

Protein Energy Malnutrition and feeding requirements

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What covering ?

1. What ?
2. Who ?
3. Why ?
4. How notice it ?
5. How manage it ?



1. What ?



What ?

- Illness develop due to *inadequate* intake of
 - Protein
 - Energy

1. What ?

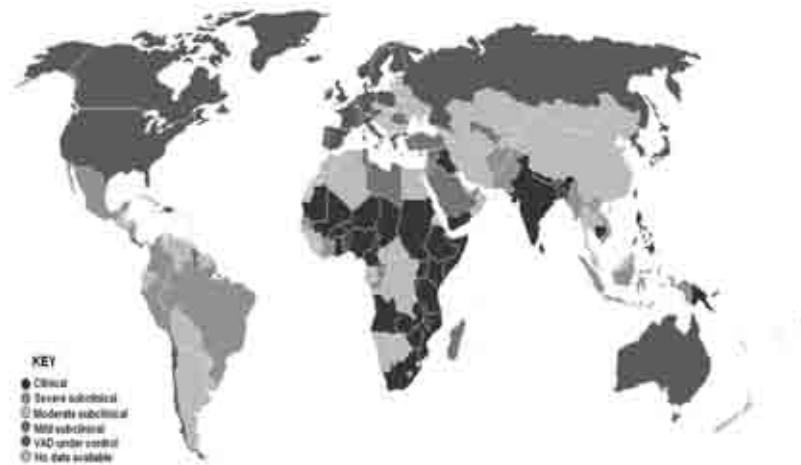
2. Who ?



Who susceptible?



Who susceptible?



Who susceptible?

- Possible in any age group
- Less frequent in older individuals
- Requirements/ kg mass are not as great

1. What ?

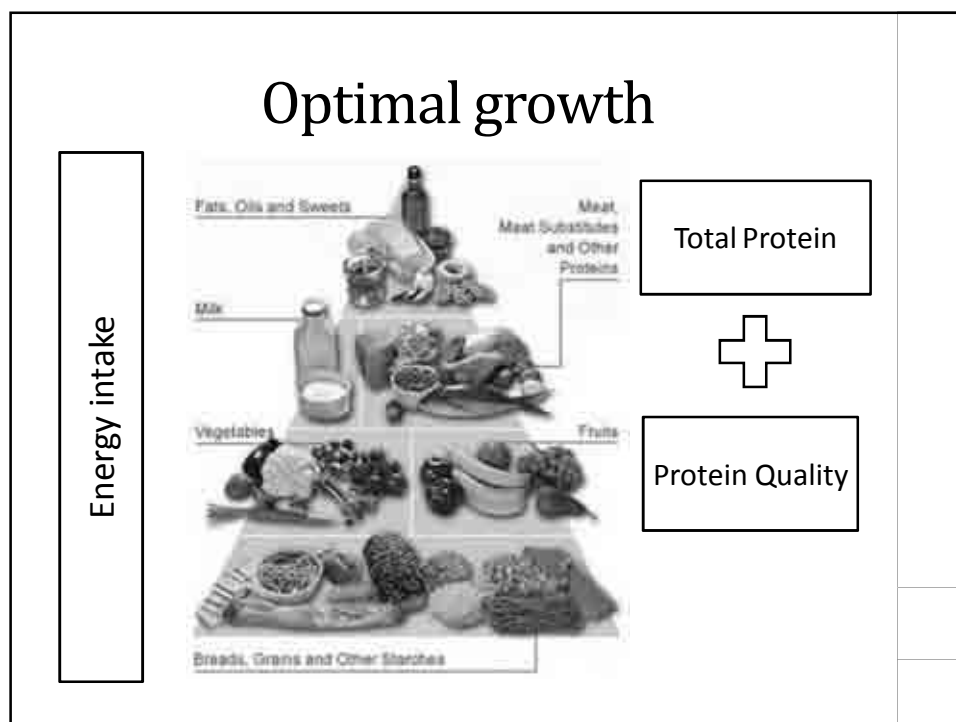
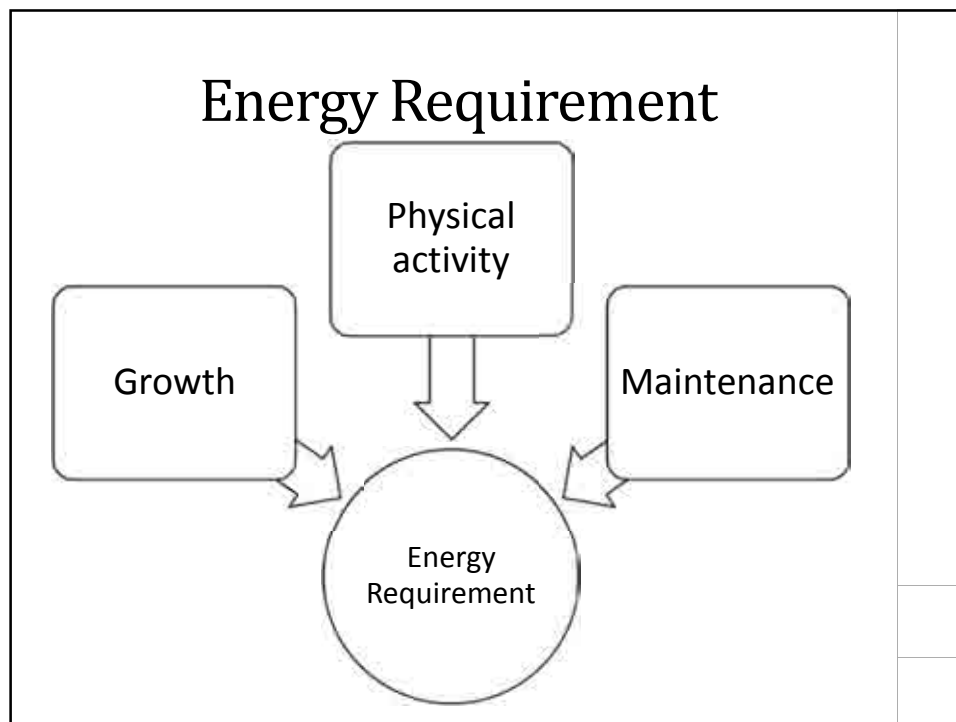
2. Who ?

3. Why ?

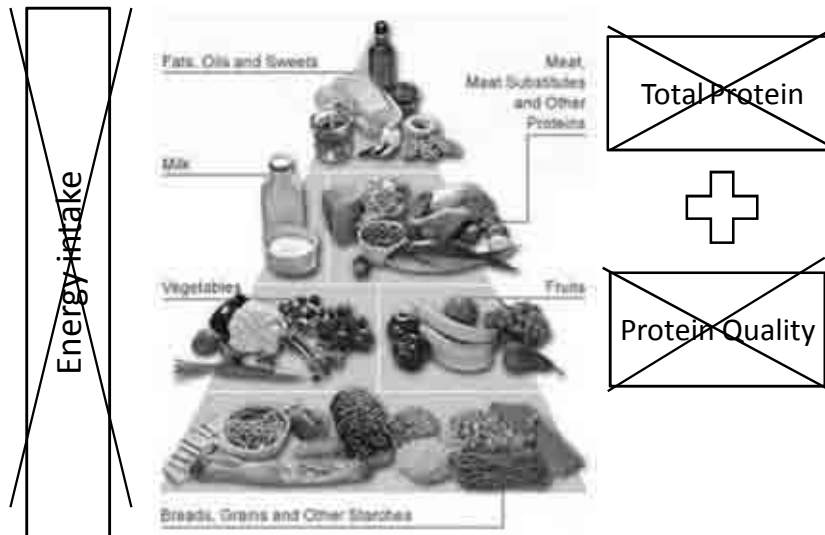


Why ?





Develop PEM



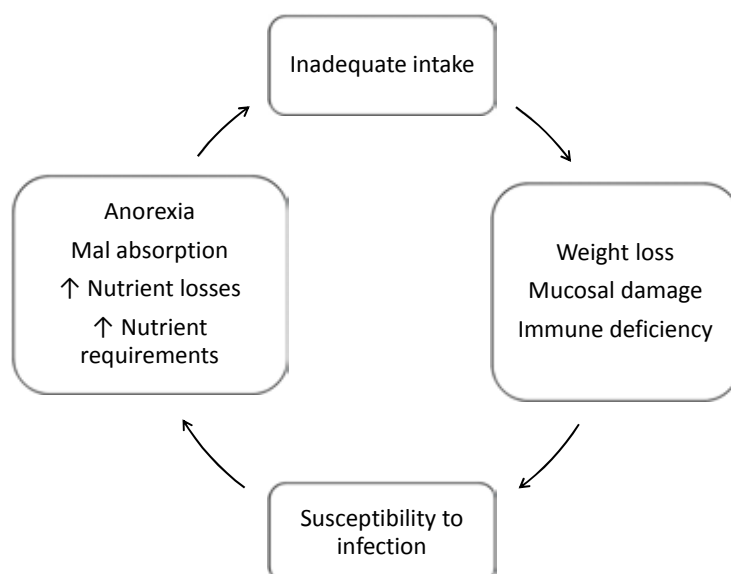
Why ?

- Diseases can cause PEM due to:
 - Intake
 - Absorption
 - Utilization of nutrients is interfered by disease and dysfunction

Why ?

- Diseases can cause PEM due to:
 - Intake
 - Absorption
 - Utilization of nutrients is interfered by disease and dysfunction
- Disease like
 - HIV infection
 - Chronic diarrhoea
 - Mal absorption

The Malnutrition – Infection cycle



1. What ?
2. Who ?
3. Why ?
4. How notice it ?



Clinical presentation

- Depends on:
 - Age
 - Degree of malnutrition
 - Duration of protein and energy deficiency
 - Previous nutritional status
 - Modifications produced by disease

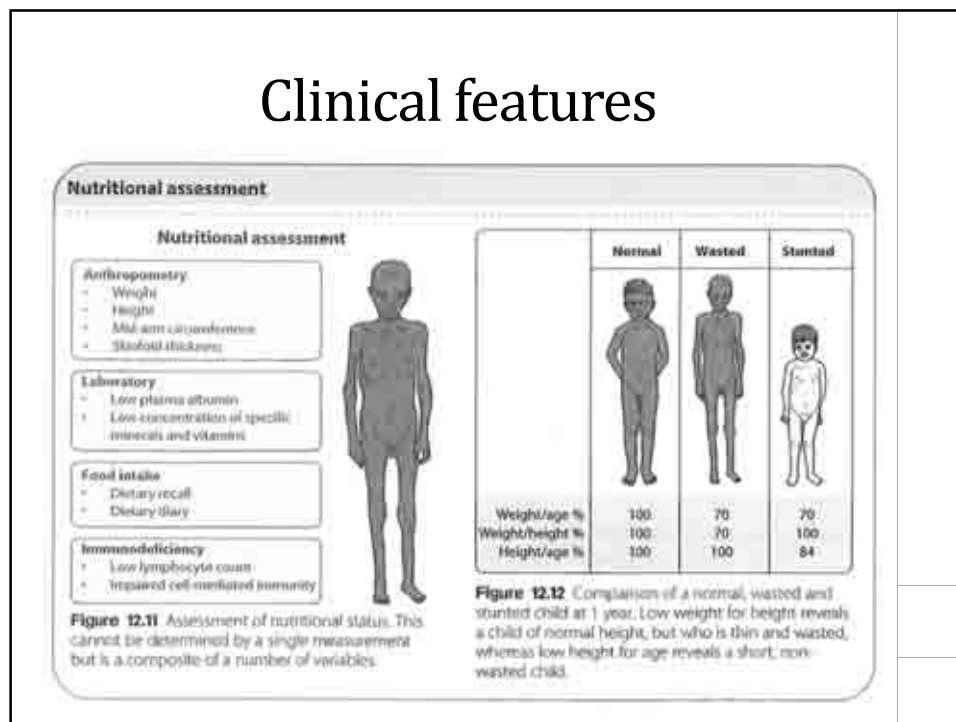
Growth parameters

- Weight for Age
 - Indicates past and present malnutrition
- Weight for height
 - Present nutritional status
 - Indicates recent weight loss
 - Wasting
- Height for age
 - Indicates Long term nutritional status
 - Chronic growth delay
 - Stunting
- Mid upper arm circumference

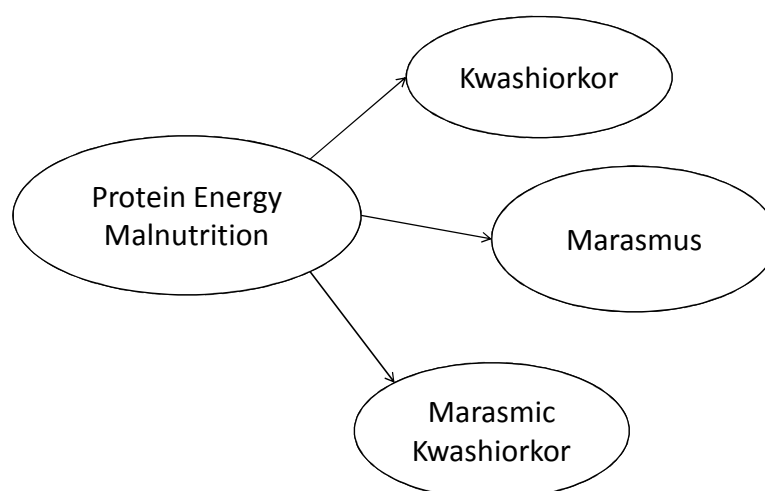
Clinical assessment

- Wide spectrum of disorders under PEM
- Previously used Waterloo and Gomez classification
- Now Z scores to help with diagnosis
- PLUS any signs of visible severe wasting
- PLUS presence of bipedal oedema

Clinical features



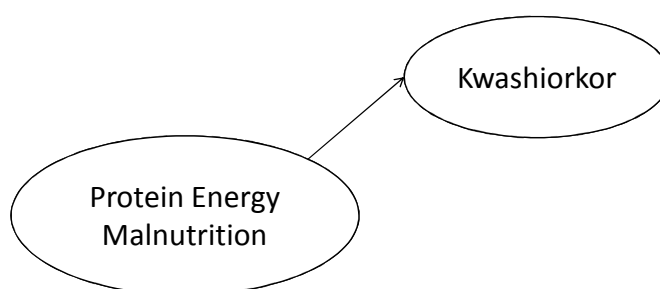
Clinical features of PEM



Clinical features of PEM

	Underweight	Marasmus	Kwashiorkor	Marasmic Kwashiorkor
Weight	↓	↓↓	↓	↓↓
Height	↓	↓	↓	↓
Dermatosis	No	No	+	+
Oedema	No	No	++	+
Apathy/Irritability	No	+	++	++
Muscle wasting	+	++	++	++
Enlarged liver	+ / -	+ / -	++	+
Anaemia	+ / -	+	++	+
Infections	+ / -	+	++	++

Clinical features of PEM



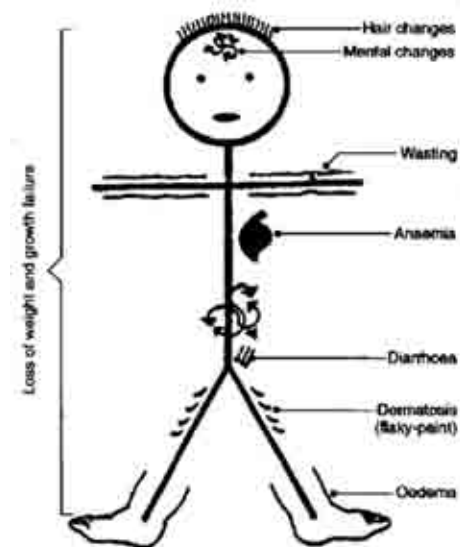
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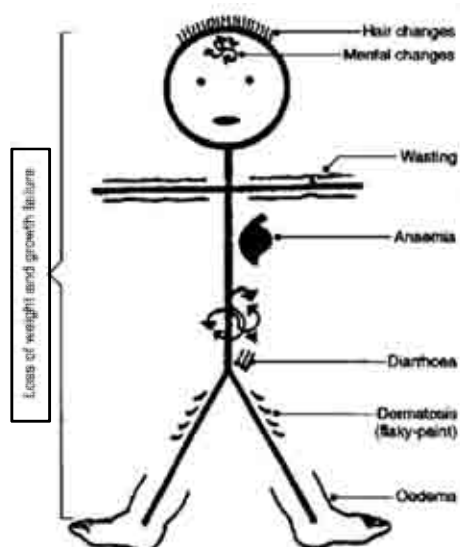
Kwashiorkor

- Severe form of PEM
- Mostly after weaning from breast or bottle
- Present with:
 - Failure to thrive
 - Oedema
 - Anorexia
 - Diarrhoea
 - Skin and mucus membrane lesions
 - Misery and apathy

Clinical features of Kwashiorkor



Growth failure

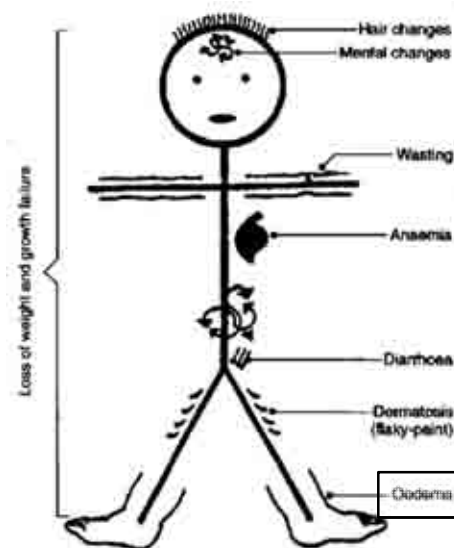


Growth failure



- Deceptively chubby appearance
- Due to oedema
- Excess subcutaneous fat from high carbohydrate diet
- Muscle wasting

Oedema

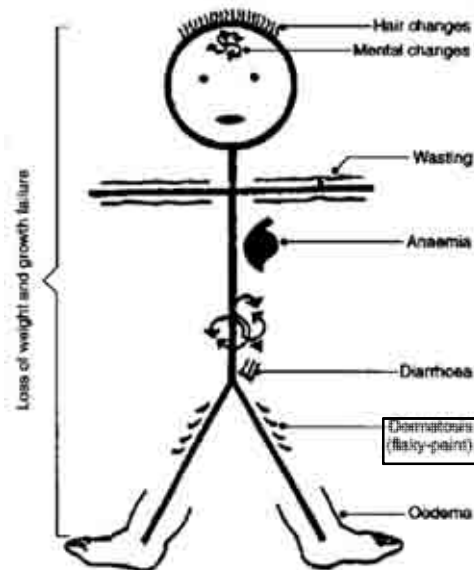


Oedema



- First appear on dorsum of the feet or lower tibia
- Oedema helps to differentiate between marasmus and kwashiorkor
- Pathophysiology is complex

Dermatosis



Dermatosis

Dry scaly pigmentation
Crazy paving



Pseudo Purpura

Bullous desquamation

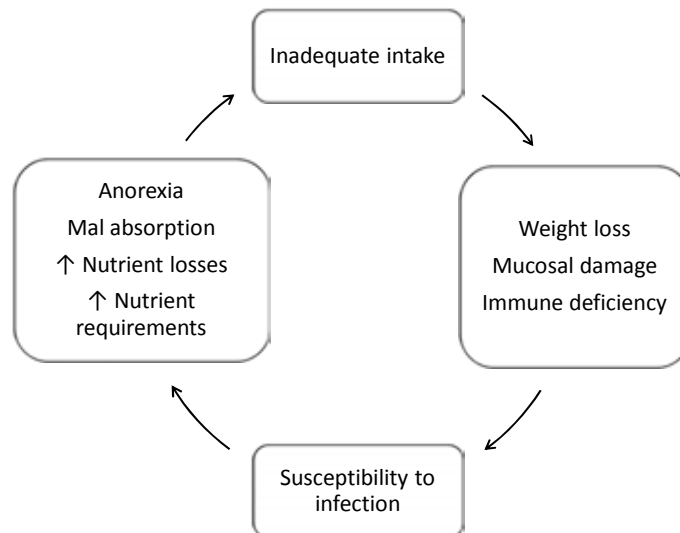


Hair changes

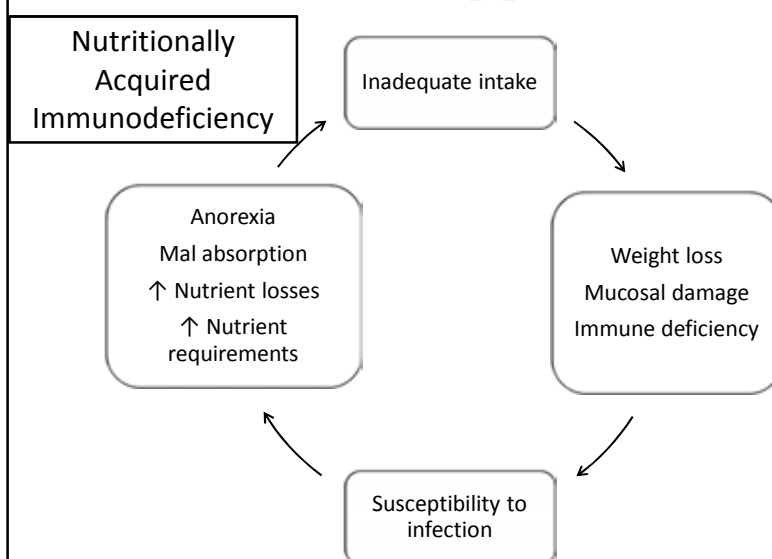


Sparse thin hair
Changes in colour to
Red & Grey

Immunosuppression



Immunosuppression

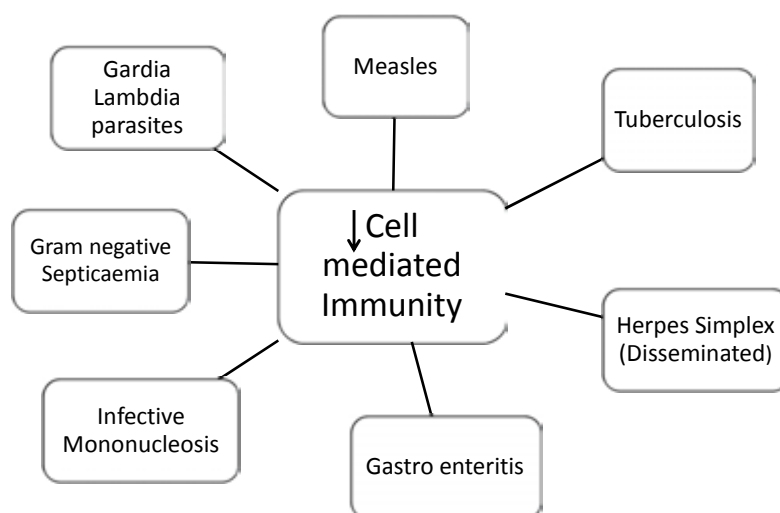


Immunosuppression

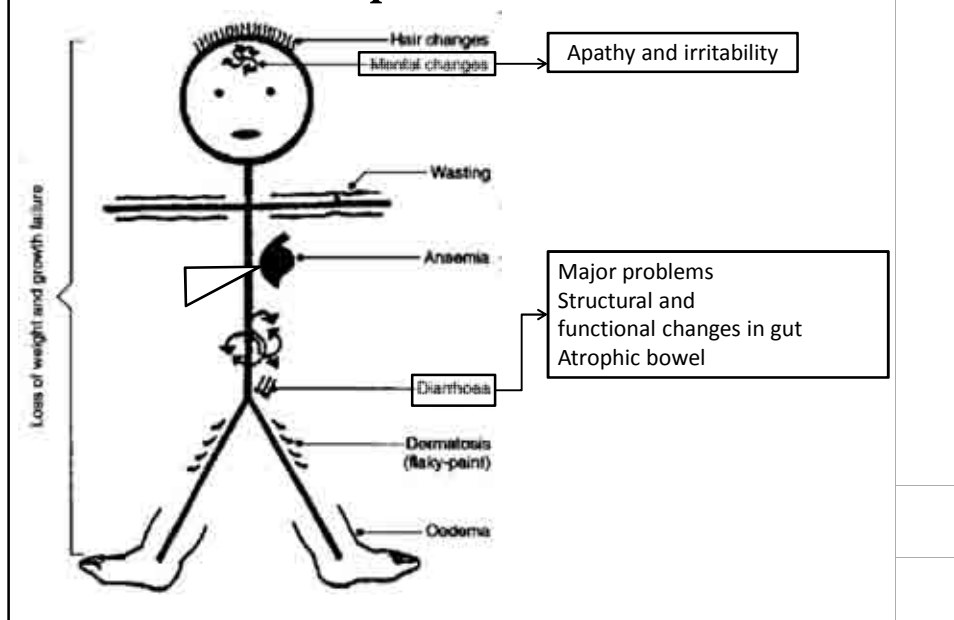
- Infections are often more severe
- Associated with complications
- High mortality
- Deficiencies in Vit A and C
- Zinc, Iron, Folate and trace elements



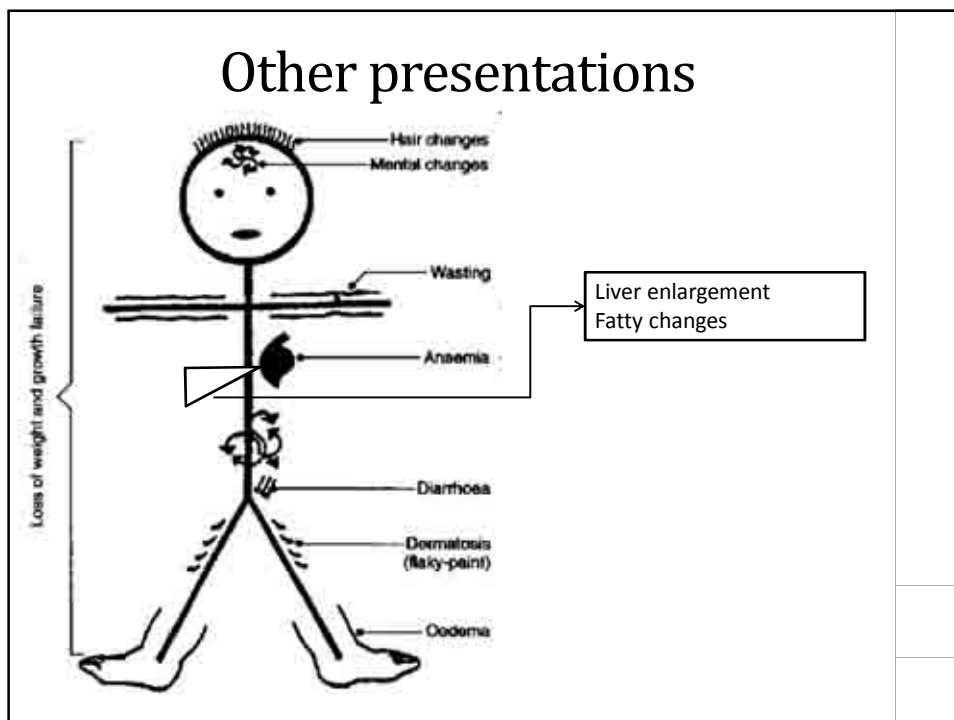
Infections



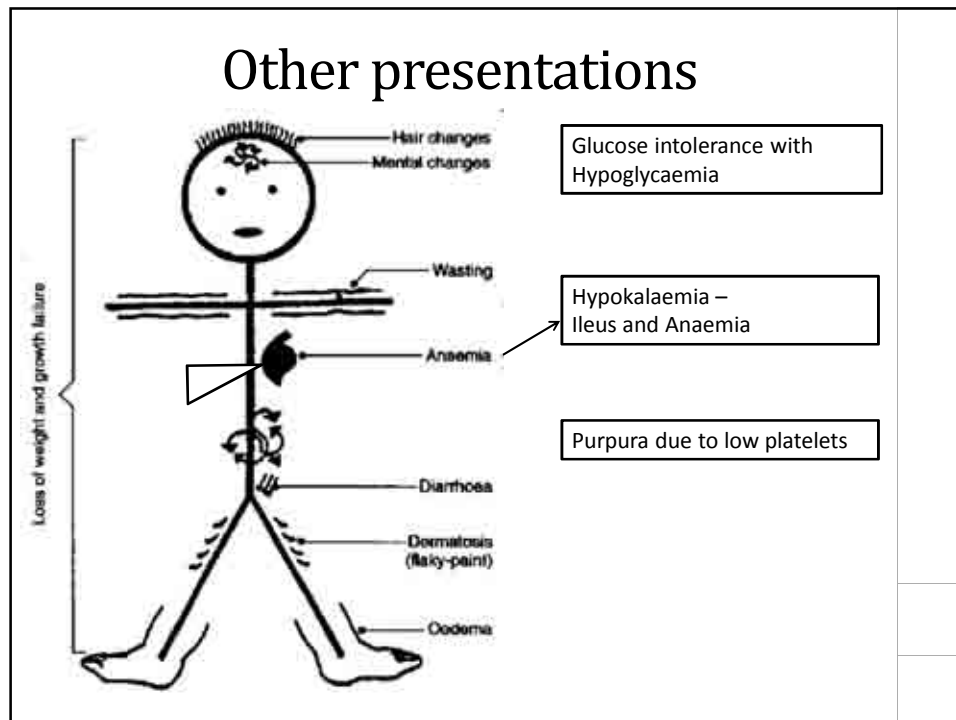
Other presentations



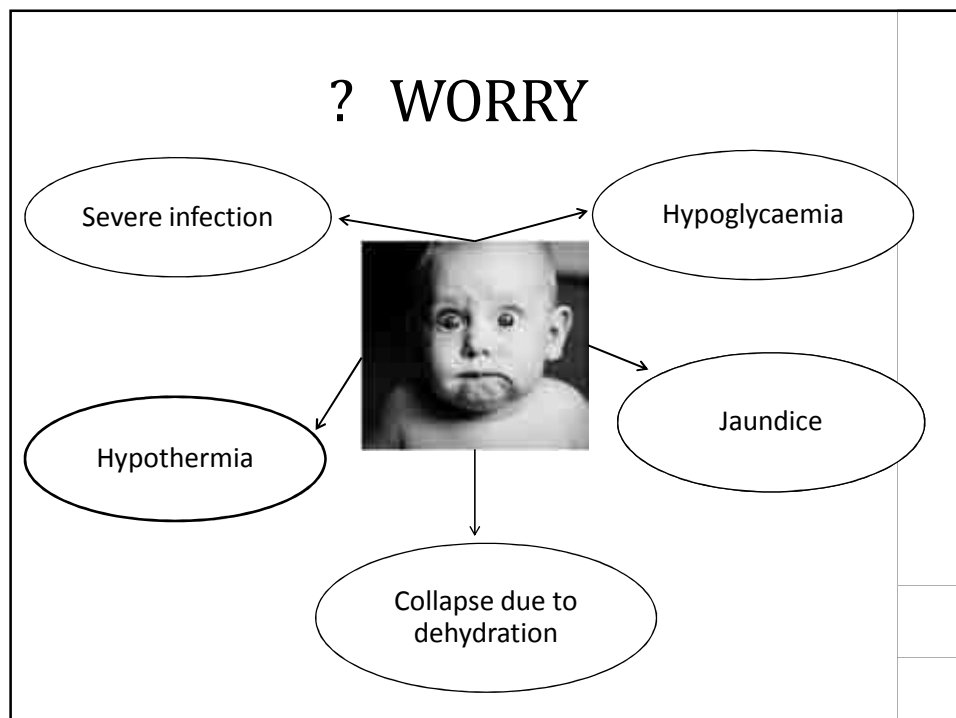
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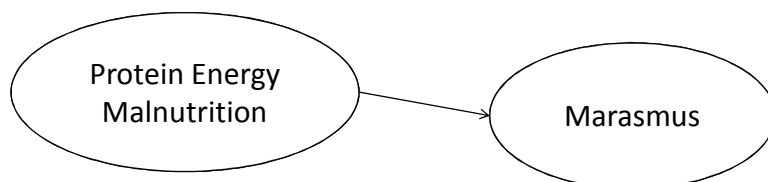
Other presentations



? WORRY



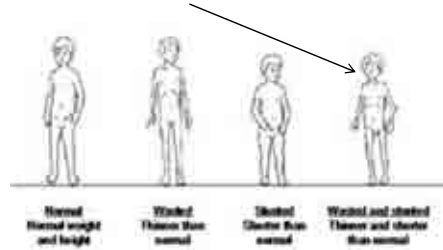
Marasmus



Marasmus

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Infections	+ / -	+	++	++

Marasmus



- First year of life
- After weaning
- Due to prolonged severe diarrhoea

Marasmus

- Presenting symptoms:
 - Failure to thrive
 - Irritable crying
 - Apathy
 - Frequently diarrhoea



Marasmus

- Presenting symptoms:
 - Failure to thrive
 - Irritable crying
 - Apathy
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- Degree of UWFA is extreme
- < 60 % of expected weight for Age
- If chronic diarrhoea
 - Distended abdomen
 - With visible bowel loops

Marasmus

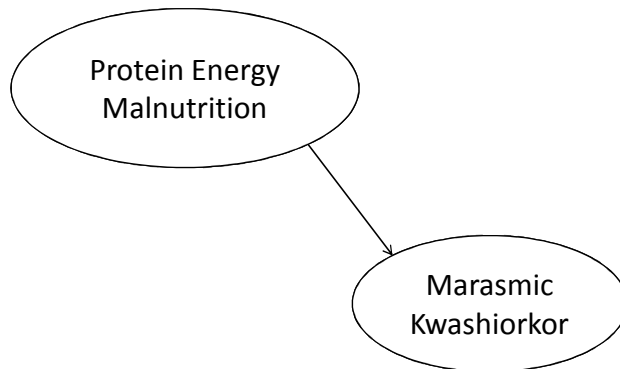
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- Differential Diagnosis
 - Chronic infections like TB
 - AIDS
 - Tropical infestations
 - Psychological factors

Marasmic Kwashiorkor



Marasmic Kwashiorkor

- Wasted forms
- +
- Clinical dermatosis
- And / Or
- Oedema

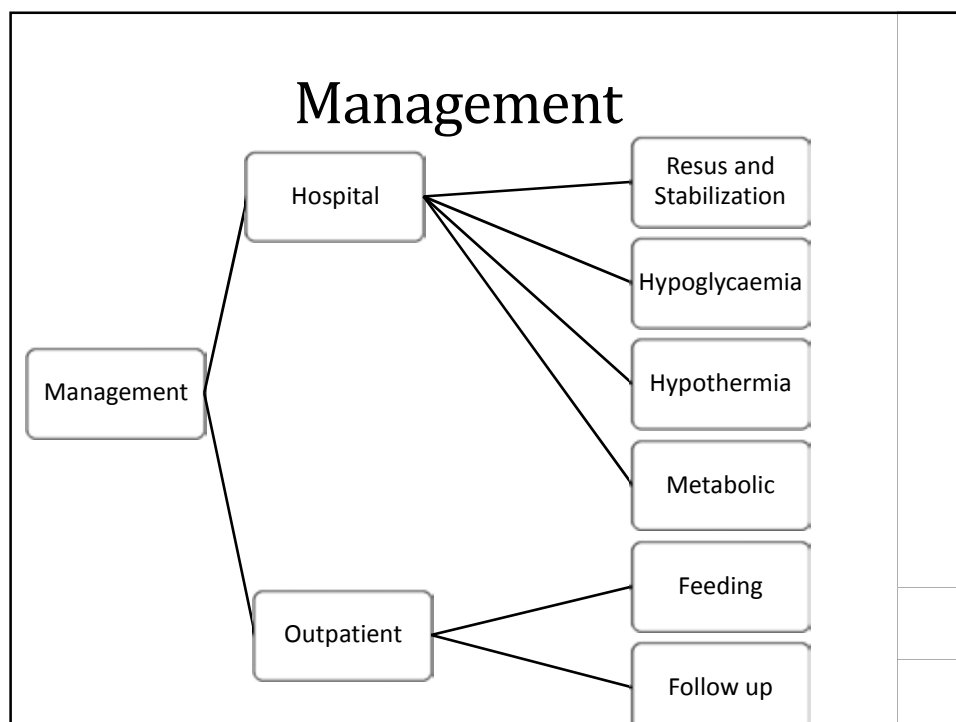
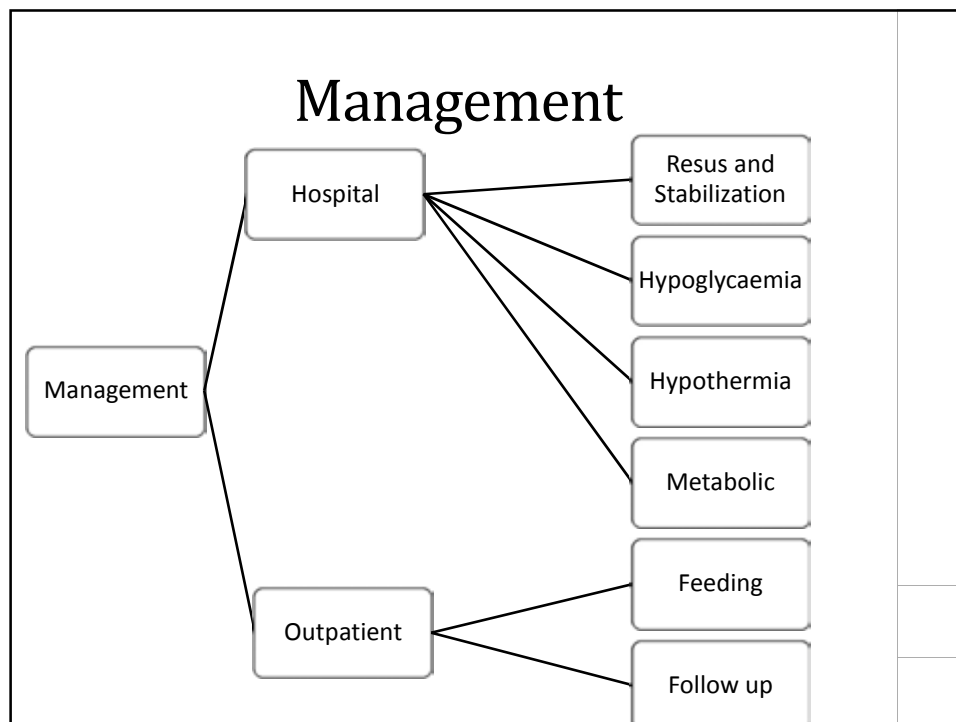
What covering ?

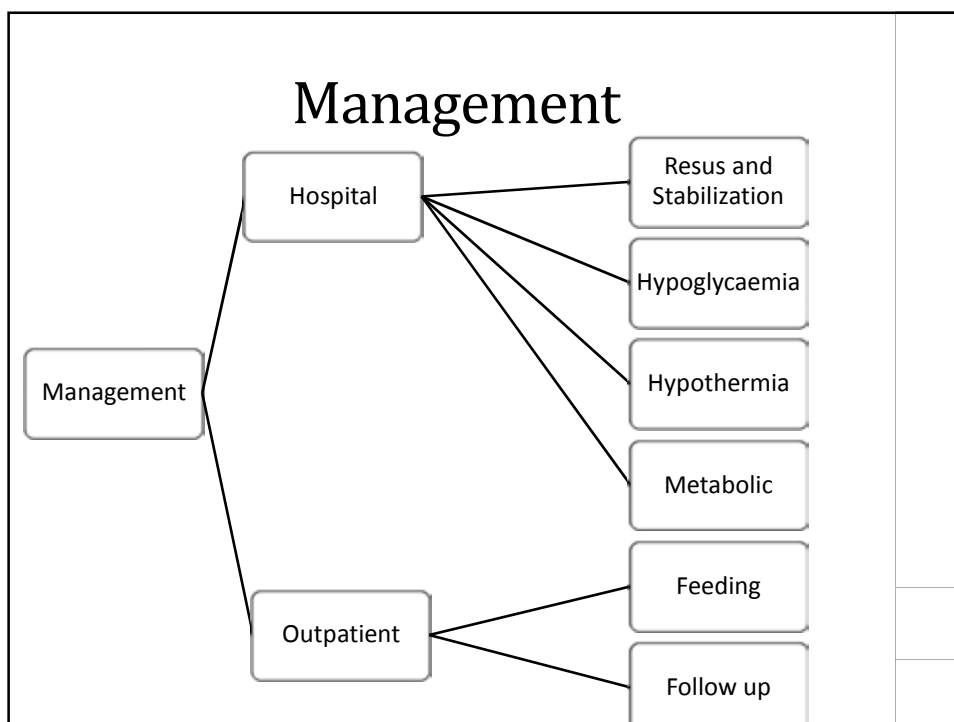
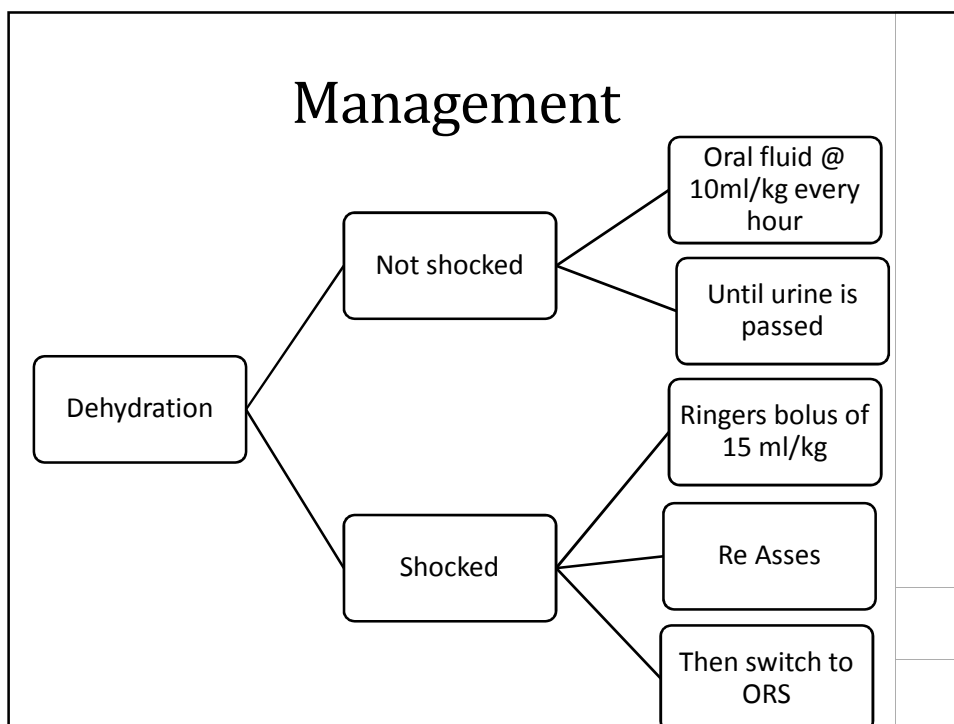
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Management

	Day 1 - 2	Day 3 - 7	Week 2 - 6
Hypoglycaemia	—————→		
Hypothermia	—————→		
Dehydration	—————→		
Electrolytes	—————→		
Infection	—————→		—————→
Micronutrients	No Iron	—————→	With Iron ———→
Initiate feeding	—————→		—————→
Catch up growth			—————→
Sensory stimulation	—————→		—————→
Prepare for follow up			—————→

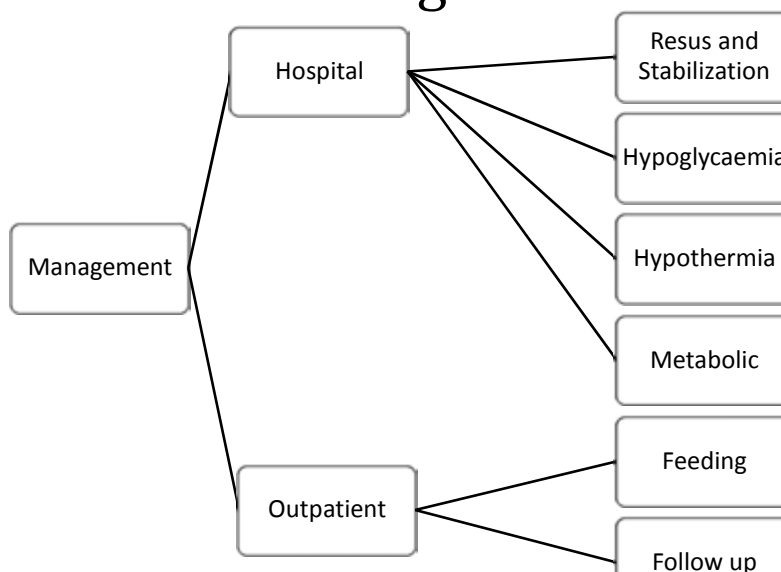




Hypoglycaemia

- Test blood glucose 3 hourly in first 24 hours
- If blood glucose < 3 mmol/L
 - Immediate feed or
 - Dextrose 10 %, ivi or per os
 - Sugar solution 10 ml/kg
- Monitor blood glucose until > 3 mmol/L
- Continue feeds
- If patient is symptomatic or unresponsive
 - 10 % dextrose ivi 5 ml/kg
- Continue feeds

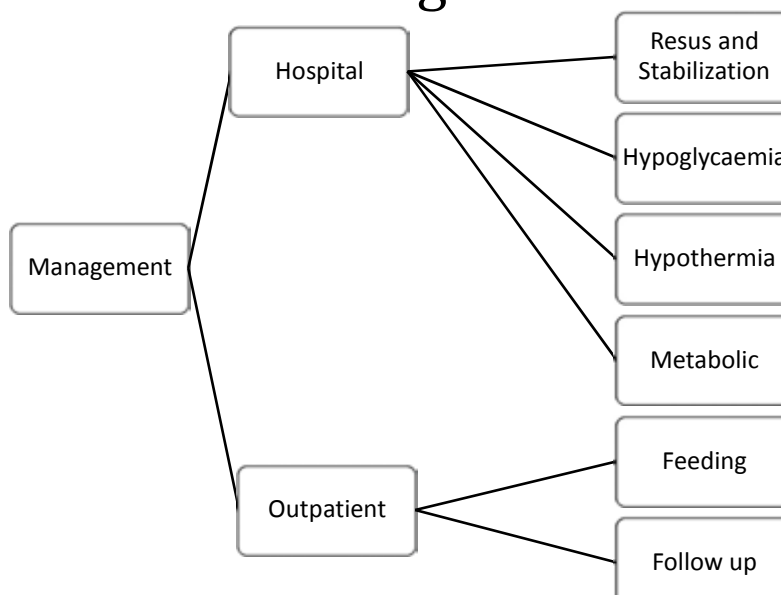
Management



Hypothermia

- Prevent hypothermia
- Treat hypothermia by
 - Checking temperature 3 hours post feed
 - If axillary temp $< 36^{\circ}\text{C}$ Warm the child urgently
 - Mother to child skin contact
 - Place heater nearby
 - If no mother wrap child in a warmed blanket including head
 - Do not apply direct heat to the skin

Management

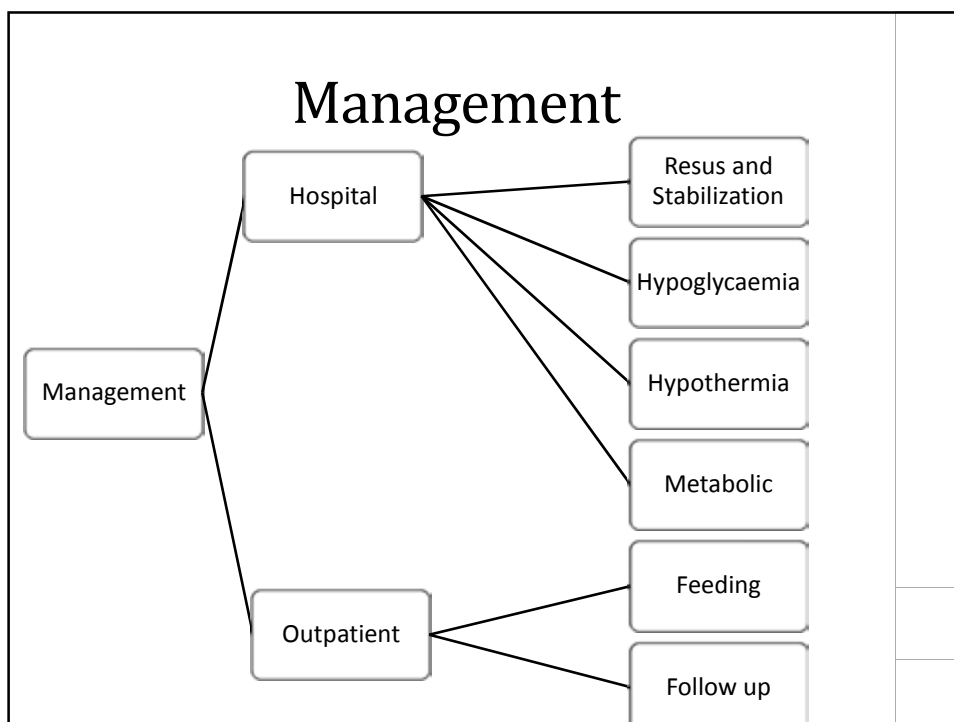


Other

- Treat for infection even if no signs
 - Ampicillin and Gentamycin or Amikacin
 - For GIT infections treat for Gardia Lambdia
 - For dysentery treat with Cefotaxime or Ceftriaxone
- Mineral and micronutrient deficiencies
 - Potassium chloride solution 25 – 50 mg/kg/dose oral
 - Magnesium sulphate
 - Vit A
 - Folic acid
 - Mutivitamin

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Feeding

- Initial phase
 - Begin feeding immediately
 - Use start up formula 130 ml/kg/day divided to give 3 hourly feeds
 - If hypoglycaemia or danger signs feed more regularly 2 hourly
 - If feeds refused or not taken give via Nasogastric Tube
- Rehabilitation
 - When appetite returns
 - Increase the feeds to higher protein/calorie content
 - First give the same amount as start up formula then gradually increase to 200 ml/kg/day

Thanks for your attention !

