

# MODULE VIII

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## Recognition and Management of Malnutrition in Humanitarian Emergencies

# NUTRITION IN HUMANITARIAN EMERGENCIES

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- Malnutrition leads to excess mortality during the recovery phase of a disaster because of impaired host defenses, poor wound healing, and loss of compensatory mechanisms
- Nutritional status directly impacts the vulnerability for and the severity of infectious diseases
- Children having frequent infections are anorexic, which increases the severity of malnutrition.

# Assesment


## Initial

- Determine pre-disaster prevalence of malnutrition and micronutrient deficiency
- Identify active community nutrition programs
- Identify vulnerable groups
- Determine quantity and quality of available food
- Determine social, cultural, economic and political determinants that could impact distribution of resources

## Recovery Phase

- Determine the quality and security of available nutritional resources for the affected population, particularly for vulnerable groups
- Determine current prevalence of malnutrition and micronutrient deficiencies
- Do periodic reassessments until adequate nutrition resources are sustainable

# VULNERABLE GROUPS

- Children < 5 years 
- Elderly
- Children removed from their family or community
- Pregnant or lactating women
- Families supported only by women
- Physically disabled or chronically ill individuals
- Individuals with emotional disturbance or mental illness
- Families having lost their home or job as a direct consequence of the disaster

# GENERAL FEEDING PROGRAMS

- Distribute food to all people affected by disaster
- Can be complementary or supplementary
- Can be wet ration or dry ration

# ANTHROPOMETRIC EVALUATION FOR ACUTE MALNUTRITION IN CHILDREN

- Mid upper arm circumference
- Weight for Height (W/H) z-score



# ANTHROPOMETRIC EVALUATION FOR ACUTE MALNUTRITION IN CHILDREN

Nutritional status	MUAC	W/H z score	W/H %
Moderate acute malnutrition	115-125 mm	-2 to -3 SD	>70 and <80%
Severe acute malnutrition*	<115 mm	<-3 SD	<70%

**\*ANY DEGREE OF BILATERAL PITTING EDEMA IN CHILDREN IS AN INDICATION OF SEVERE ACUTE MALNUTRITION**

# Weight-for-length GIRLS

Birth to 2 years (z-scores)



WHO Child Growth Standards



# BMI

## CHILDREN AND ADOLESCENTS

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### PERCENTILE

$< 5^{\circ}$	Underweight
$5^{\circ}$ - $85^{\circ}$	Normal range
$85^{\circ}$ - $95^{\circ}$	Overweight risk
$>95^{\circ}$	Overweight

# Severe Acute Malnutrition Infants 1-6 Months of Age

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- Bilateral edema of the feet or
- For infants  $\leq 45$  cm: Confirmed weight loss of more than 10 % if a prior weight is available.
- For infants 45 - 65 cm: W/H z score  $< -3$
- Consider evidence of insufficient intake

# Adults and elderly (>18 years)

## Severe acute malnutrition

- Presence of bilateral pitting edema Grade 3 or worse

Or

- MUAC <185 mm

## Moderate acute malnutrition

- MUAC between 185 and 210 mm

Classification	BMI Category (kg/m <sup>2</sup> )	Risk of Developing Health Problems
Underweight	< 18.5	Increased
Normal Weight	18.5 – 24.9	Least
Overweight	25.0 – 29.9	Increased
Obese		
Class I	30.0 – 34.9	High
Class II	35.0 – 39.9	Very High
Class III	≥ 40.0	Extremely High

# Studies suggest that there is no difference in diets of children who develop marasmus or kwashiorkor

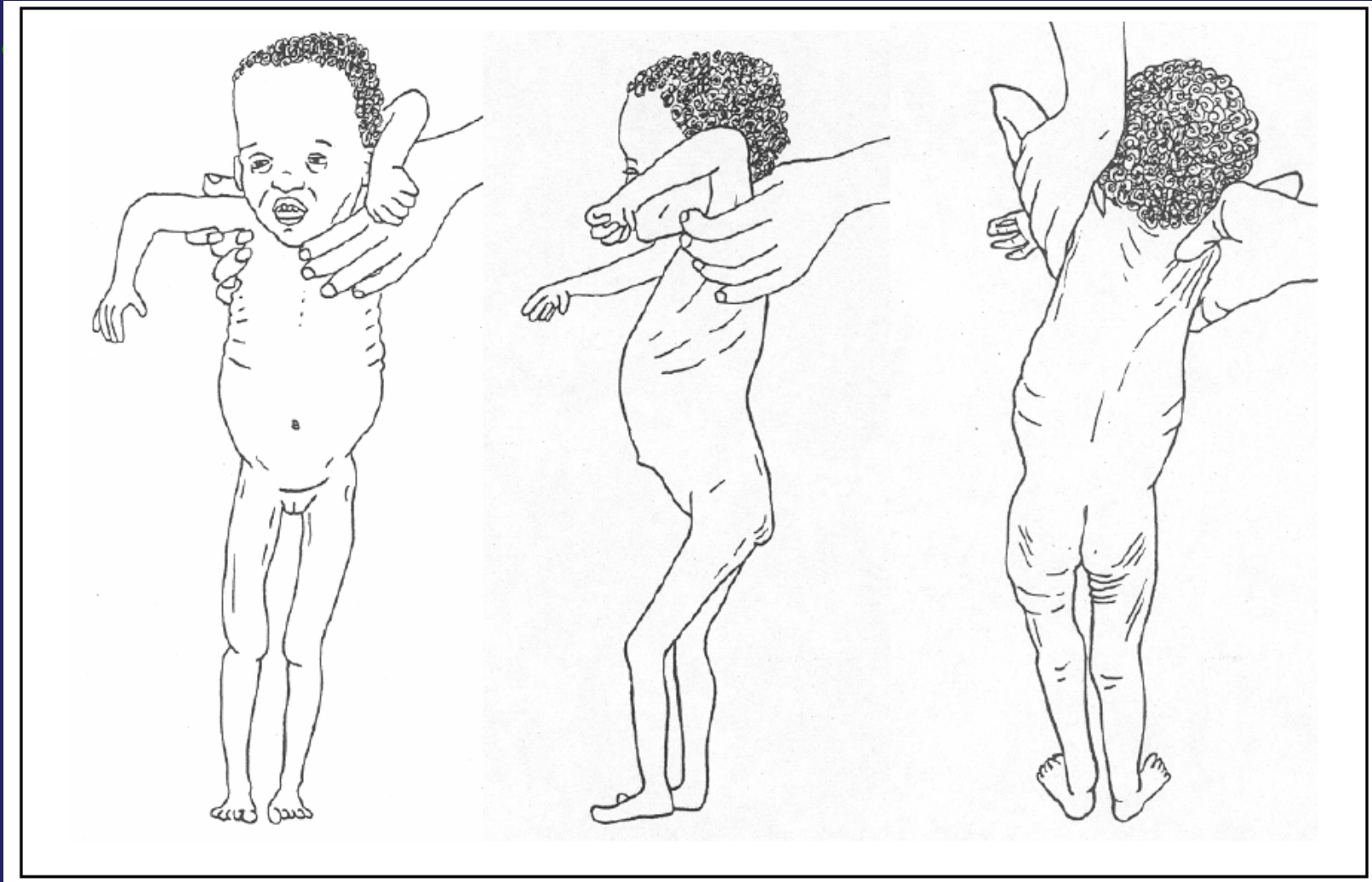
## Kwashiorkor

- Edema
- Enlarged liver and spleen
- Water and electrolyte shifts
- Loss of appetite
- Skin and hair (discoloration) changes

## Marasmus

- Most frequent children  $< 1$  y
- Marked emaciation
- Apathy; irritability
- Marked loss of subcutaneous fat
- Appetite preserved

# Marasmus



# Marasmus



# Kwashiorkor





# Nutritional Edema



+ Mild



+ Moderate



+++ Severe

# Treatment

- Antibiotics for bacterial infections
- Measles vaccination if prior vaccination is not documented
- Consider malaria test if endemic/ seasonal
- Vitamin A if inadequate diet and supplementation program not available prior to disaster
- Albendazole for intestinal worms
- Consider praziquantel for schistosomiasis/bilharziosis
- Assess for risk of TB and HIV

# INFANT AND YOUNG CHILD FEEDING

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- Promote exclusive breast-feeding for infants < 6 months, and continued breast-feeding for children 6-24 mo (WHO) supplemented with adequate complementary foods
- Provide adequate nutrition to lactating mothers
- Supplement feeding with formula or animal milk is not recommended
- Artificial feeding requires increased use of limited resources (water, fuel)

# Severe Acute Malnutrition

Medical complication?

Yes

No

Hospital or ITFC

Appetite test

Fail

Pass

Phase 1: Stabilization

Transition

ATFC

Phase 2: Growth

Discharge

ITFC-inpatient therapeutic feeding center  
ATFC-ambulatory therapeutic feeding center

# Appetite Test

- Failure means child has a serious infection and/or metabolic disorder needing admission
- RUTF or a porridge (BP100) is offered
- Encourage quietly without forcing
- Provide drinking water in addition to the RUTF
- Usually short duration but may take an hour

# Appetite Test

Minimum quantity the child must eat to pass the appetite test:

Child's weight (Kg)	Peanut paste (sachet of 92g)	Child's weight (Kg)	BP 100 (Bars)
Less than 4kg	$\frac{1}{8}$ to $\frac{1}{4}$ of the sachet	Less than 5 kg	$\frac{1}{4}$ to $\frac{1}{2}$
4 – 6.9 kg	$\frac{1}{4}$ to $\frac{1}{3}$ of the sachet	5 – 9.9 kg	$\frac{1}{2}$ to $\frac{3}{4}$
7 – 9.9 kg	$\frac{1}{3}$ to $\frac{1}{2}$ of the sachet		
10 – 14.9 kg	$\frac{1}{2}$ to $\frac{3}{4}$ of the sachet	10 – 14.9 kg	$\frac{3}{4}$ to 1
15 – 29 kg	$\frac{3}{4}$ to 1 sachet	15 – 29 kg	1 to $1\frac{1}{2}$
More than 30kg	> 1 sachet	Over 30 kg	> $1\frac{1}{2}$

# Criteria for Inpatient Treatment

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- IMCI general danger sign
- +++ Edema
- Medical Complications
  - Any severe IMCI classification for child with cough, fever, or diarrhea
  - Pneumonia
  - Dehydration

# REFEEDING SYNDROME

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- Hypothermia
- Hypoglycemia
- Hypokalemia
- Hypophosphatemia
- Thiamine deficiency

Give additional phosphate, potassium, magnesium, and thiamine, as well as a continuous supply of glucose to compensate for rapid shifts between intracellular and extracellular compartments

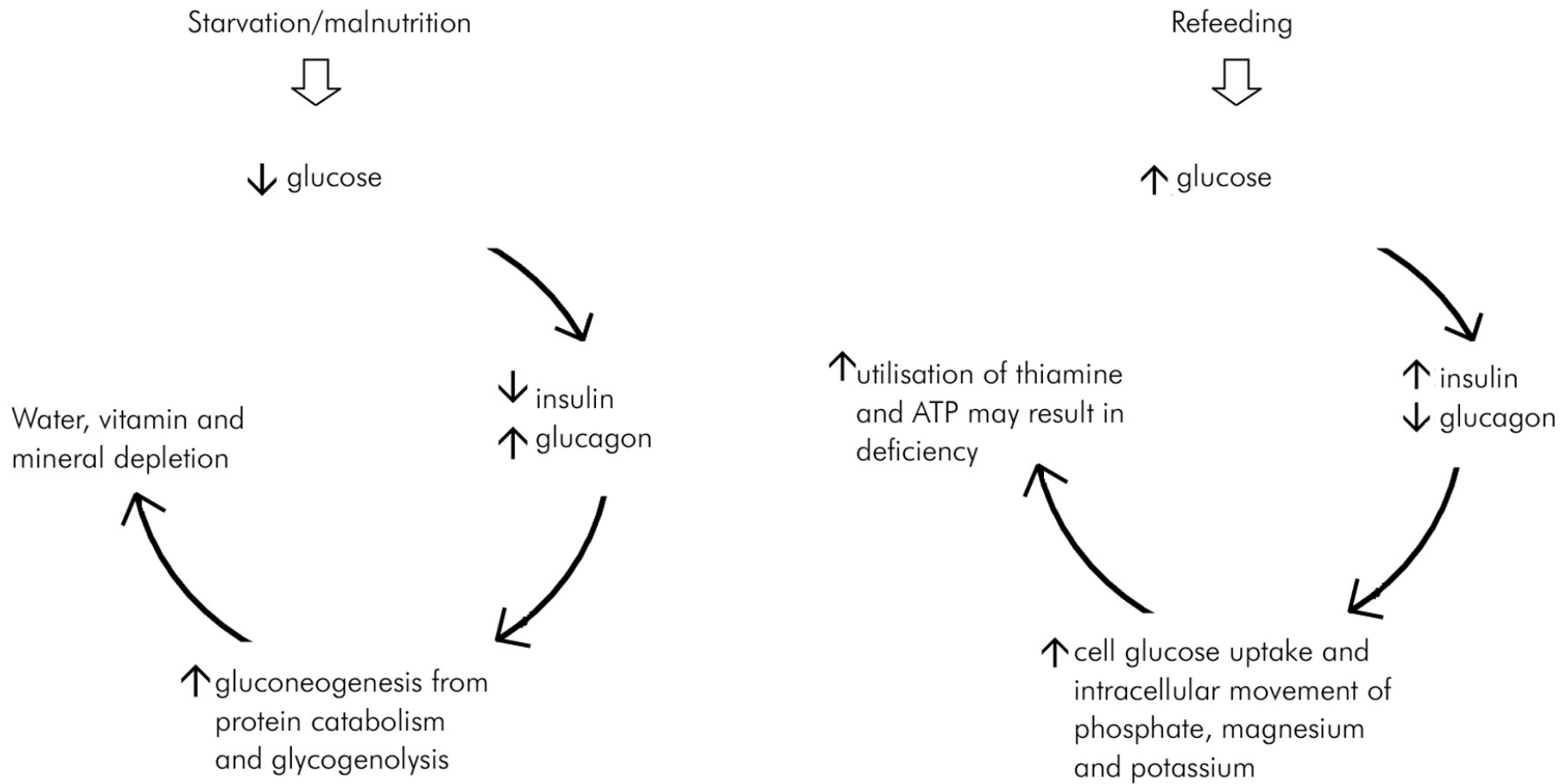


# Acute thiamine deficiency syndrome

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- The refeeding process with carbohydrate drives a rapid use of Thiamine that produces a "functional Thiamine deficiency" aggravated by low thiamine body stores.

# Refeeding Syndrome



# Clinical Symptoms of Rapid Re-feeding

Re-feeding Syndrome	Beriberi	Wet Beriberi	Cerebral Beriberi
Cardiac Failure Anemia Arrhythmia Delirium Seizures	Peripheral Neuropathy Ataxia Ophthalmoplegia Increased ICP Vomiting	Edema Cardiac Failure <ul style="list-style-type: none"><li>• Increased JVD</li><li>• Dyspnea</li></ul>	Amnesia Confusion

**TABLE 13. Nutritional phases in a therapeutic feeding program**

Phase	Objective	Product Used	Quantities	Meal timetable	Duration	Where
Phase 1 Stabilization	To restore metabolic functions, stabilize, treat and/or prevent medical complications.	F75	<b>6 m-10 years</b> 100 Kcal/kg/day (135 ml/kg/day) <b>&gt;10 y-18 yr</b> 55 Kcal/kg/day (75 ml/kg/day) <b>Adults and elderly</b> 40 Kcal/kg/day (55 ml/kg/day)	8 meals a day Every 3 hours even at night. To adapt according to the context.	Minimum 3 days Maximum 7 days <sup>1</sup>	ITFC
Phase Transition	To gradually ensure the patient can tolerate a higher calorie, protein and osmolar load before progressing to Phase 2	RUTF (or F100)	RUTF: 130 kcal/kg/day max F100: <b>6 m-10 years</b> 135 Kcal/kg/day (135 ml/kg/day) <b>&gt;10 y-18 yr</b> 75 Kcal/kg/day (75 ml/kg/day) <b>Adults and elderly</b> 40 Kcal/kg/day (55 ml/kg/day)	6 meals a day	1-5 days (may be longer)	ITFC
Phase 2	Intended to promote rapid weight gain and catch up growth.	RUTF and local meal	RUTF: <6 kg: 2 sachets/day 6-10 kg: 3 sachets/day 10 kg: 4 sachets/day	At home time meals	4-6 weeks	ATFC (home)

<sup>1</sup>For Kwashiorkor, the passage to transition will depend on the evolution of the edema. Causes of failure to respond (lack of loss of edema) should be daily assessed and measures should be taken.

# ATFC Discharge Criteria

## 6 months to 10 years

- Absence of edema for at least two weeks

**AND**

- MUAC > 125 mm

**OR**

- WH  $z \geq -2$  Z-score

Note: The anthropometric indicator used to diagnose SAM should be used to assess whether a child has reached nutritional recovery

# ATFC Discharge Criteria

## 10 to 18 years

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- Absence of edema for at least two weeks
- AND**
- W/H% > 80%

# MICRONUTRIENT DEFICIENCIES

- **Vitamin A**
- **Iron**
- **Zinc**
- **Niacin**
- **Thiamine**
- **Vitamin C**
- **Riboflavin**
- **Vitamin D**
- **Calcium**

# DIETARY FACTORS

## MICRONUTRIENT DEFICIENCIES

- Niacin (pellagra): maize-based diet
- Thiamin (beri-beri): polished rice or cassava/manioc diet
- Vitamin A: lack of fresh fruits and green leaf vegetables
- Vitamin C (scurvy): lack of fresh fruits and low fat diet
- Iron: lack of animal products
- Zinc: lack of animal products
- Riboflavin: lack of animal products
- Vitamin D (rickets): poor sunlight exposure
- Calcium: lack of dairy products, green leaf vegetables, bony fish

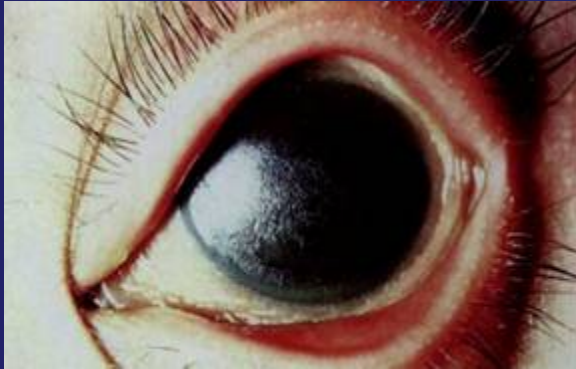


# VITAMIN A DEFICIENCY

## CLINICAL FINDINGS

- **Eyes**
  - Dryness (xerophthalmia)
  - Night blindness
  - Conjunctival xerosis
  - Bitot`s spots
  - Keratomalacia
- **Impaired hematopoiesis and immune function**

# EFFECTS OF VITAMIN A DEFICIENCY



**Xerophthalmia**



**Bitot's spot**



**Corneal ulceration**

# Vitamin A treatment and prevention

Age	Treatment*	Preventive Dosage
<6 months (<6 kg)	50,000 IU	50,000 IU every 4-6 months
6-12 months (6-8 kg)	100,000 IU	100,000 IU every 4-6 months
>1 year (> 8kg)	200,000 IU	200,000 IU every 4-6 months
Women	200,000 IU**	200,000 IU $\leq$ 8 weeks after delivery

# IRON DEFICIENCY

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- **Most common nutritional deficiency worldwide**
- **Mostly children and women**
- **Most frequent cause of anemia**

# ANEMIA : RISK FACTORS

- Diet lacking animal products
- Pregnancy
- Prematurity, low birth weight, premature cord clamping
- Accelerated growth
- Animal milk use
- Impaired absorption due to high phytates and phosphates in diet
- Menstruation
- Intestinal parasites

# ANEMIA: CLINICAL IMPACT

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- Impaired development
- Increased morbidity associated with infections
- Decreased physical activity, productivity, attention span
- Increased mortality (severe anemia)

# CLINICAL FINDINGS: SEVERE ANEMIA

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- Pale skin, mucous membranes, nail beds
- Resting dyspnea and tachypnea
- Laboratory: ↓ hemoglobin and/or hematocrit

# IRON DEFICIENCY TREATEMENT AND PROPHYLAXIS

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**Treatment: 3 mg elemental iron/kg/day for 3-6 months**

**Prophylaxis: 1-2 mg elemental iron/kg/day**

- **Full-term infants: exclusive breast-feeding 6 months**
- **Premature infants: early iron supplementation**
- **Iron supplementation**
  - Breast-fed infants: after 6 months of age
  - Formula-fed infants: after 4 months of age

**If at risk, give antihelminthics to population over 2 years old**



# ZINC

## DEFICIENCY AND SUPPLEMENT

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**Impaired cell life, function, growth, differentiation,  
and replication**

**Recommended daily allowances:**

- **Infants: 5 mg**
- **Young children: 10 mg**
- **Women: 12 mg**



**THANK YOU!**