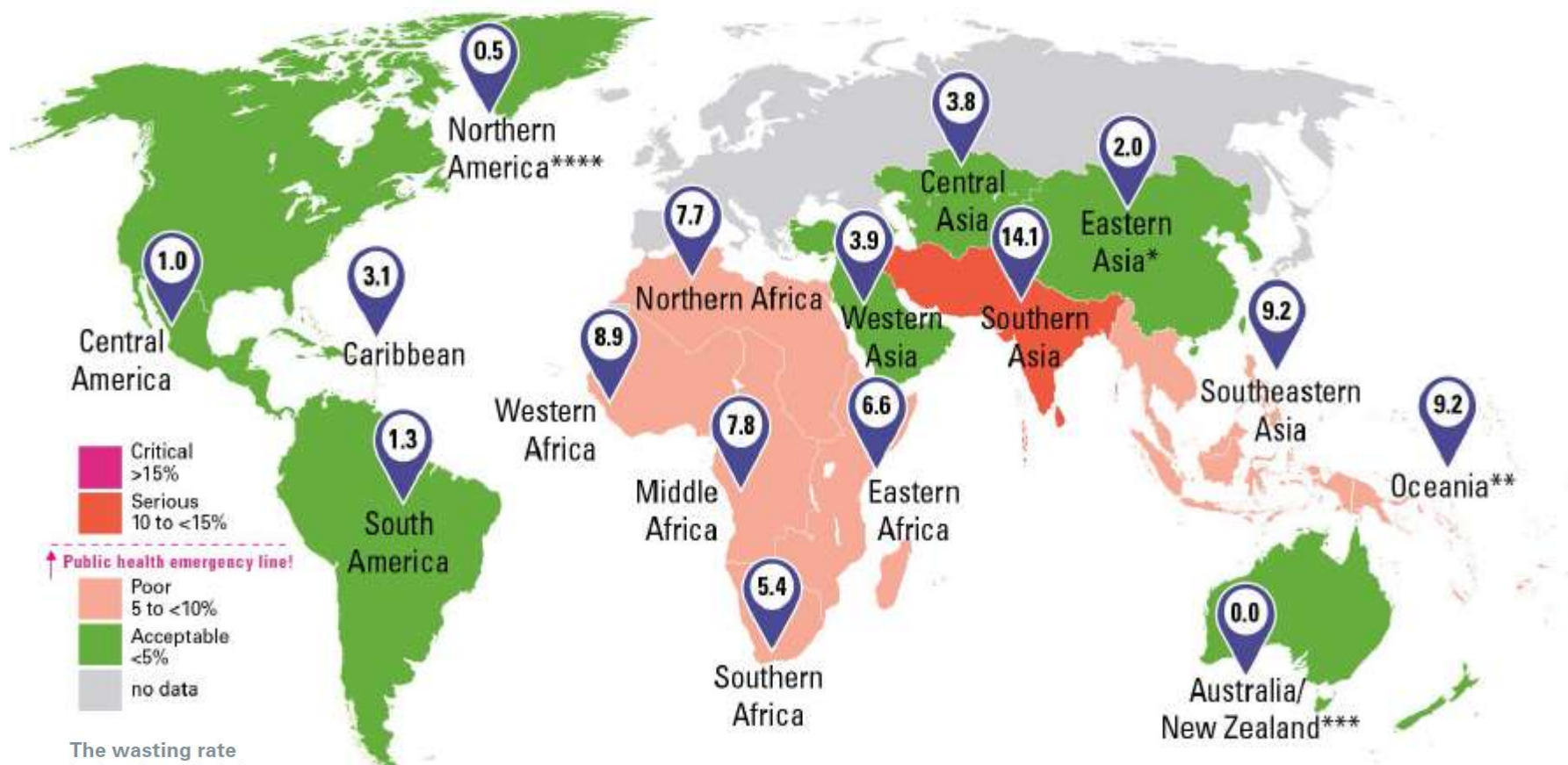
Children with SAM: 4.6% = 8 million

India: 112.8 million children under 5

Wasting prevalence : 15.1% = 16.9 million

Children with SAM: 4.6 % = 5.2 million

Prevalence of Wasting in Children under 5



↑ Public health emergency line!

- Critical >15%
- Serious 10 to <15%
- Poor 5 to <10%
- Acceptable <5%
- no data

The wasting rate in Southern Asia is approaching a critical public health emergency



Percentage of wasted children under 5, by United Nations sub-region, 2015



In 2015, more than two thirds of all **wasted** children under 5 lived in Asia and more than one quarter lived in Africa.

Vulnerability of children with SAM

- Children with SAM are 11 times more likely to die as compared to normal children
- For this reason, the improved management of SAM is an integral part of the World Health Resolution on IYCN (WHA 63.23) to improve child survival and reduce the global burden of disease
- Malnutrition in children typically develops during 6-18 months when growth velocity and brain development are specifically high
- Young children are particularly susceptible to malnutrition if Complementary Foods are of low nutrient density and have low bioavailability of micronutrients
- Children's nutritional status will be further compromised, if complementary foods are introduced too early or too late or are contaminated
- In addition, the nutritional status will get further compromised when children are affected by chronic infections
- Children with SAM have profoundly disturbed physiology and metabolism, and this needs to be corrected in the first phase of treatment for children with or without medical complications

Screening for Severe Acute Malnutrition (6-59 months)

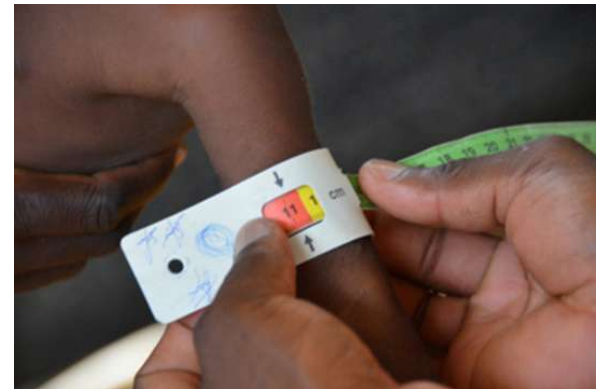
- Weight for height/length
<-3SD from reference
median

and / or

- MUAC <11.5 cm for
children 6-59 months

and / or

- Presence of bilateral
pitting edema



Does this child appear normal?





Why is this child wasted?

- Over 40 nutrients are essential for health
- If even one is deficient then the person will not be healthy and resist disease
- Many are ignored by practitioners and their deficiency is not recognized
- They are divided into two groups in terms of the response to a deficiency

Type I Nutrients

Type II Nutrients

Type 1

Functional nutrients

- has a body store
- reduces in concentration with deficiency
- Specific signs of deficiency
- Growth failure not a feature
- variable in breast milk

Type 2

Growth nutrients

- has no body store
- Tissue concentration stable
- no specific signs of deficiency
- Growth failure the dominant feature
- stable in breast milk

Type 1

- iron
- iodine
- copper
- calcium
- selenium
- thiamin
- riboflavin
- pyridoxine
- niacin
- folate
- cobalamin
- vitamin A, D, E, K

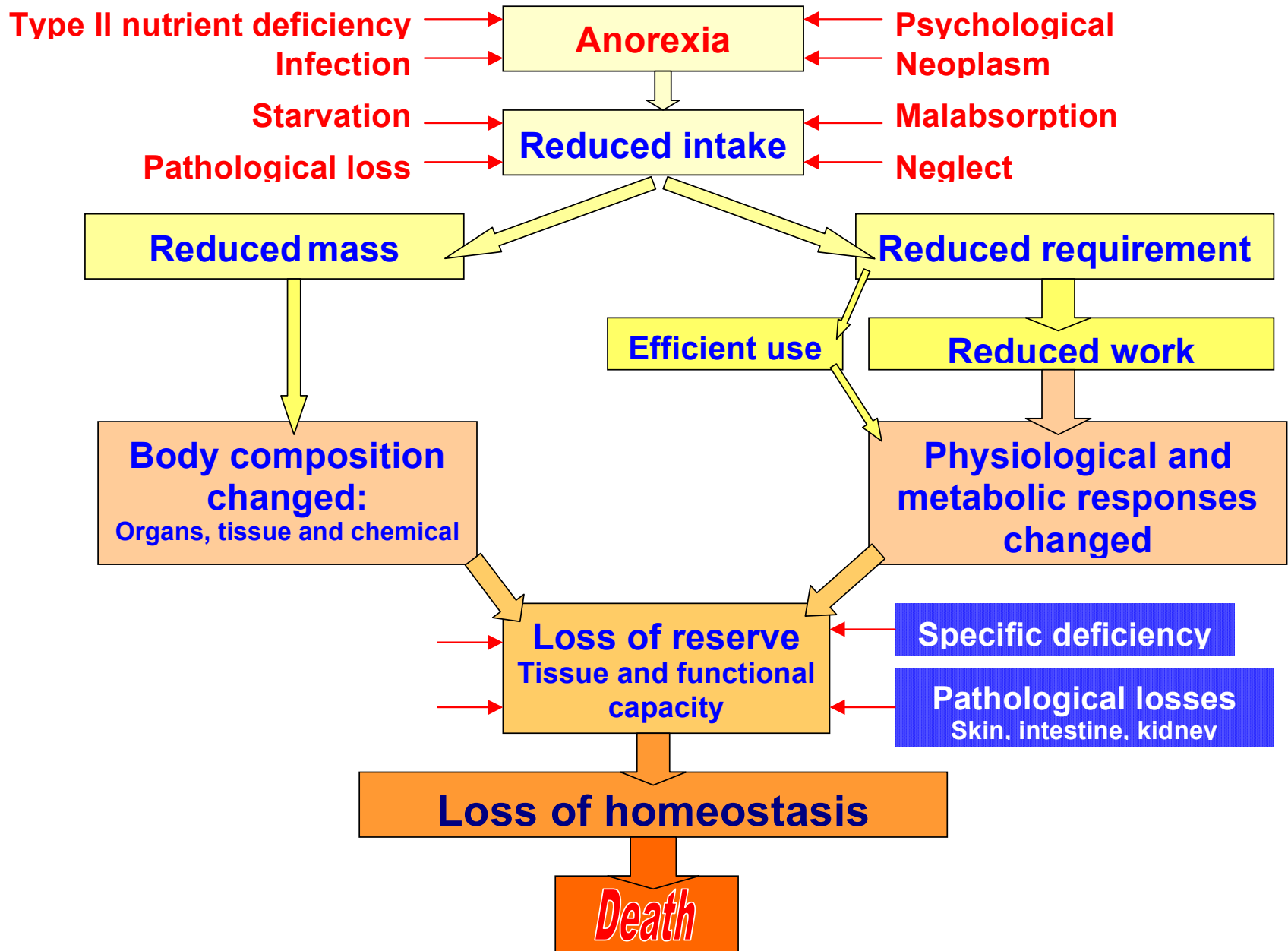
Type 2

- nitrogen
- essential amino acids
- potassium
- magnesium
- phosphorus
- sulphur
- zinc
- sodium
- chloride

Puppies of same age and breed



Factors leading to metabolic changes



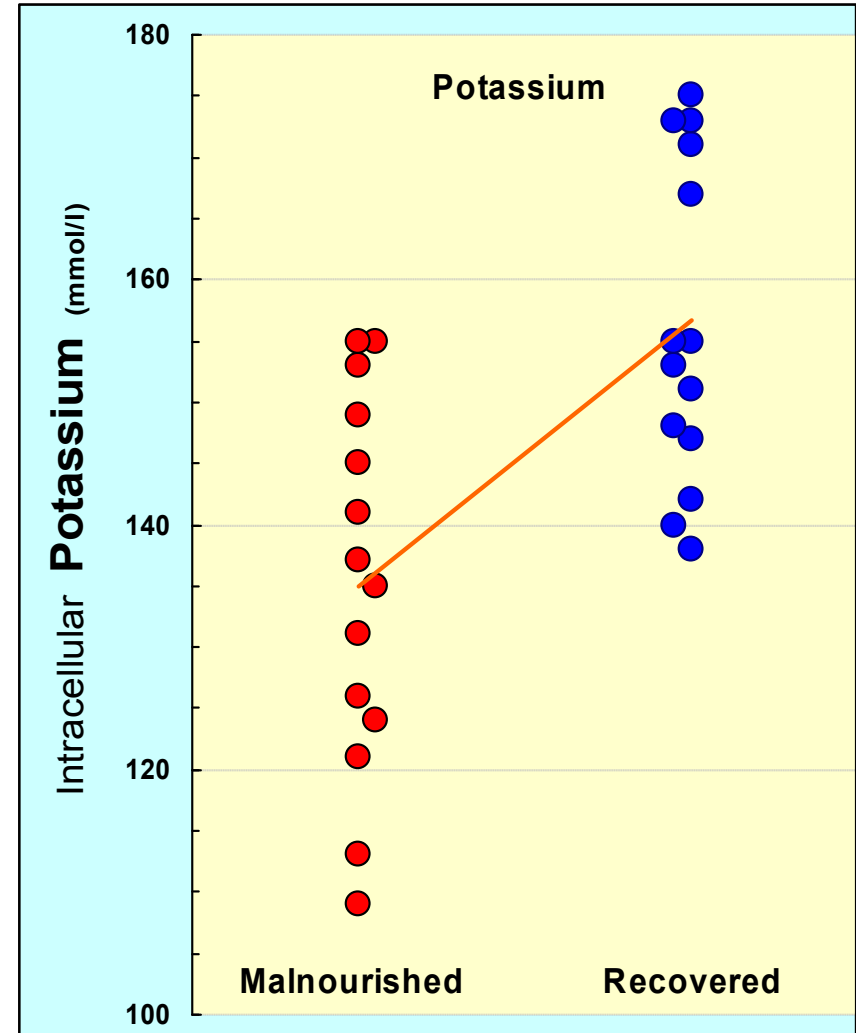
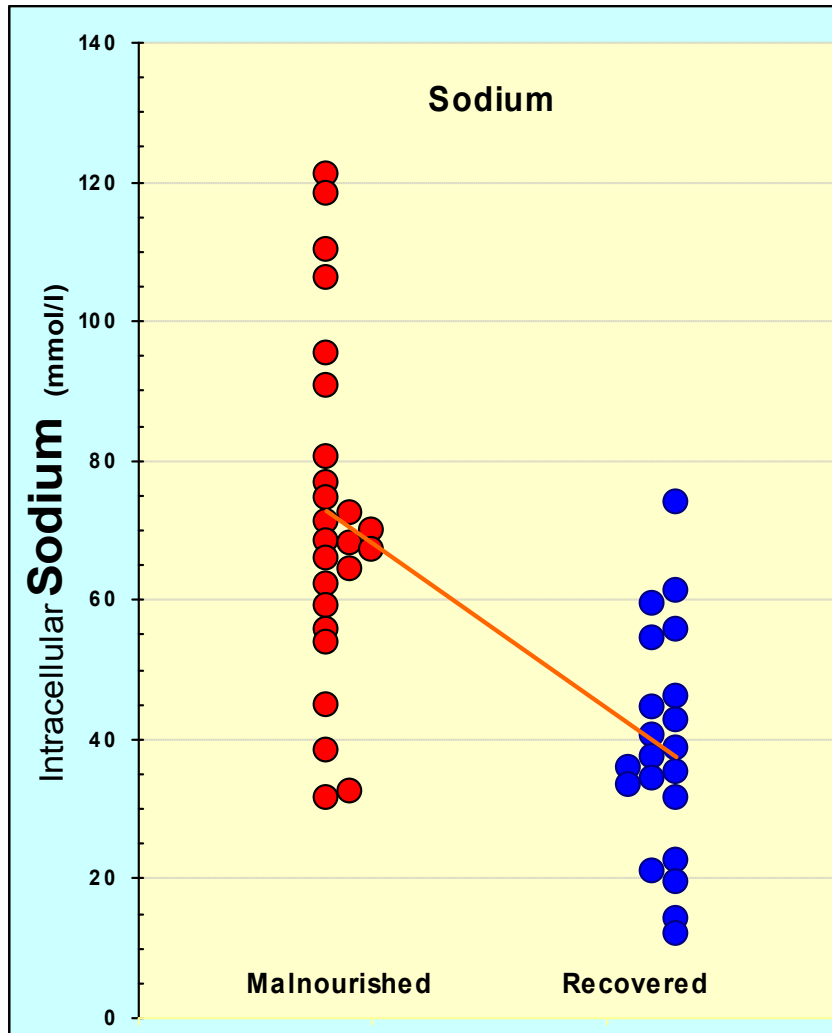
Reductive Adaptation

- Whole body
 - activity
- Organ
 - Cardiac function
 - renal function
 - intestinal function
 - liver function
 - muscle function
- Cell
 - Protein synthesis
 - Sodium-potassium pump
- General
 - Temperature regulation
 - immune function

Electrolyte metabolism in severe malnutrition

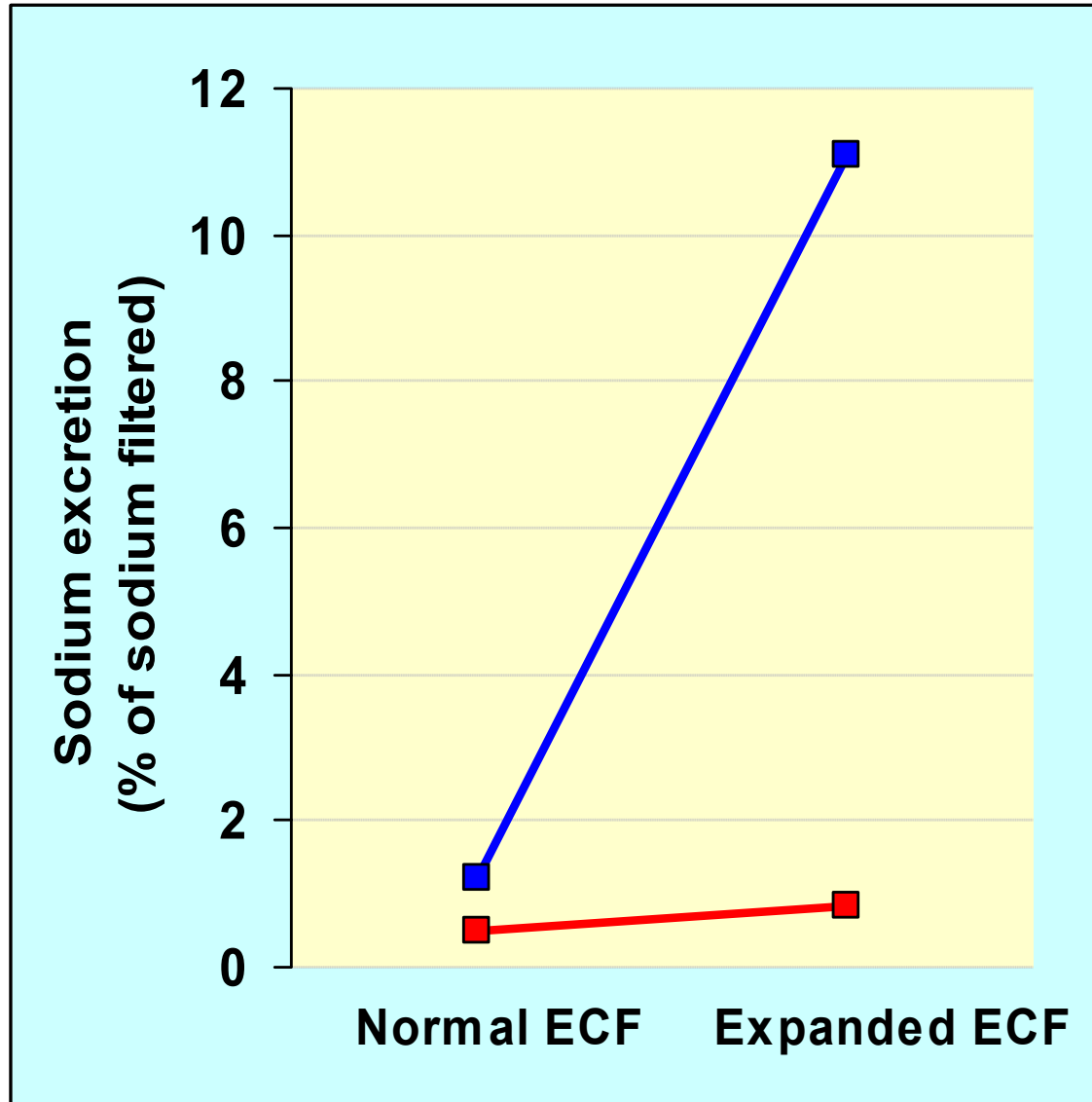
Intracellular SODIUM concentration

Intracellular POTASSIUM concentration



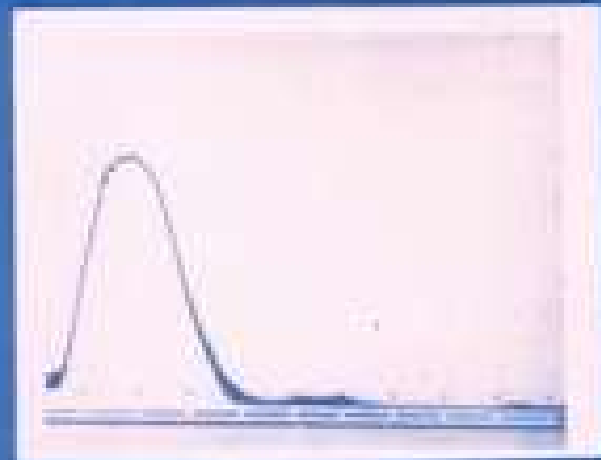
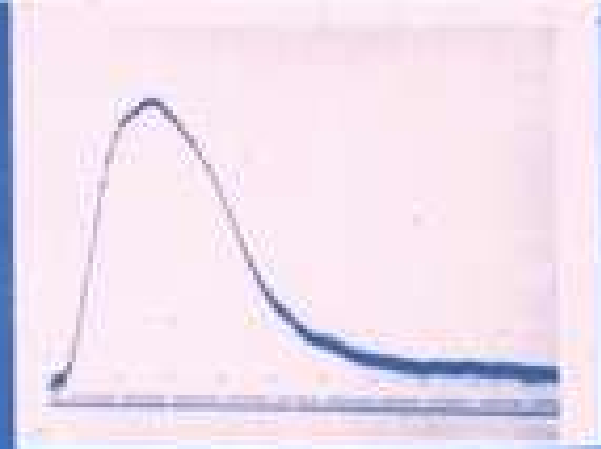
Renal function in severe malnutrition

Sodium excretion with a normal and an expanded extracellular fluid compartment



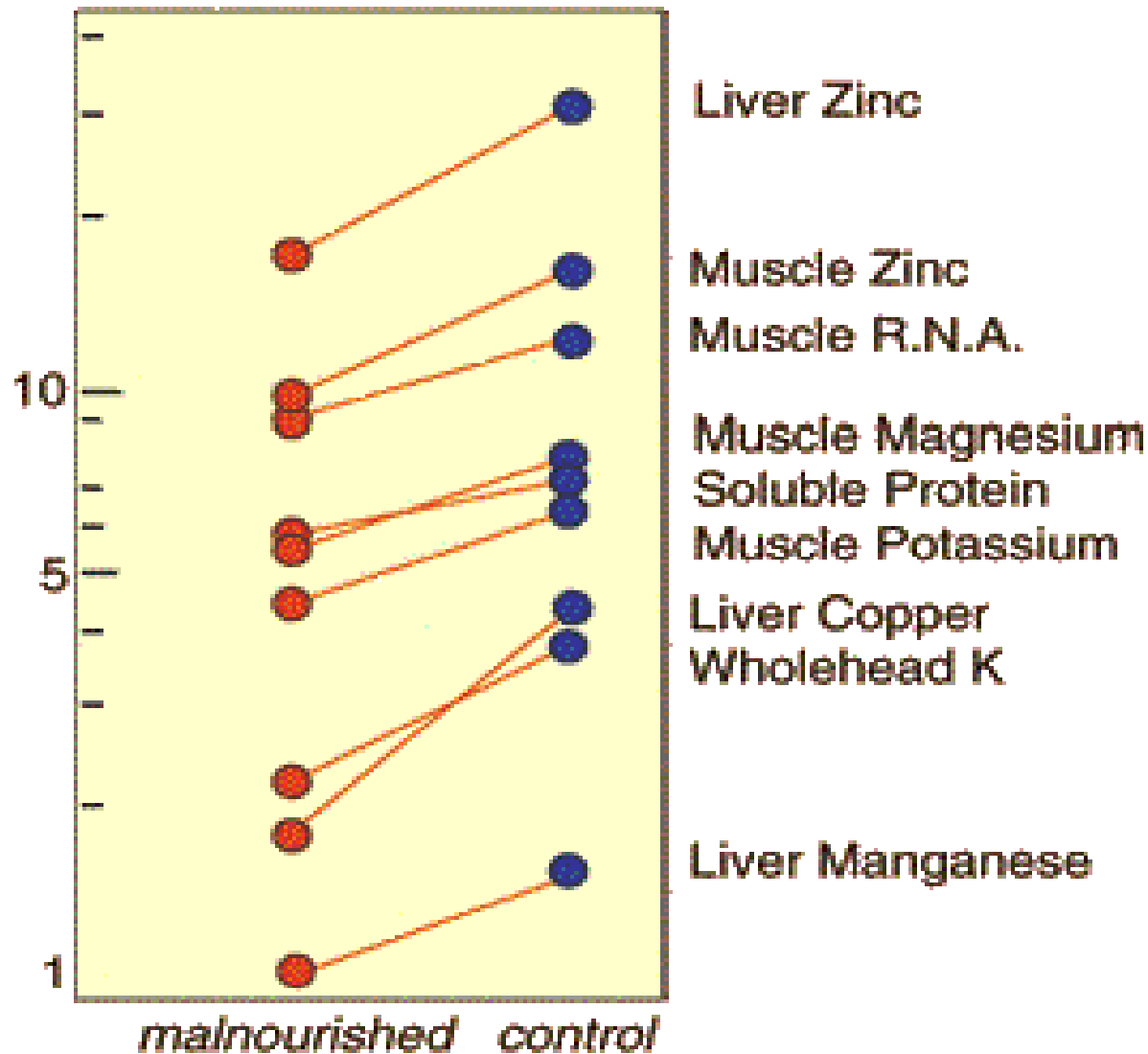
Muscle function

- Ankle reflex measured on admission, after phase 1 and on recovery.
- The same sluggish pattern is seen in skeletal, smooth and cardiac muscle
- This leads to SBO, urinary infection, aspiration pneumonia and easy fatigability



Tissue Constituents

$\mu\text{mol/g FFDW}$ x various factors



Chostochondral junction swelling

- This is *NOT* due to vitamin D deficiency
- It *IS* due to phosphorus or sometimes calcium deficiency



Scorbutic rosary - chronic vitamin C (or copper) deficiency



Vitamin A deficiency





All the patients have gross
osteoporosis
They very rarely get fractures



Affected hair becomes straight, and discoloured –
the forest sign





Intestinal function in severe wasting



Multiple small green mucoid stools are a feature of malnutrition. Counting the stools can give a false impression of diarrhea. It is due to changes in the colonic metabolism and is not related to infections such as entamoeba



SAM with Edema



You must formally test for edema with finger pressure
as you cannot tell by just looking



The liver is nearly always affected.
It becomes fatty.

There is reduction of nearly all
enzymatic activity.

This acquired reduction in
metabolic function may be as
severe as that seen in inborn
errors of metabolism!

Would you give a high protein
diet to a child with a congenital
error of amino acid metabolism?

Then do not do it to the child with
SAM!



Management of SAM in 6-59 month olds

- **Management of community/household level:** Most children with SAM (80%) and no medical complications, and with a good appetite can be managed at the community level
- **In-patient management :** Children with SAM and medical complications, poor appetite and/or edema
- Management aims at recovering physiological, metabolic and immunological functions in the initial phase rather than weight gain
- Phase 2 aims at nutritional rehabilitation with weight gain

Management of SAM in Infants below 6 months

- In infants below 6 months of age, their physiological functions such as thermoregulation, and gastrointestinal, renal and liver functions are relatively immature as compared with older infants.
- These children may require modified management approaches or clinical interventions.
- Currently, the management of SAM in this age group has focused on establishing or re-establishing exclusive breastfeeding, and if not possible some reports of using special therapeutic formula or early introduction of complementary foods are available.
- However, more research is required to formulate the guidelines for identification and management of children with SAM in this group.

Discharge criteria

- Children with severe acute malnutrition should only be discharged from treatment when their:
 - weight-for-height/length is ≥ -2 Z-score and they have had no edema for at least 2 weeks, or
 - mid-upper-arm circumference is ≥ 125 mm and they have had no oedema for at least 2 weeks

Follow up for one year after discharge

- Mother is counseled on the importance of follow up
- With good appetite, the child gains weight at the rate of at least 6-8g/kg/day
- Infection is prevented
- Mother is counseled on appropriate foods and feeding
- Mother is explained about stimulation with play therapy
- Immunization is complete with well maintained record
- Mother is advised to return to the centre any time in case of emergency

Whether this child recovers
or not depends upon you

NOT diagnosing dehydration

NOT giving a drip or a blood
transfusion and

NOT giving ORS or ReSoMal

F75 has much less sodium
than F100 and should be
the initial treatment



THANK YOU!

