



Nutrition

&




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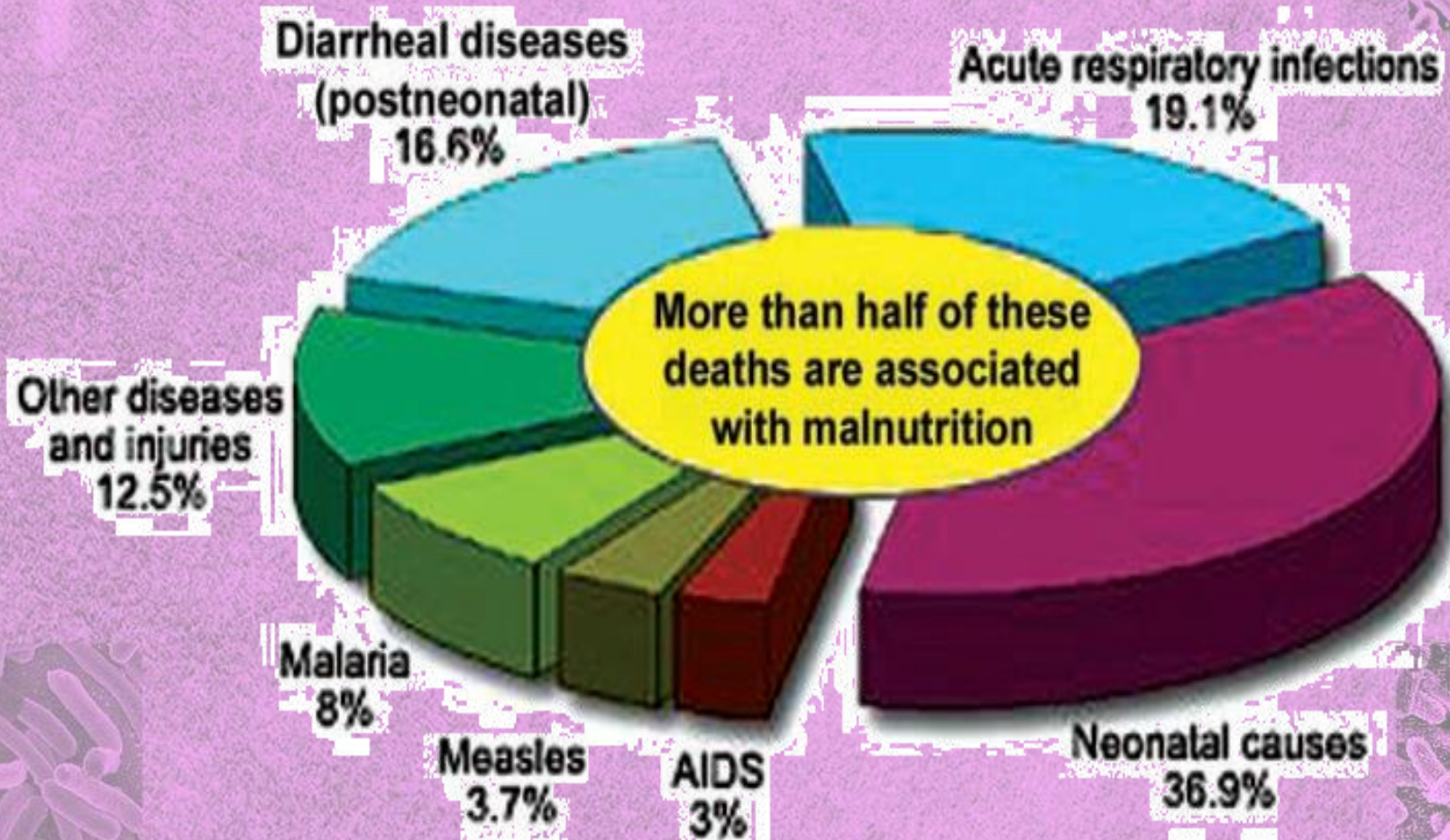


# What will we talk about in the next 30 minutes:

- Introduction – Cycle of malnutrition and infection
- Effect of Infection on Nutritional Status
- Effects of Nutrient Deficiency on Immunity
- Dietary management of infection
- Community nutrition interventions to help decrease morbidity and mortality



# Causes of death aged <5 years, 2000–2003

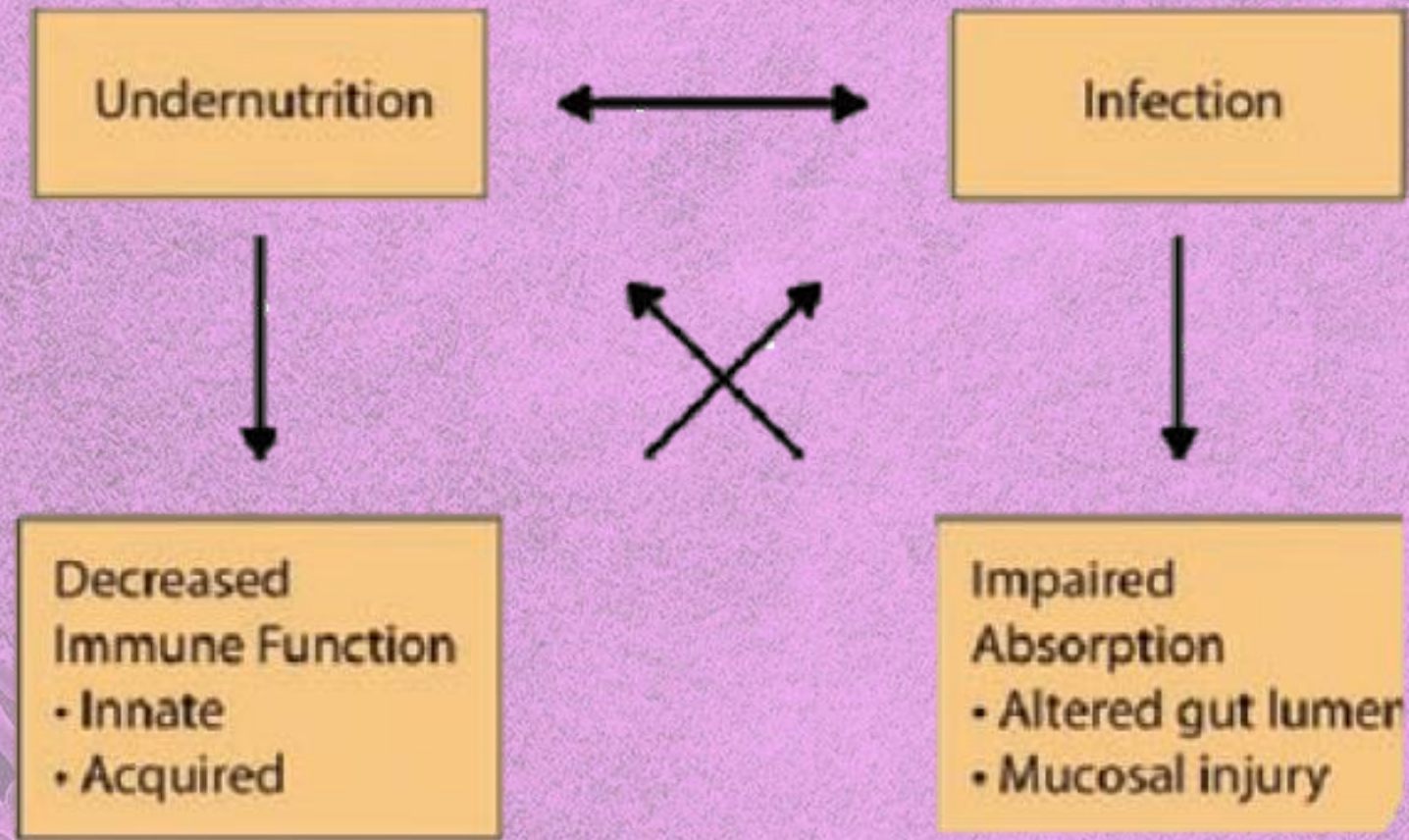


What is the global importance of malnutrition?

# 2017 WHO Global Data

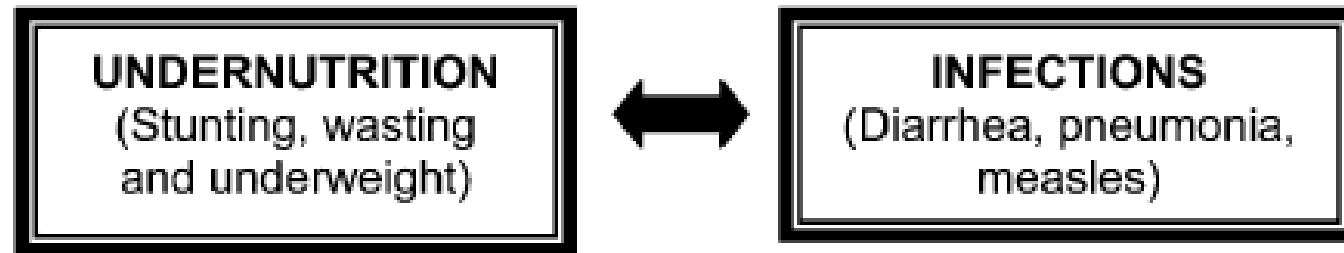
- 6.3 million children <15 years died in 2017
- 45% of under-5 deaths are attributable to undernutrition
- Malnourished children have a higher risk of death from common childhood illness such as diarrhea, pneumonia, and malaria.
- High risk of mortality is associated with stunting, severe wasting, deficiencies of vitamin A and zinc, and suboptimum breastfeeding

# Interactions between malnutrition and infection



# Correlation between major childhood infections and nutrition conditions

Food security, Poverty, Overcrowding, Household air pollution, Poor water quality, Unhygienic excreta disposal, Unwashed hands, Access to health services, Maternal education, Maternal undernutrition, Fetal Growth Restriction, SGA, Not breast feeding, Micronutrient deficiencies



**THERE IS A SYNERGISTIC ASSOCIATION BETWEEN MALNUTRITION AND INFECTION AS A CAUSE OF MORTALITY**

# Effect of Infection on Nutritional Status



for every degree rise in temp, basal metabolic rate increases by 13%, and in sick patients basal metabolic rate higher by 30-40%

-anorexia

-shivering –increases energy expenditure

- Higher need for carbohydrates and amino acids

“**CONSUMPTION**” –weight loss or wasting illness



# Effect of Infection on Nutritional Status

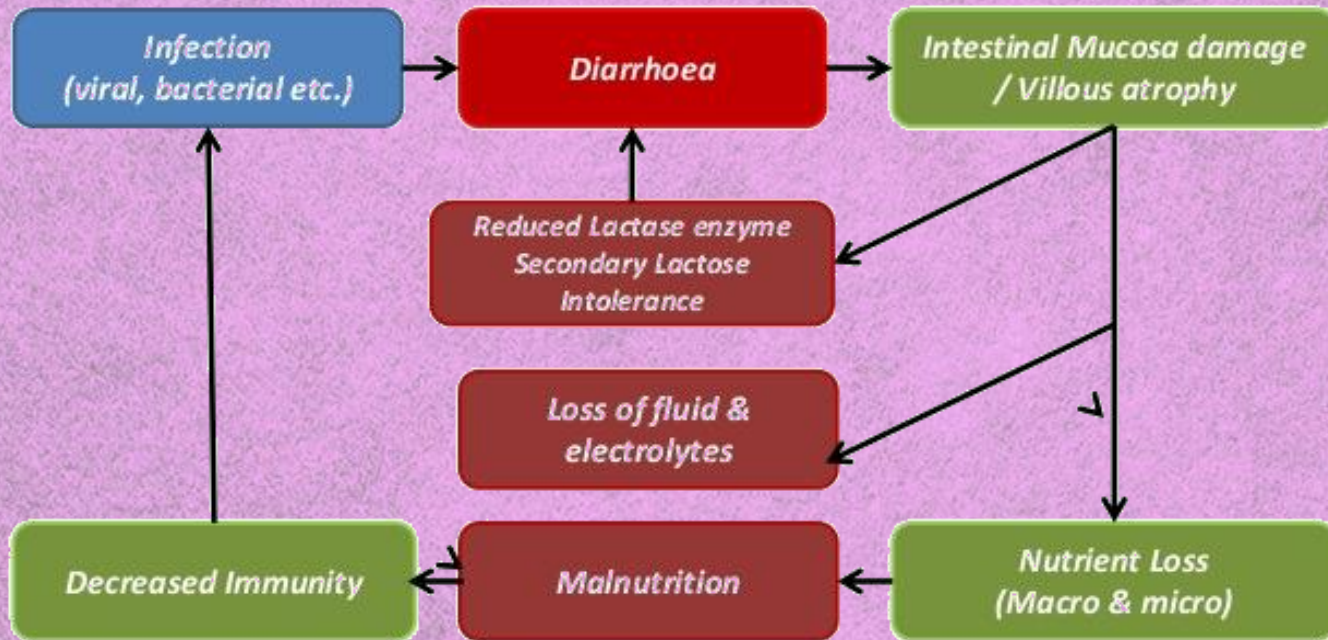
## Effects on body metabolism

- Increased protein metabolism;
- muscle breakdown due to increase in cortisol
- Need for synthesis of: cytokines, immune cells (B and T lymphocytes, macrophages, leukocytes, antibodies
- Levels of vitamins fall during an infection- (Vitamin A, riboflavin, vitamin C)





# Vicious circle of diarrhoea-malnutrition



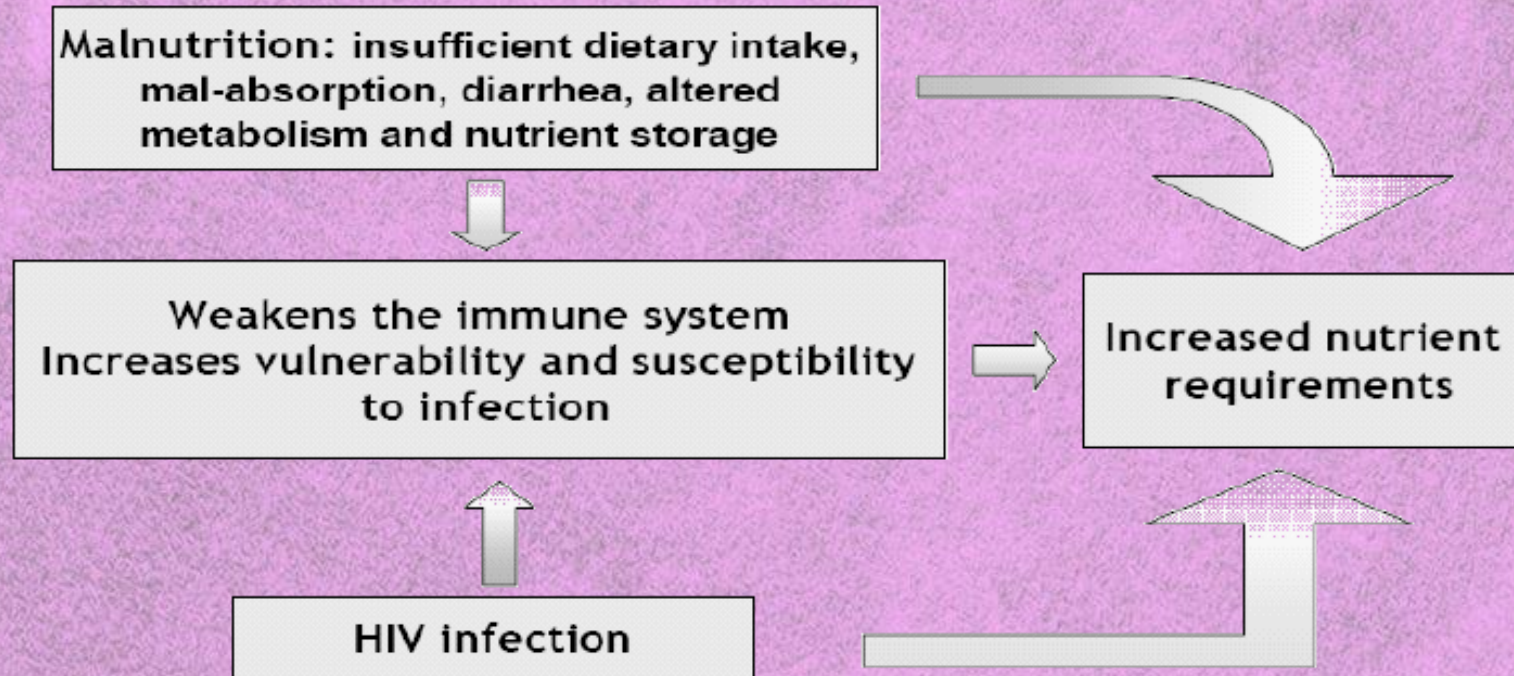
# Effect of Infection on Nutritional Status

## MEASLES

- most contagious disease known
- profound effect on **appetite** which is suppressed for several weeks
- damages the intestinal mucosa
- severe catabolism, breakdown of tissues and neg energy balance
- dec in plasma retinol, inc urinary excretion of metabolites of Vit A; temp reduction in Vit A absorption
  - most common cause of blindness
- produces general immunosuppression, esp T-cell immunity
- mortality may be due to pneumonia or diarrhea



# Malnutrition and HIV Work in Tandem



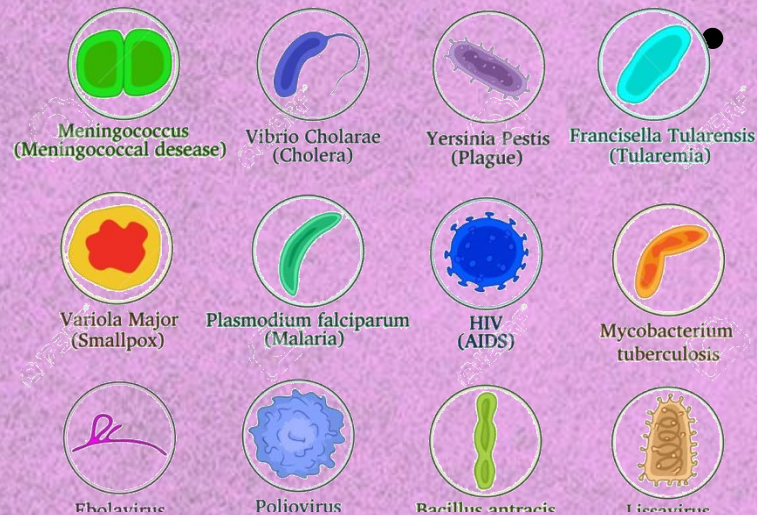
Source: Adapted from Piwoz, Ellen, and Elizabeth Preble. 2000. *HIV/AIDS and Nutrition: A Review of the Literature and Recommendations for Nutritional Care and Support in Sub-Saharan Africa*. Washington: Academy for Educational Development.

# Infections which affect nutrition: And the list goes on



- Acute respiratory tract infections
- Food borne diseases
- Tuberculosis
- Malaria

- Ascariasis
- Hookworm
- Schistosoma
- Giardia
- Entamoeba



# Effect of Malnutrition on Immune System

OPEN ACCESS Freely available online



## The Immune System in Children with Malnutrition—A Systematic Review

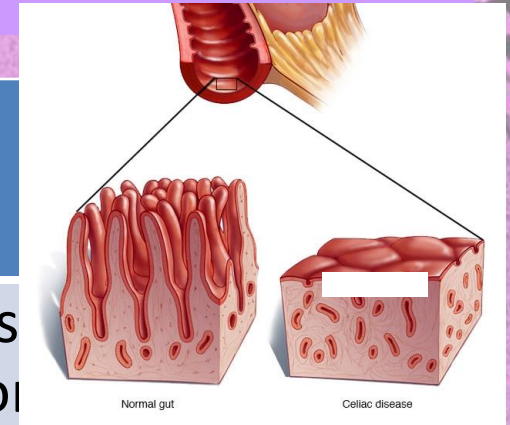


Maren Johanne Heilskov Rytter<sup>1\*</sup>, Lilian Kolte<sup>2</sup>, André Briend<sup>1,3</sup>, Henrik Friis<sup>1</sup>, Vibeke Brix Christensen<sup>4</sup>

<sup>1</sup> Department of Nutrition, Exercise and Sports, Faculty of Science, University of Copenhagen, Frederiksberg, Denmark, <sup>2</sup> Department of Infectious Diseases, Copenhagen University Hospital, Hvidovre, Denmark, <sup>3</sup> Department for International Health, University of Tampere, School of Medicine, Tampere, Finland, <sup>4</sup> Department of Paediatrics, Copenhagen University Hospital Rigshospitalet, Copenhagen, Denmark

- literature search yielded 3402 articles, of which 245 met the inclusion criteria
- published between 1970 and 1990, and only 33 after 2003.

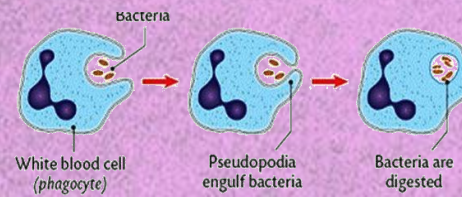
# Summary of Results in Studies of each Immune Parameter on Children with Severe Malnutrition



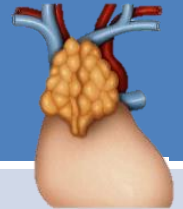
Immune parameter	No. of studies	Effect
Skin	21	Atrophy of cells in skin abras granuloocytes, decreased mo
Gut function	19	Thin mucosa, shorter villi, infiltration of immune cells, increased intestinal permeability
Factors in secretion	19	slgA: dec in saliva, tears, nasal washings inconsistent results in duodenal fluid dec in gastric juice
Microbial flora	11	Diff pattern of stool microbiota Bacterial growth in small intestine- increased yeast and gram neg bacteria

# Summary of Results in Studies of each Immune Parameter on Children with Severe Malnutrition

Immune parameter	No. of studies	Effect
White blood cells	38	no change in number; dec microbicidal activity and decreased chemotaxis
Acute phase	24	Inc positive acute phase protein with infection and sometimes without clinical infection
Complement	24	Dec C3, C6, C1, C9, Factor B



# Summary of Results in Studies of each Immune Parameter on Children with Severe Malnutrition

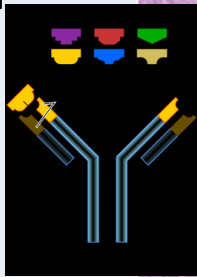


Immune parameter	No. of studies	Effect
Lymphatic tissue	12	Thymic atrophy, fewer lymphocytes in thymus cortex, less atrophy of other tissue
DTHR	21	Dec response in Mantoux after BCG vaccination; dec reaction to other antigens
Lymphocytes	58	Same no of lymphocytes; dec no of B cells, dec response to PHA

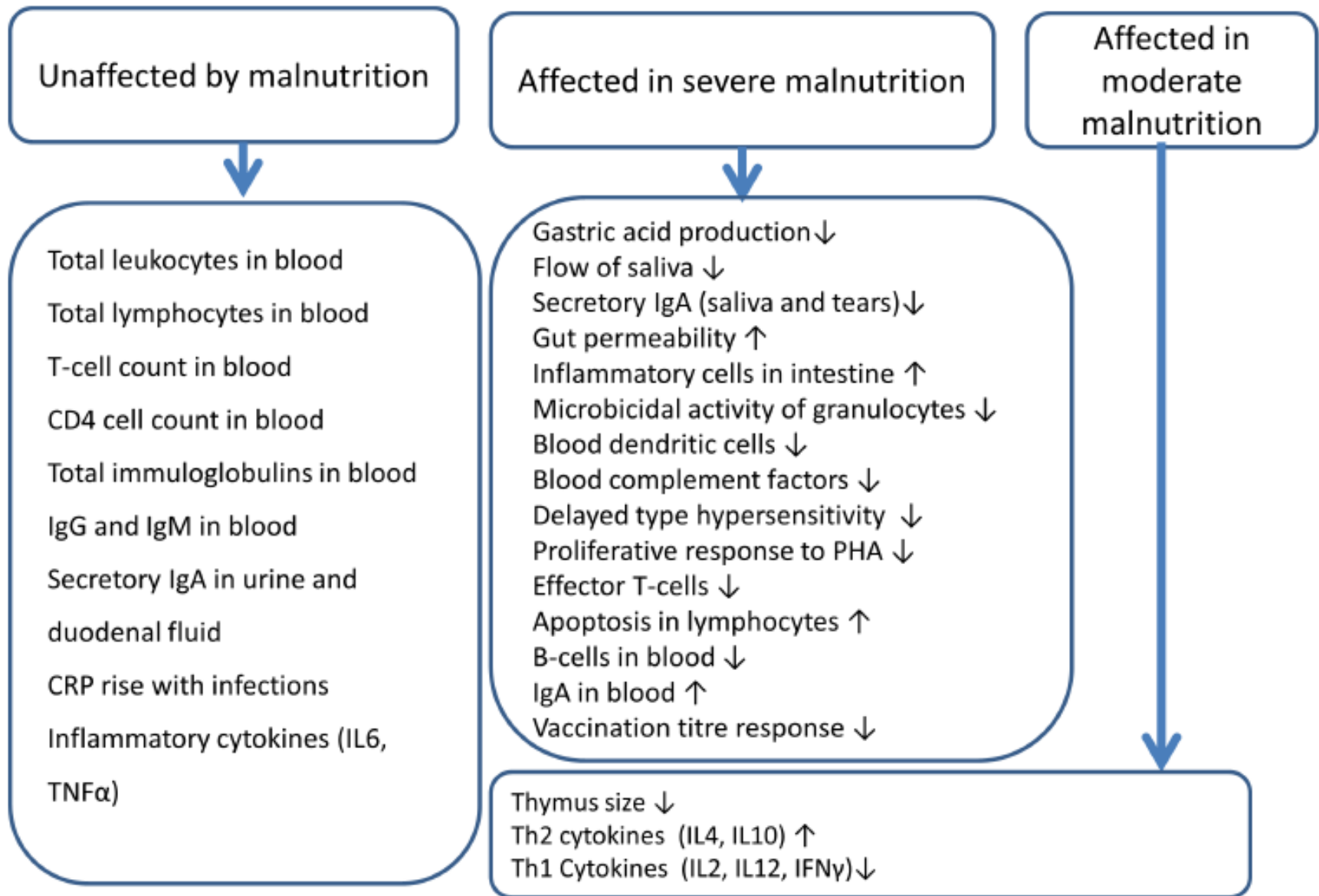


# Summary of Results in Studies of each Immune Parameter on Children with Severe Malnutrition


Immune parameter	No. of studies	Effect
Antibody levels	32	Same for IgG and IgM; inc IgA
Vaccination response	35	Dec antibody titer, most with acceptable seroconversion, possible delay in antibody response
Cytokines	35	Dec TH1 cytokines (IL1, IL2, IFN gamma); inc TH2 cytokines (IL10, IL14)



# Summary of immune parameters affected and not affected by malnutrition.




# Effect of Micronutrient deficiency on Immunity

Micronutrient	Impact of Deficiency	Impact of Supplementation
<p>Vitamin C</p> 	<p>Inc incidence and severity of pneumonia Dec resistance to infection and cancer, dec DTHR, impaired wound healing</p>	<p>Children- reduced duration and severity of common cold symptoms; improved outcomes in pneumonia, malaria and diarrheal symptoms</p>
<p>Vitamin D</p>	<p>Increased susc to infections esp RTI, increased morbidity and mortality, inc severity of infections, dec in no of lymphocytes and lymphoid organ weight; inc risk of autoimmune dis (MS, SLE, RA)</p>	<p>Reduced acute resp tract infections if deficient</p>
<p>Vitamin E</p>	<p>Impairs humoral and cell-mediated immunity including B and T-cell function</p>	<p>Elderly: reduced RTI</p>

Maggini S, Pierre A, Calder PC. Immune Function and Micronutrient Requirements change over the Life Course. *Nutrients*. 2018; 10, 1531.

# Effect of Micronutrient deficiency on Immunity

Micronutrient	Impact of Deficiency	Impact of Supplementation
Vitamin A 	Affects no and killing activity of NK cells, neutrophil function, phagocytosis of macrophage, growth and diff of B cells, dec no of T cells. Inc susc to diarrhea, RTI, measles , malaria	Children: reduces all cause mortality, diarrhea, incidence and mortality in measles, dec risk of morbidity and mortality from infect dis; Not beneficial in pneumonia
Vitamin B6	Lymphocytopenia, reduced lymphoid tissue weight; reduced response to mitogens; lowered antibody responses; gen deficiencies in cell mediated immunity	?
Vitamin B12	Depressed DTHR, T-cell proliferation	?

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# Effect of Micronutrient deficiency on Immunity

Micronutrient	Impact of Deficiency	Impact of Supplementation
Folate	Depressed DTHR, T-cell proliferation	
Zinc	<p>Dec lymphocyte no and function, esp T cells, inc thymic atrophy, altered cytokine production that contributes to oxidative stress and inflammation, Inc bacterial, viral and fungal infections (esp diarrhea and pneumonia) and diarrheal and respiratory complications, Inc thymic atrophy and consequent risk of infection</p>	<p>Restoration of thymulin activity, inc no of cytotoxic T cells, reduced no of activated T helper cells (which can contribute to autoimmunity), inc NK cell cytotoxicity, reduced incidence of infections</p> <p>Children: dec in duration of diarrhea and incidence of pneumonia in at-risk children &gt;6 mo., reduced duration and severity of common cold symptoms; improved outcomes in pneumonia, malaria and diarrheal symptoms</p>



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# Effect of Micronutrient deficiency on Immunity

Micronutrient	Impact of Deficiency	Impact of Supplementation
Iron 	Reduced capacity for adequate immune response (dec DTHR, mitogen responsiveness, NK cell activity), dec lymphocyte bactericidal activity, lower IL6 levels	May protect from infection with bacteria, viruses, fungi and protozoa depending on the level of iron, but <b>untargeted supplementation</b> may inc availability of iron for pathogen growth and virulence and inc susceptibility to malaria and bacterial sepsis in particular Children: potential detrimental effects in iron-replete children
Copper	Abnormally low neutrophil levels, Potentially increased susceptibility to infection	Children: inc ability of certain WBC engulf pathogens if deficient Reduced Ab production in response to influenza vaccine with chronic high doses in healthy young men

# Effect of Micronutrient deficiency on Immunity

Micronutrient	Impact of Deficiency	Impact of Supplementation
Selenium	Impaired humoral and cell-mediated immunity, Inc viral virulence, Suppression of immune function, inc cancer incidence and cardiomyopathy with chronic deficiency Children: increased risk of respiratory infections in the first 6 wks. of life	Improves cell-mediated immunity and enhances immune response to viruses in deficient individuals, but may worsen allergic asthma and impair the immune response to parasites



Maggini S, Pierre A, Calder PC. Immune Function and Micronutrient Requirements change over the Life Course. *Nutrients*. 2018; 10, 1531.

# Obesity and risk and outcome of infections

**Table 1.** Obesity-related factors affecting the risk and outcome of infectious diseases

## *Obesity*

### *Respiratory tract*<sup>22</sup>

- Pulmonary restriction
- Decreased pulmonary volumes
- Ventilation-perfusion mismatching
- Obstructive sleep apnea
- Risk of pulmonary embolism
- Dysregulated immune response in the lung

### *Skin and soft tissues and bone*<sup>23</sup>

- Disrupted micro- and macrocirculation
- Decreased wound healing
- Lymphedema<sup>93</sup>

### *Immune system*<sup>14</sup>

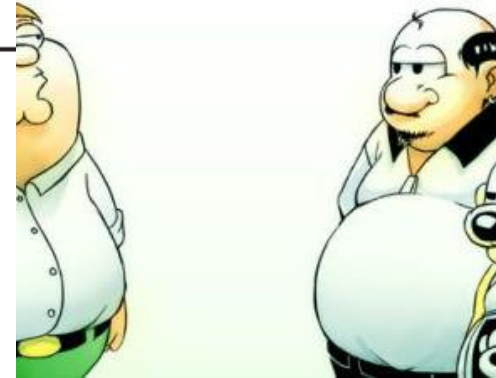
- Impaired chemotaxis
- Altered differentiation of macrophages
- Dysregulated cytokine production
- Imbalanced cross-talk between immune system and adipose cells

### *Obesity-related comorbidities*

- Diabetes mellitus
- Atherosclerosis

### *Pharmacological issues*<sup>7</sup>

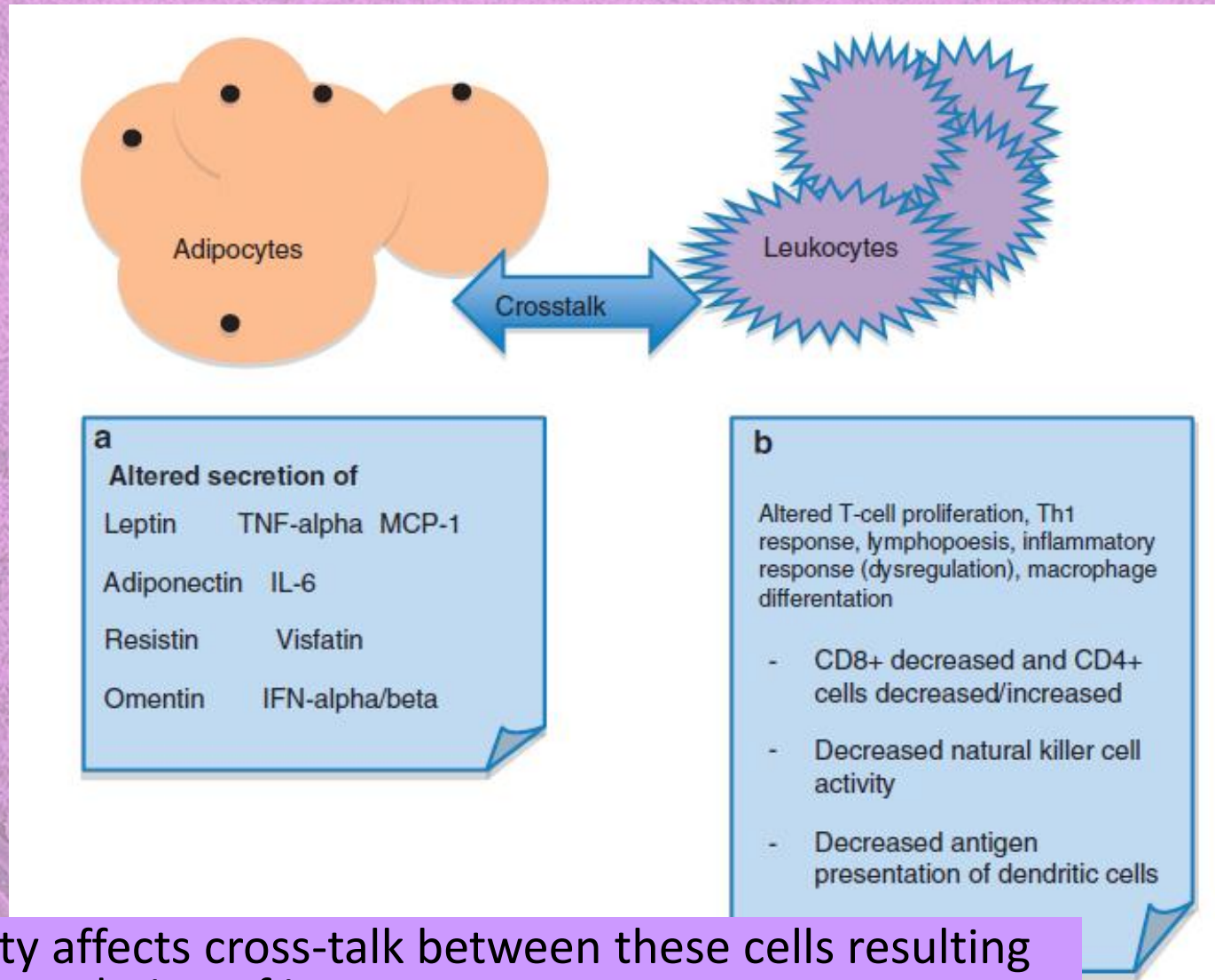
- Limited or no data on the right dosing of antimicrobials in obesity
- Altered protein binding, metabolism and volume of distribution of antimicrobials



International Journal of Obesity (2013)  
37, 333–340



# Interactions between adipocytes and leukocytes



Obesity affects cross-talk between these cells resulting in dysregulation of immune system.

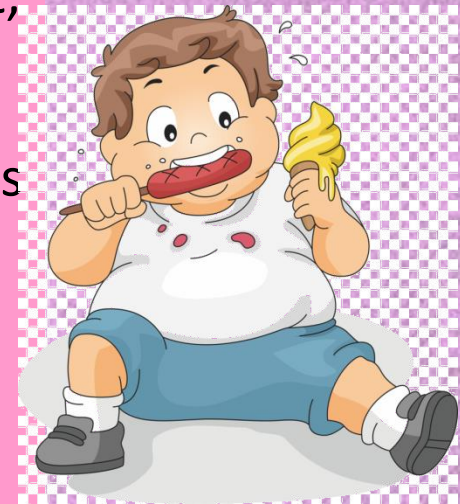
International Journal of Obesity (2013) 37, 333–340

# Obesity and infections in children

Hsu and Chen. Obesity and risk of urinary tract infection in young

children presenting with fever. *Medicine* (2018) 97:49

- UTI -incidence of UTI was higher in young, overweight, and obese children presenting with fever than in normal-weight, febrile children.
- Control of excess body weight should be considered as early as possible. Urinalysis should be considered for obese
- children <2 years of age who present with fever, especially those with mild respiratory or gastrointestinal symptoms.



N.N. Toaima et al. / *Journal of Infection and Public Health* 12 (2019) 57–61

- Obese children are posed at increased risk of infections and have higher serum leptin levels with possible negative effects of leptin on phagocytic functions.

# Get a good History

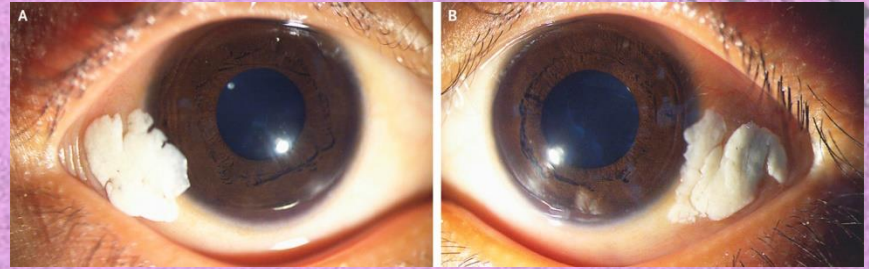
Food history, recurrent infections

- recent intake of food and fluids
- usual diet (before the current illness)
- breastfeeding
- duration and frequency of diarrhea and vomiting
- type of diarrhea (watery/bloody)
- loss of appetite
- family circumstances (to understand the child's social background)
- chronic cough
- contact with tuberculosis
- recent contact with measles
- known or suspected HIV infection.



# On Physical Examination check:

- Anthropometrics
- signs of dehydration or severe palmar pallor
- eye signs of vitamin A deficiency:
  - dry conjunctiva or cornea,
  - Bitot's spots
  - corneal ulceration
  - keratomalacia



# On Physical Exam check:


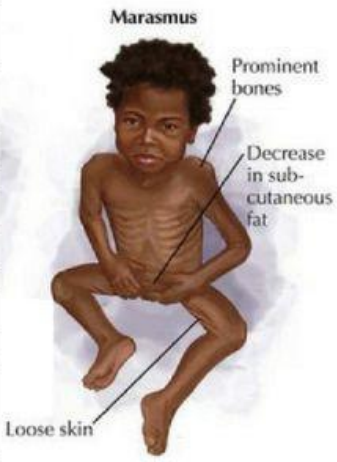
- localizing signs of infection, including ear and throat infections, skin infection or pneumonia
- signs of HIV infection
- fever or hypothermia (rectal temperature <math><35.5\text{ }^{\circ}\text{C}</math>, <math><95.9\text{ }^{\circ}\text{F}</math>)
- mouth ulcers, bleeding gums



# On Physical Exam check:

- skin changes of kwashiorkor:
  - — hypo- or hyperpigmentation
  - — desquamation
  - — ulceration (spreading over limbs, thighs, genitalia, groin, and behind the ears)

**Kwashiorkor** **10 Differences between Kwashiorkor and Marasmus**  
[www.majordifferences.com](http://www.majordifferences.com)  
 Comparison Table

Kwashiorkor	Marasmus
It develops in children whose diets are deficient of protein.	It is due to deficiency of proteins and calories.
It occurs in children between 6 months and 3 years of age.	It is common in infants under 1 year of age.
Subcutaneous fat is preserved.	Subcutaneous fat is not preserved.
Oedema is present.	Oedema is absent
Enlarged fatty liver.	No fatty liver.
Ribs are not very prominent.	Ribs become very prominent.
Lethargic	Alert and irritable.
Muscle wasting mild or absent.	Severe muscle wasting
Poor appetite.	Voracious feeder.
The person suffering from Kwashiorkor needs adequate amounts of proteins.	The person suffering from Marasmus needs adequate amount of protein, fats and carbohydrates.

**Kwashiorkor vs Marasmus**

# Micronutrient deficiencies

Give daily (for at least 2 weeks):

- a multivitamin supplement
- folic acid (5 mg on day 1, then 1 mg/day)
- zinc (2 mg Zn/kg/day)
- copper (0.3 mg Cu/kg/day)
- *once gaining weight*, ferrous sulfate (3 mg Fe/kg/day).
- high-dose vitamin A supplementation reduces mortality in children with severe acute malnutrition complicated by measles-specific respiratory infections.
- **low-dose (5000 IU) vitamin A supplementation given daily to children with SAM, from the time of admission until discharge from treatment, is more effective in reducing the mortality of children with edema, the incidence of severe diarrhea, and the incidence and duration of RTI than single high-dose vitamin A supplementation day 1 of admission (UPDATE 2013)**

#HUNGERPROJECT

# Latest PH Nutrition Survey reveals little progress in beating hunger

The 2013 National Nutrition Survey reveals how far the Philippines has gone in its fight against hunger



**Fritzie Rodriguez**

@fritzdrodriguez

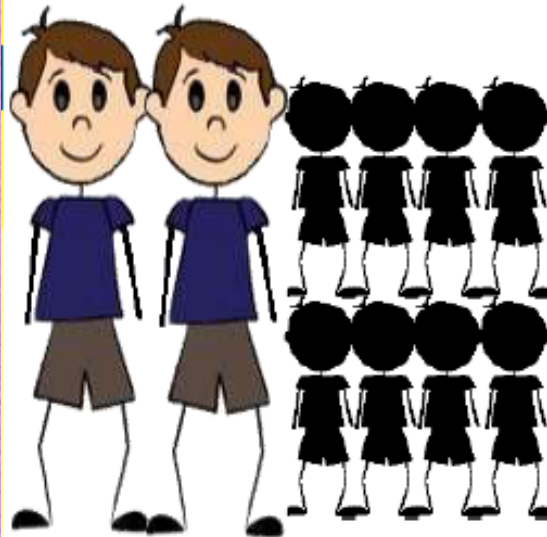
Published 5:28 PM, July 10, 2014

Updated 1:19 PM, September 01, 2015





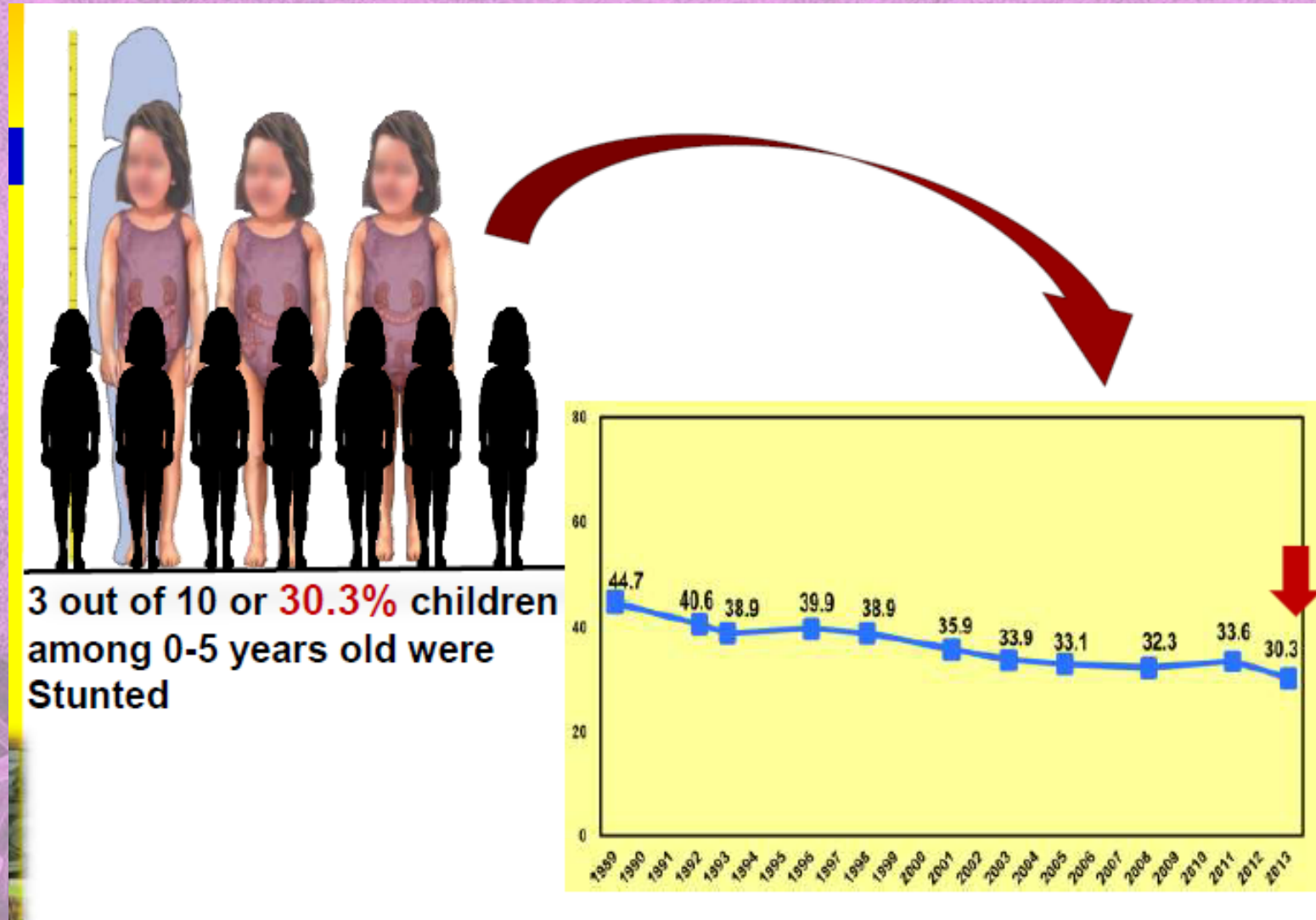
# 2013 (Phil) National Nutrition Survey



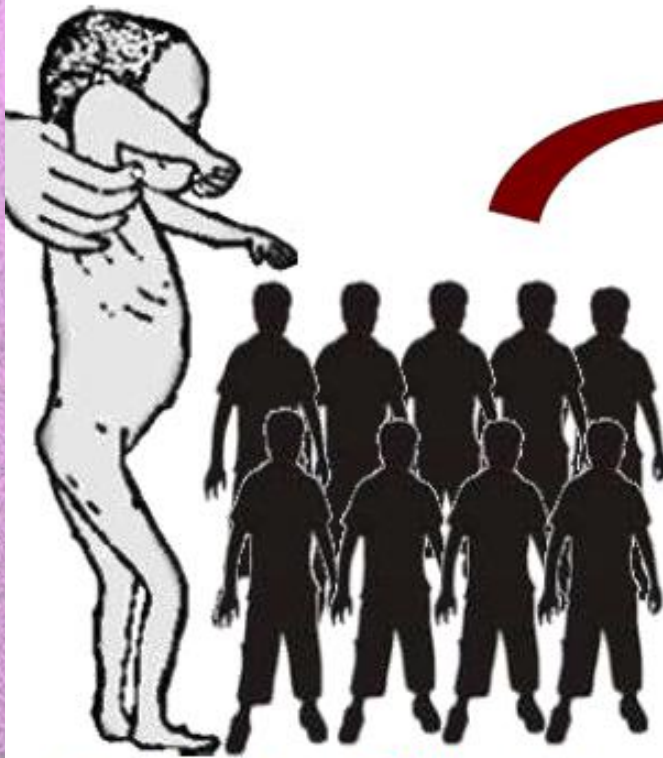
2 out of 10 or **19.9%**  
children among 0-5 years  
old were underweight



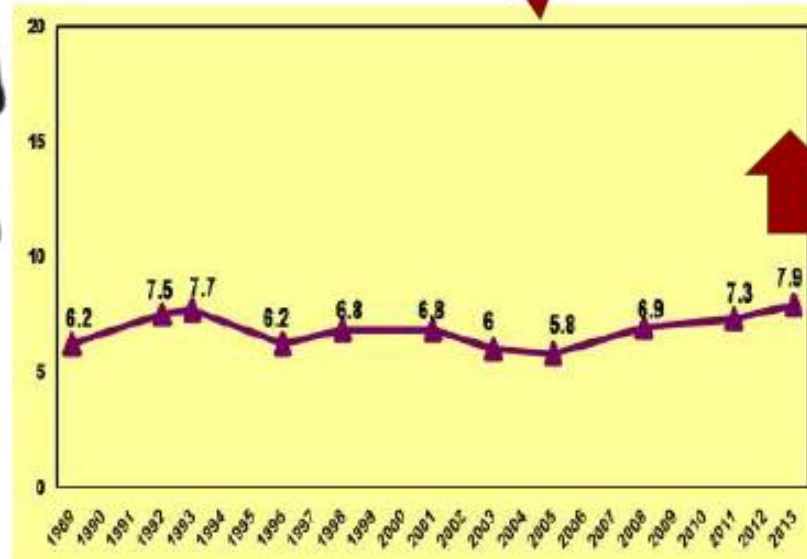
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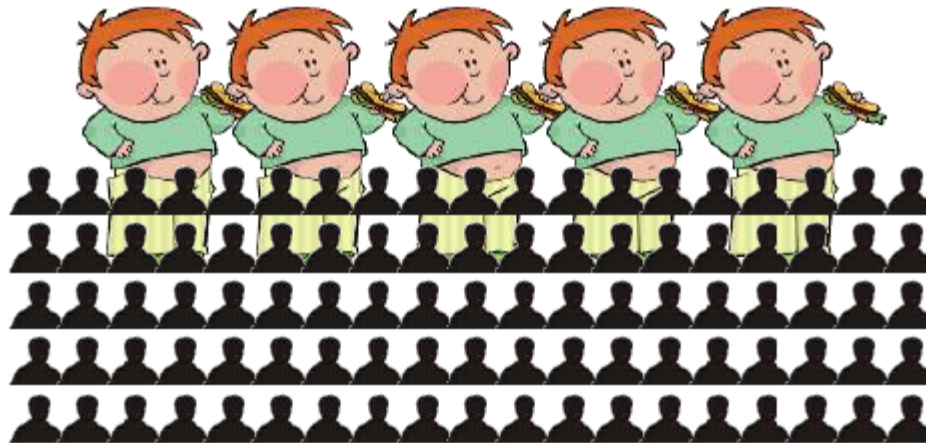


1 out of 10 or **7.9%** children among 0-5 years old were wasted

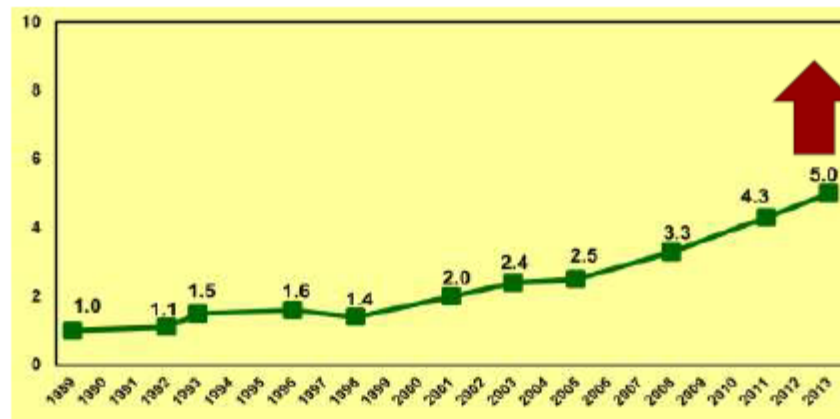


# 2013 (Phil) National Nutrition Survey

## Prevalence of overweight-for-height among children, 0-5.0 years old (**0-60 months**): Philippines, 2013



5 out of 100 or **5.0%** children among 0-5 years old were overweight



## Top regions with highest and lowest prevalence than national average: Philippines, 2013

Form of Malnutrition	Highest Regions	Lowest Regions
<b>0-5.0 years old (0-60 months)</b>		
<b>UNDERWEIGHT</b>	MIMAROPA Western Visayas Bicol	NCR CAR Central Luzon
<b>STUNTING</b>	Bicol ARMM Zamboanga Peninsula	NCR Central Luzon CALABARZON
<b>WASTING*</b>	MIMAROPA Ilocos Region Western Visayas	CAR NCR SOCCSKSARGEN
<b>OVERWEIGHT</b>	CALABARZON NCR Central	Zamboanga Peninsula Eastern Visayas Davao

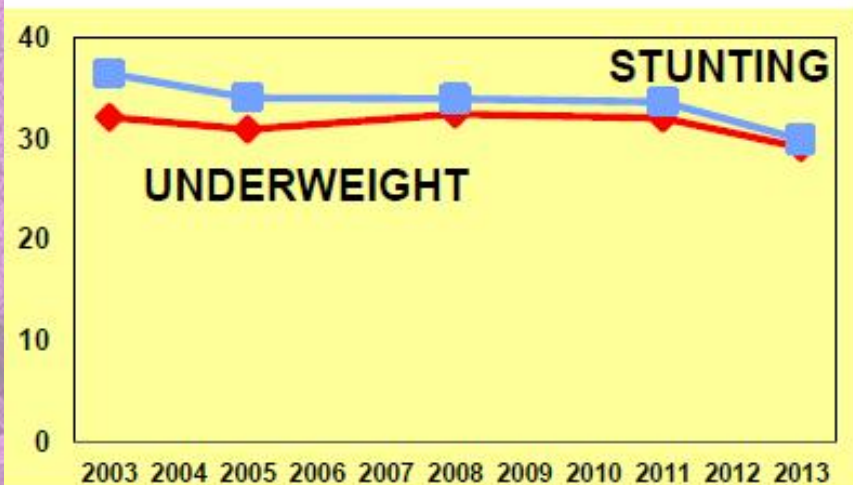
# Prevalence of malnourished children, 5.08-10.0 years old (61-120 months): Philippines, 2013

**UNDERWEIGHT**

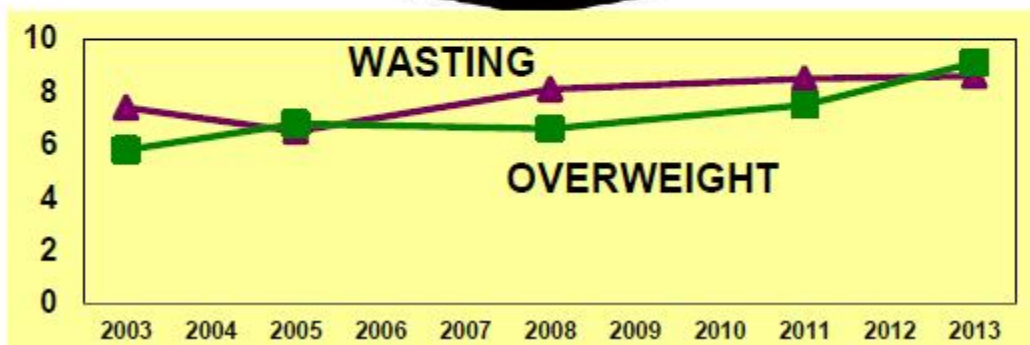
**29.1%**

**STUNTING**

**29.9%**



# Prevalence of malnourished children, 5.08-10.0 years old (61-120 months): Philippines, 2013



# Prevalence of malnourished children, 10.08-19.0 years old (121-228 months): Philippines, 2013

**WASTING**

**12.4%**



**OVERWEIGHT**

**8.3%**



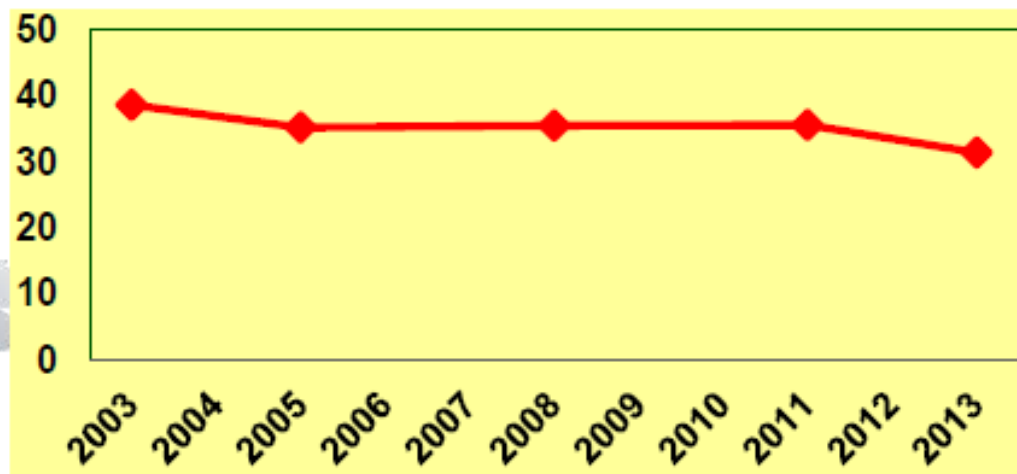


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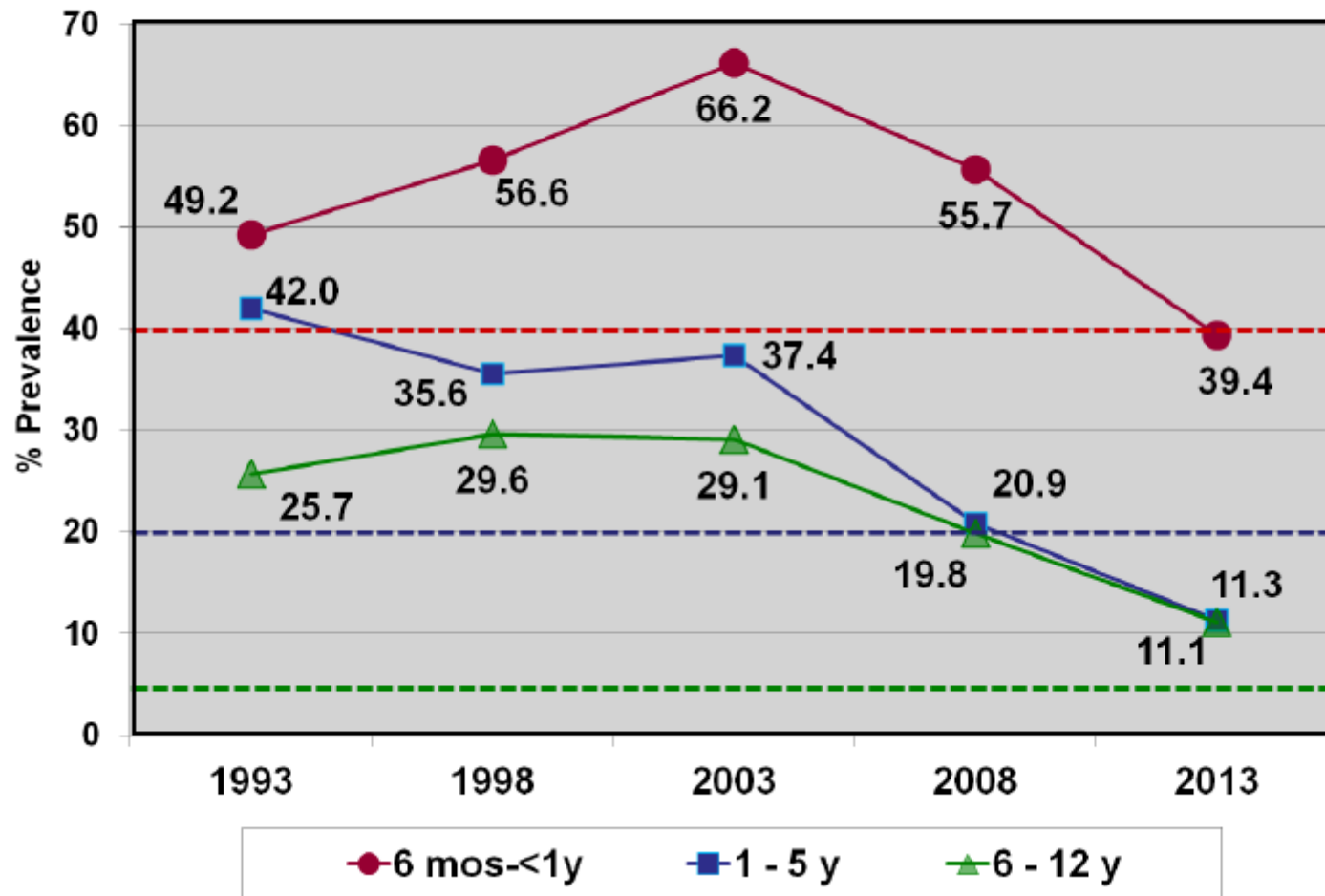


**STUNTING**

**31.5%**



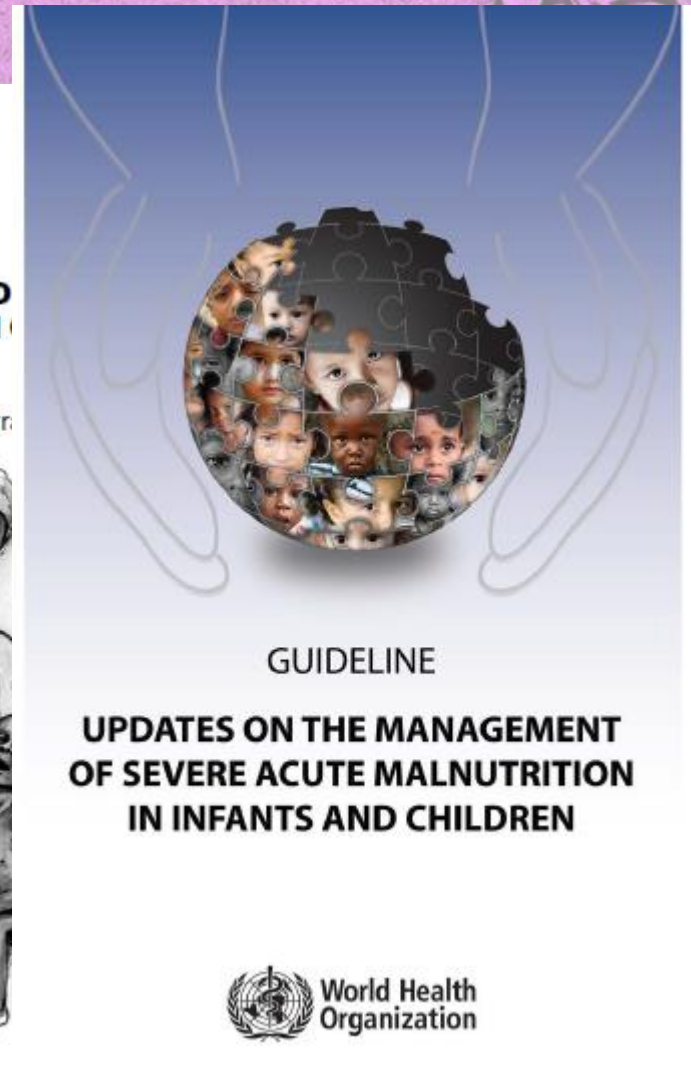
## Trends in the prevalence of anemia among children Philippines: 1993, 1998, 2003, 2008 and 2013



# Severe malnutrition

Key diagnostic features are:

- weight-for-length (or height)  $<70\%$  or  $-3SD$  (marasmus)
- edema of both feet (kwashiorkor or marasmic kwashiorkor).





**1**  
Packet

=

**1** Chicken  
**2** breast



**3** Cups  
of milk



**1** Orange



**1** Bunch of  
spinach



**1** Cup of  
**2** olive oil



**1 1/2** Carrots



**9** Spears of  
asparagus



**1** Stick of  
**3** butter



**2** Meat  
patties



**FOOD  
FOR  
FAMINE**  
.ORG



# Dietary management of infection

## 1. CONTINUATION OF BREASTFEEDING/FEEDING DURING INFECTIONS

- applies to all infections, but esp in diarrhea, measles, RTI, and malaria.
- 4-6 mos. exclusive breastfeeding is recommended
- With breastfeeding, growth faltering commonly is rarely seen; risk of death is minimized.
- do not withhold food
- give frequent small feeds, every 2–3 hours
- coax, encourage, and be patient
- feed by nasogastric tube if the child is severely anorexic
- promote catch-up growth after the appetite returns.



**Newborn, birth up to 1 week**



- Immediately after birth, put your baby in skin to skin contact with you.
- Allow your baby to take the breast within the first hour. Give your baby colostrum, the first yellowish, thick milk. It protects the baby from many illnesses.
- Breastfeed day and night, as often as your baby wants, at least 8 times in 24 hours. Frequent feeding produces more milk.
- If your baby is small (low birth weight), feed at least every 2 to 3 hours. Wake the baby for feeding after 3 hours, if baby does not wake self.
- DO NOT give other foods or fluids. Breast milk is all your baby needs. This is especially important for infants of HIV-positive mothers. Mixed feeding increases the risk of HIV mother-to-child transmission when compared to exclusive breastfeeding.

**1 week up to 6 months**



- Breastfeed as often as your child wants. Look for signs of hunger, such as beginning to fuss, sucking fingers, or moving lips.
- Breastfeed day and night whenever your baby wants, at least 8 times in 24 hours. Frequent feeding produces more milk.
- Do not give other foods or fluids. Breast milk is all your baby needs.

**6 up to 9 months**



- Breastfeed as often as your child wants.
- Also give thick porridge or well-mashed foods, including animal-source foods and vitamin A-rich fruits and vegetables.
- Start by giving 2 to 3 tablespoons of food. Gradually increase to 1/2 cups (1 cup = 250 ml).
- Give 2 to 3 meals each day.
- Offer 1 or 2 snacks each day between meals when the child seems hungry.

**1 week up to 6 months**



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**9 up to 12 months**



- Breastfeed as often as your child wants.
- Also give a variety of mashed or finely chopped family food, including animal-source foods and vitamin A-rich fruits and vegetables.
- Give 1/2 cup at each meal (1 cup = 250 ml).
- Give 3 to 4 meals each day.
- Offer 1 or 2 snacks between meals. The child will eat if hungry.
- For snacks, give small chewable items that the child can hold. Let your child try to eat the snack, but provide help if needed.

**12 months up to 2 years**



- Breastfeed as often as your child wants.
- Also give a variety of mashed or finely chopped family food, including animal-source foods and vitamin A-rich fruits and vegetables.
- Give 3/4 cup at each meal (1 cup = 250 ml).
- Give 3 to 4 meals each day.
- Offer 1 to 2 snacks between meals.
- Continue to feed your child slowly, patiently. Encourage—but do not force—your child to eat.



PINGGANG PINOY®



# PINGGANG PINOY®

A food guide using a food plate model to show the recommended proportion by food group in every meal.

## GO ENERGY GIVING

**Go** for rice, root crops, pasta, bread, and other carbohydrate-rich foods, which provide energy to support bodily functions and physical activity.

**Choose** whole grains like brown rice, corn, whole wheat bread, and oatmeal, which contain more fiber and nutrients than refined grains and are linked to lower risk of heart disease, diabetes, and other health problems.

## GROW BODY BUILDING

**Eat** fish, shellfish, lean meat, poultry, eggs, and dried beans and nuts needed for the maintenance and repair of body tissues.

Have enough animal-based protein foods, which provide more absorbable iron.

**Include** fatty fish in the diet like tuna, sardines and mackerel 2-3 times a week to provide essential fatty acids that help protect against heart diseases.

**Consume** milk, milk products and other calcium-rich foods like *dilis* and small shrimps for strong bones and teeth.

## GLOW BODY REGULATING

**Enjoy** a wide variety of fruits and vegetables, which are packed with vitamins, minerals and fiber needed for the regulation of body processes.



# PRINCIPLES OF A HEALTHY DIET

**Balance**

**Variety**

**Moderation**



# Measles Diet Chart



TOTAL CALORIES  
(kcal/Day)  
**1600**



## **UNHEALTHY DIET is energy-dense but nutrient-poor**

- High in sodium
- High in trans fatty acids and saturated fats
- High in free sugars
- Low in vegetables and fruits

# Dietary management of infection

## 2. MAINTENANCE OF DIET DURING INFECTION, ESPECIALLY PERSISTENT DIARRHOEA, INCLUDING BOTH ACTIVE AND RECOVERY (CATCH-UP) PHASES

- Maintaining supplementary foods in young children (above four to six months of age) during the course of infection, and increasing intake during the recovery period, is essential
- correct mistaken view that dietary intake should be restricted during infection
- encouragement to continue feeding required, but promotion of methods that increase the energy density of palatable diets

# Dietary management of infection

- 3. Administration of vitamin A in the management of measles, acute respiratory infections, etc.
- may be accomplished by counselling for vitamin A-rich foods in the diet, and often can also be effectively achieved by direct provision of vitamin A supplements.



# Dietary management of infection

4. Use of oral rehydration therapy in treatment of acute diarrhea
  - aid in counteracting anorexia, thus enabling more successful application of other interventions
  - Home-prepared fluids (e.g. gruels) for treating dehydration may be considered.

# Dietary management of infection

5. Dietary support in chronic infections With diseases such as tuberculosis, leprosy and AIDS, attention to maintaining adequate

- continuation of breastfeeding, and provision of higher energy density and palatable foods, and emphasis on frequency of feeding.
- Check specific guidelines
- Offer food 4-5 times per day- frequent small feedings



# Dietary management of infection

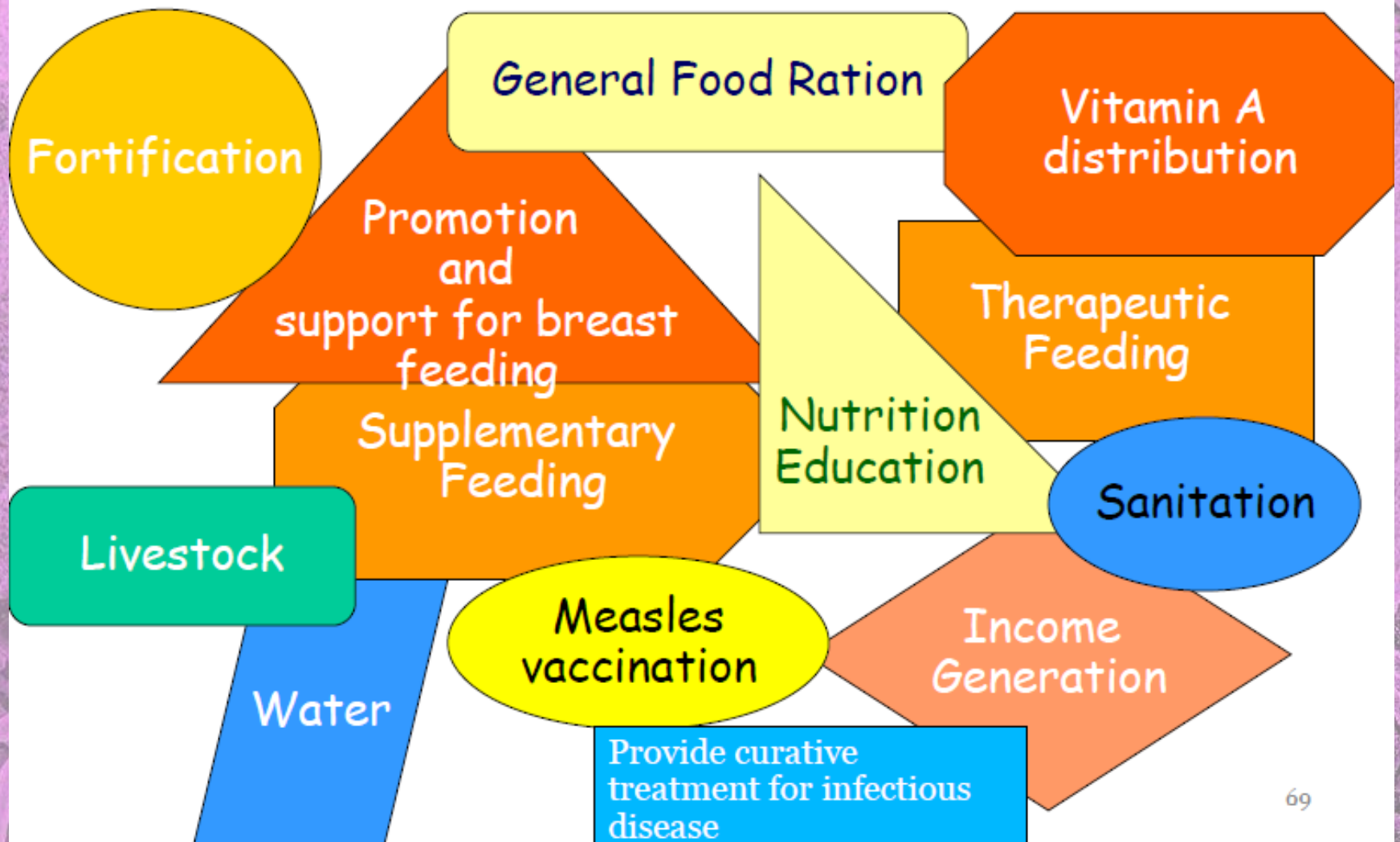
- 6. ORAL ADMINISTRATION OF IRON DURING THE TREATMENT OF MALARIA, IN MODERATE DOSES, IS VALUABLE.
- iron with or without folic acid may reduce the risk of clinical malaria, while in areas where these services are absent, the same intervention may increase the risk of malaria
- Hemoglobin and anemia status were improved at follow-up in children treated with iron



# Dietary management of infection

- Other micronutrient deficiencies
- Multiple micronutrient deficiencies are commonly associated with infectious disease and have particularly been implicated in acute respiratory infections (notably zinc, iron, and possibly vitamin D).
- Due attention to micronutrient status during management is appropriate

# Potential strategies to address and prevent malnutrition





## PROMOTING HEALTHY DIET IN VARIOUS SETTINGS

1. Homes
2. Workplaces
3. Communities
4. Schools
5. Food service establishments/food manufacturers
6. Institutional care facilities
7. Recreational facilities

# EVERYONE has the RIGHT to FOOD

*(Article 25, Universal Declaration of Human Rights)*



## Gov't will establish national feeding program for children

Republic Act No. 11037, also known as "Masustansyang Pagkain para sa Batang Pilipino Act," aims to combat hunger and undernutrition among Filipino children.

Under the law, the Department of Social Welfare and Development (DSWD) will implement a supplemental feeding program for daycare children while the Department of Education (DepEd) will enforce the school-based feeding program. The two programs involve the provision of one fortified meal to undernourished kids for not less than 120 days in a year.

# OK 'TO!



## OBLIGASYON + KARAPATAN

# Potential problems

## Beneficiaries may not receive food:

- Underestimation of affected population
- Political priorities of donor and host governments
- Internal disputes
- Lack of agency resources
- Late delivery of food aid
- Poor access
- Theft
- Looting and pillage
- Attack
- Taxation
- Diversion
- Manipulation
- Coercion/extortion

# Real World/Real Philippines



- Report from a city in Visayas
- RUTF supply expired June 2018.
- thousands of RUTF were wasted
- No more available supply in any health centers.

## Why it was not used?

- Misallocations, politics, unreasonable implementation
- allocated to hospitals but hospitals did not have programs in the community settings
- health centers with nutrition programs were not supplied with RUTF
- suggested that MAM patients should also be given RUTF at an adjusted dose, was told it was not part of the guideline. This was finally allowed this only one month before the expiry

# Real Philippines Response

- To sustain the community program of their private hospital serving urban poor area
- Hired a dietitian to make a similar recipe- peanut/milk based, better tasting
- Operation Timbang for 6 mo-5 yrs old f, Jan to March
- Pedia residents and BHWs go house to house
- determine weight, height and MUAC
- classify nutritional status
- Moderate acute Malnutrition – given nutritional advice.
- SAM with infection or other medical problems are referred to Malnutrition Ward at hospital
- SAM without infection or comorbidities are enrolled to the feeding program
- All with close monitoring



# Real Philippines Response

- Private hospital provides all the ingredients (not dependent on donations or gov't)
- the counterpart of the mothers, do the cooking and food provided for 1 week per child, given 3x a day





# Take Home Messages

- Malnutrition is the primary cause of immunodeficiency worldwide
- Malnutrition and infections are part of a vicious cycle which leads to further morbidity and mortality
- Nutritional history and nutritional assessment should be performed in each and every patient
- Supplementation is important in micronutrient deficient patients

# Take Home Messages

- Nutritional interventions should be viewed as an INTEGRAL part of well baby clinics. Advice given at every visit.
- Nutritional interventions should be viewed as an INTEGRAL part of management of infections.
- Consider nutritional programs as important as immunization programs in decreasing the morbidity and mortality from infectious diseases.