Infant feeding ..

Backer rawashdeh M.D
Pediatric gastroenterologist

Main aspect of talk :-

1- Normal growth pattern

2- Breast milk

3- Food allergy

4- Infant formula

5- cmpa

6- weaning

7- galactosemia

8- pku

Normal Growth: Weight

- Normal birth weight 3.5 kg (2.5 kg – 4 kg)
- Loss of 10% of weight in 1st week
- Regain birth weight by 10 days - 2 weeks
- Expected gain
  - 200g per week for 1-3 months
  - 150g per week for 4-6 months
  - 100g per week for 7-9 months
  - 50-75g per week for 10-12 months

Normal Growth: Weight

- Slows after 1st year eg 2.5kg in 2nd year;
- 2.5 kg per year thereafter til 2-5years
- Older children (age + 4) x 2

Weight

- Doubling of weight at 4 month
- Triple birth weight at 1 year
- Quadrable birth weight at 2 year
- 16 kg at 4 year

Normal Growth : Length

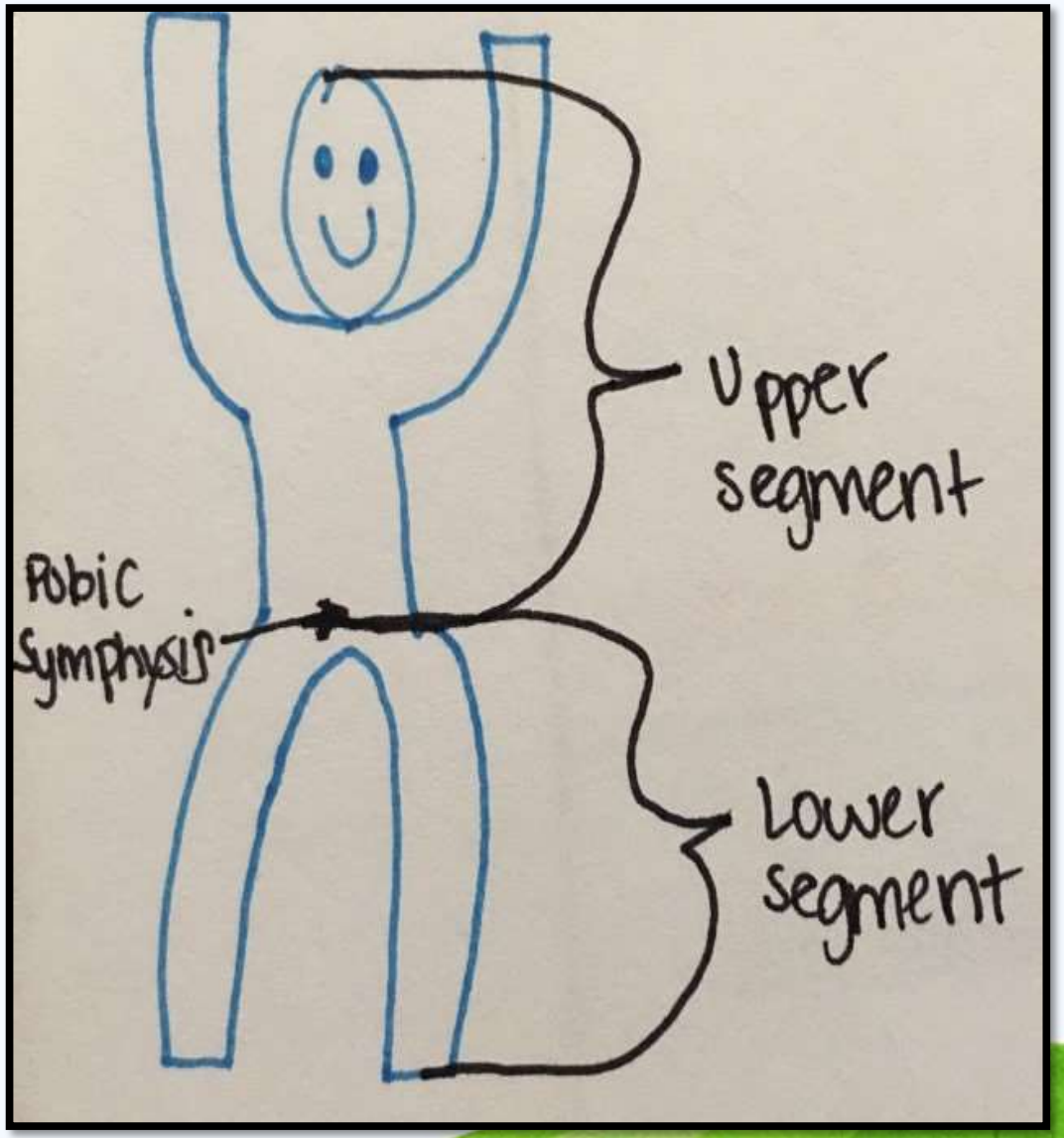
- Normal birth length 50cm (48 cm – 53 cm)
- Expected growth
  - 1st year 25cm
  - 2nd year 12cm
  - 2-5 year 7-8 cm per year
  - 6-11 year 6-7 cm per year
  - Double birth lenght at 4years
  - Triple birth lenght at 13 years
- Supine length until age 2

Normal Growth: OFC

- Normal head circ at birth 35cm (33 cm – 37 cm)
- 12 cm per first year(48cm by 1 yr)
- 6 cm in 2 year
- Then 5 cm
- Reflects brain growth
- Above eyes, upright, looking straight ahead

Upper/lower segment ratio

- 1.7 at bith
- 1.3 at 3 years
- 1 at 7 years




Breast feeding ..

The milk ejection reflex

The Prolactin Reflex

1. (Long arrow) Nerve impulses from sucking go to brain
2. (Short arrow) The pituitary gland releases prolactin into the blood
3. (Breast) This causes the alveolar cells to secrete milk and swells the alveoli

The Milk Ejection Reflex

1. (Long arrow) Nerve impulses from sucking go to the brain
2. (Short arow) The pituitary gland releases oxytocin into the bloodstream
3. (Breast) This causes muscles around the alveoli in the breast to squeez milk to the nipple

Recommendation

- Minimal Duration for **exclusive** breast feeding is 6 months, then Continue to breastfeed after that, in combination with appropriate complementary foods, until the age of 2 years or beyond

Macronutrients

Content	Protein	Carbohydrate	Fat
Calories	4 kcal/gram = 3-4gm/kg/ day 10% of calories	4 kcal/gram = 40-50% of calories	9 kcal/gram = 40-50% of calories
Content	Whey:Casein (70:30) Whey: soluble and easy to digest	**Lactose** and oligosaccharides	**LCT** and MCT Essential fatty acids DHA, ARA
Other contents	IgA Lactoferrin Lyzozymes Lactoalbumin Growth factors		lipase

Micronutrients

- Water: 90%
- Minerals:
  - Iron
  - Vitamin D
  - Ca : Phosphorus

human milk 2:1 cow's milk 1:1

Table 2. Comparison of Human Milk, Cow Milk, and Infant Formula

Component	Human Milk	Similac®/Enfamil® Formulas	Cow Milk
Calories (kcal/L)	747	700	701
Protein (g/100 mL)	1.1	1.5	2.8
Casein	3.7		25.0
Taurine (mM/100 mL)	25 to 30	Added artificially	<1.0
Phenylalanine (mg/100 mL)	48	390 mM/100 mL	172
Tyrosine	61		179
Fat (g/1,000 mL)	4.5	2.6	4.4
Cholesterol (mg/L)	139	0	120
Carbohydrate (g/1,000 mL)	6.8	7.2	4.7
Minerals ash (weight %)	0.2	0.33	0.7
Calcium (mg/dL)	34	55	118
Phosphorus (mg/dL)	14	44	93
Calcium/phosphorus ratio	2.4:1	1.2:1	1.3:1
Sodium (g/L)	0.512 (7 mL Eq/L)	1.1 (6 mL Eq/L)	0.768 g/L
Vitamin D	4 to 40 IU/L	400 IU	47 to 100 IU
Vitamin K	0.9 to 6.9 mg/L	4 mg/100 kcal	19 mg/L

Composition

Colostrum → **Transitional Milk** → **Mature**

First few days — 3 days–2 weeks — >2 weeks

Throughout any given feeding session

Foremilk → **Hindmilk**

Colostrum

- First 2-5 days
- Yellow thick milk
- Has Laxative effect:
  - passage of meconium
  - Lowering bilirubin

- Higher protein and IgA content
- Lower Na, carbs, fat content

Transitional

- Higher carbohydrate and fat
- Lower protein and minerals
- Increase fat and suger

Mature

- More thinner and watry
- Contains all essential nutrients for growth
- Less protein, more fat and energy
- Carbohydrate
  contains lactose = improved Ca absorption
- Minerals
  - higher bioavailability of iron and zinc
  - low sodium content

Preterm milk

- Preterm milk
- Is the breast milk of a mother who delivers premauturly
- High quantity of protiens , sodium , iron , immunoglobulins .

MACRONUTRIENT (PER100ML)	COLOSTRUM	MATURE MILK
Energy	58 Kcal	58-72 Kcal
Total Protein	2.3 g	0.9 g
IgA	364 mg	142 mg
Casein	140 mg	187 mg
Lactoferrin	330 mg	167 mg
Lactalbumin	218 mg	161 mg
Total Fat	2.9 g	4.2 g
Lactose	5.3 g	7.0 g
Cholesterol	27 mg	16 mg

Enough or not?

- At least 8 times – 12 times per day for neonates
- About 10-15 min per breast each feed
- The infant should take from each breast each feed
- Feeding every 2-3 hours, not longer than 4-5 hours
- Feeling of breast emptying
- Sleeping after feeding
- Passing of urine *6 – 8 wet dipers
- Passing of stool *4
- Increasing weight (15 – 30 gram per day)

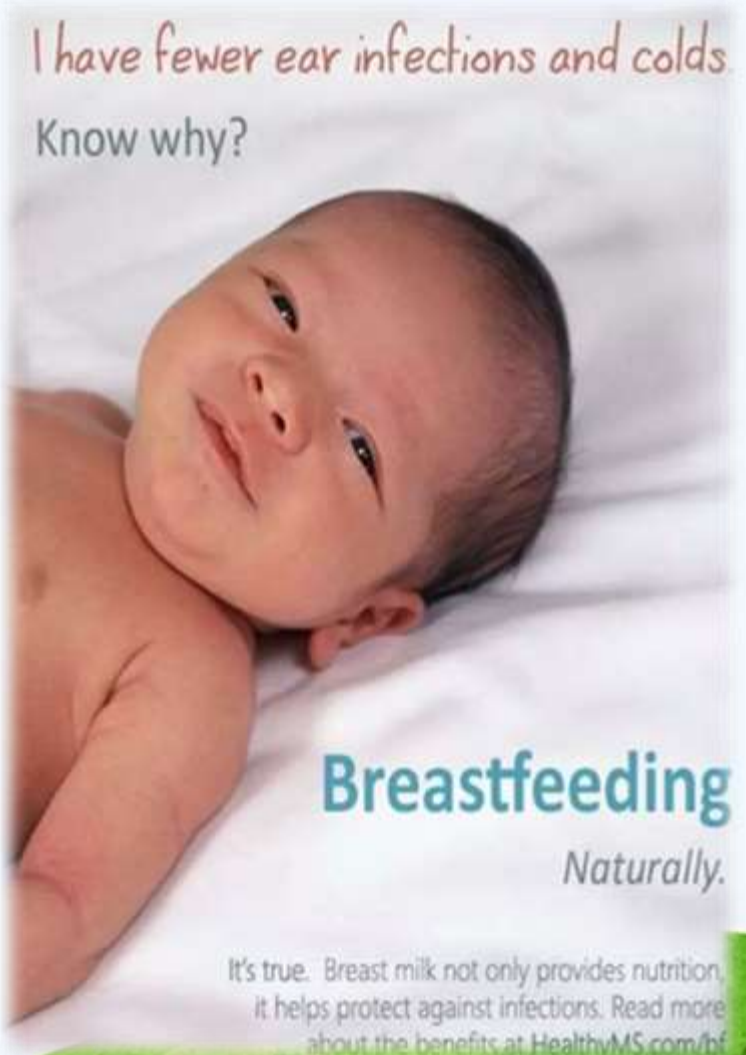
Frequency and Volume of Feeds

- Feed on demand
- Initially small frequent feeds
- Volumes increase, frequency decreases

Age	frequency/day	Volume (mL) per feed
Birth – 1 week	6-10	30-90
1 week–1month	7-8	60-120
1- 3 months	5-7	120-180
3-6 months	4-5	180-210
6-9 months	3-4	210-240
9-12 months	3	210-240

Advantages of breast feeding to child

- complete nutrition
- cover against infection
- cheaper
- helps in expulsion of placenta and
- Minimize risk of pph .
- Bonding between mother and infant
- Contour of the body come back to normal



Protective effect of breast feeding

Acute conditions	Chronic conditions
Acute diarrheal illnesses	DM
Otitis media	Celiac
UTI	Crohn's disease
Botulism	Allergy
NEC	Obesity
	Lymphoma
	Leukemia
	Higher iq

Contraindications

- Galactosemia and congenital lactase deficiency
- Phenylketonuria
- Chemotherapy and radiotherapy

- HIV mother
- Active / non treated Tuberculosis infection

- Temporary:-

  Active Herpes, or chicken pox

Contraindications to breastfeeding or feeding expressed breast milk to infants

Do not breastfeed and do not feed expressed breast milk	
Infant has classic galactosemia (ie, not Duarte variant)	These conditions preclude breastfeeding.
Mother has HIV infection*	
Mother is infected with HTLV I or II	
Mother is using illicit drugs (eg, phencyclidine or cocaine)¶	
Mother has suspected or confirmed Ebola virus disease	
Temporarily do not breastfeed and do not feed expressed breast milk	
Mother has untreated brucellosis	Mothers may be able to resume breastfeeding after consulting with a clinician to determine when their breast milk is safe for their infant. These mothers should be provided with lactation support to learn how to maintain milk production and feed their infants with pasteurized donor human milk or formula while temporarily not breastfeeding.
Mother is taking certain medications Δ ◇	
Mother has an active HSV infection, with lesions present on the breast§	
Temporarily do not breastfeed, but may feed expressed breast milk to infant	
Mother has untreated active tuberculosis¥	Airborne and contact precautions may require temporary separation of the mother and infant, during which time expressed breast milk should be given to the infant by another care provider. Mothers should be able to resume breastfeeding after consulting with a clinician to determine when there is no longer a risk of spreading infection. These mothers should be provided with lactation support to learn how to maintain milk production while not breastfeeding and/or while expressing their milk.
Mother has active varicella that developed between 5 days prior to delivery and 2 days following delivery	

While human milk provides the most complete form of nutrition for infants, including premature and sick newborns, there are rare exceptions when human milk/breastfeeding is not recommended, as outlined in this table.

HTLV: human T-lymphotropic virus; HSV: herpes simplex virus.
* This recommendation is for women in the United States and other resource-rich countries. Breastfeeding by HIV-infected women may be appropriate in resource-limited settings if breast milk replacement is not feasible, affordable, or safe[1].
¶ Narcotic-dependent women who are in a supervised methadone program or buprenorphine program with negative screening for HIV and other illicit drugs may breastfeed[1].
Δ Most, but not all, therapeutic drugs are compatible with breastfeeding[1]. Medications should be reviewed on a case-by-case basis for potential contraindications. The LactMed database, produced by the National Library of Medicine, is a free authoritative reference for lactation compatibility for prescription and over-the-counter drugs. This resource provides data on drug levels in human milk and infant serum, potential adverse effects on breastfeeding infants and lactation, and recommendations for alternative drugs.
◇ Breastfeeding should be suspended during and after administration of certain radiopharmaceutical drugs. The recommended suspension of breastfeeding varies depending on the radioactive compound. Compounds used for tumor and cardiac imaging usually require prolonged cessation of breastfeeding[2].
§ Mothers breastfeed directly from the unaffected breast if lesions on the affected breast are covered completely and with good handwashing to avoid transmission.
¥ The mother may resume breastfeeding once she has been treated appropriately for 2 weeks and is documented to be no longer contagious[1].

References:
1. *Johnston M, Landers S, Noble L, et al. Breastfeeding and the use of human milk. Pediatrics 2012; 129:e827.*
2. *Sachs HC, Committee On Drugs. The transfer of drugs and therapeutics into human breast milk: an update on selected topics. Pediatrics 2013; 132:e796.*

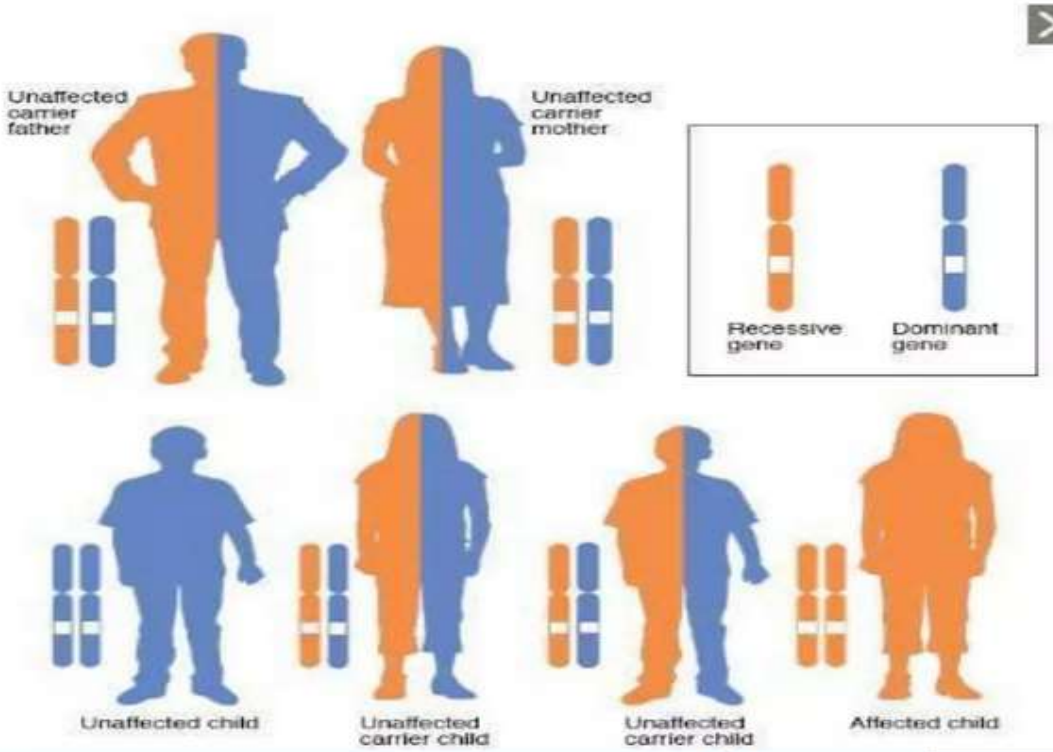
Modified from: Centers for Disease Control and Prevention. Breastfeeding: Contraindications to Breastfeeding or Feeding Expressed Breast Milk to Infants. Available at: https://www.cdc.gov/breastfeeding/breastfeeding-special-circumstances/contraindications-to-breastfeeding.html (Accessed on July 31, 2020).

Not contraindicated

- Hepatitis B, C
- Smoking and alcohol

Galactosemia

Mode of inheritance



To have an autosomal recessive disorder, you inherit two mutated genes, one from each parent. These disorders are usually passed on by two carriers. Their health is rarely affected, but they have one mutated gene (recessive gene) and one normal gene (dominant gene) for the condition. Two carriers have a 25 percent chance of having an unaffected

CLASSICAL GALACTOSEMIA (GALT)

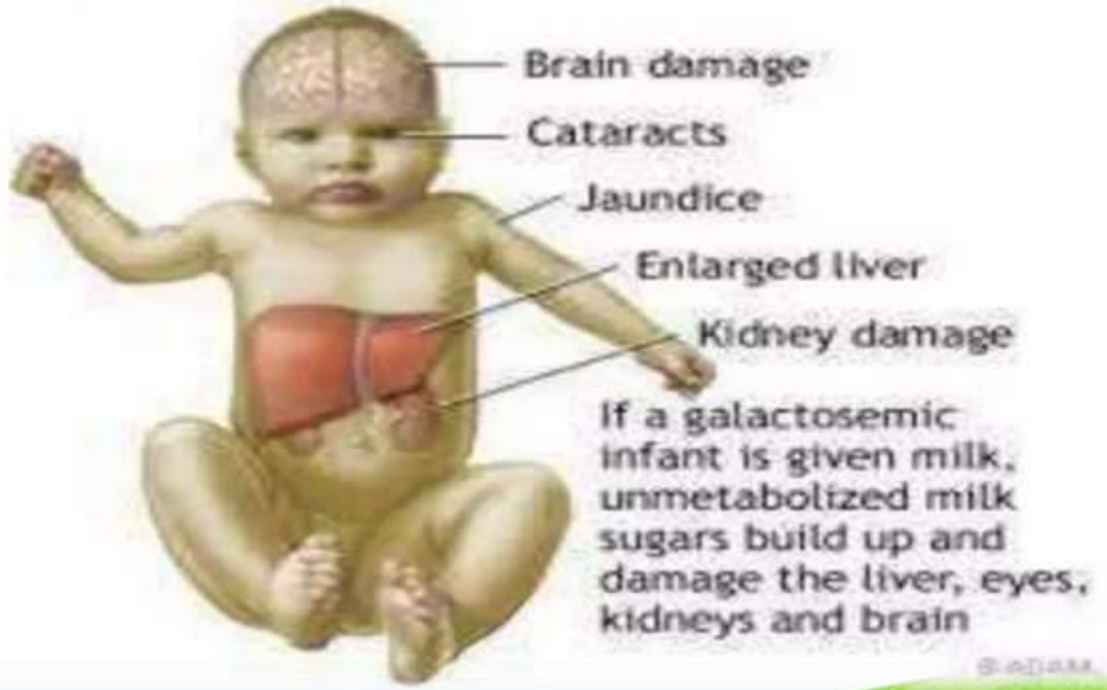
- Galactosemia is due to deficiency of the enzyme galactose 1-phosphate uridyltransferase.
- It is a rare congenital disease in infants, inherited as autosomal recessive disorder.
- Mutation in the GALT gene located on chromosome 9 is responsible for this disorder.

1. Galactose metabolism is impaired leading to increased galactose levels in blood (galactosemia) and urine (galactosuria).
2. Accumulated galactose is diverted for production of galactitol by the enzyme aldol reductase. Galactitol has been implicated in the development of cataract.

3. The accumulation of galactose 1-phosphate and galactitol in various tissues like liver, nervous tissue, lens and kidney leads to impairment in their function.
4. The accumulation of galactose 1-phosphate in liver results in the depletion of inorganic phosphate for other metabolic functions.

CLINICAL SYMPTOMS:

- Weight loss (in infants)
- Hepatosplenogamy
- Jaundice
- Mental retardation
- Severe cases : cataract, amino aciduria and albuminuria.



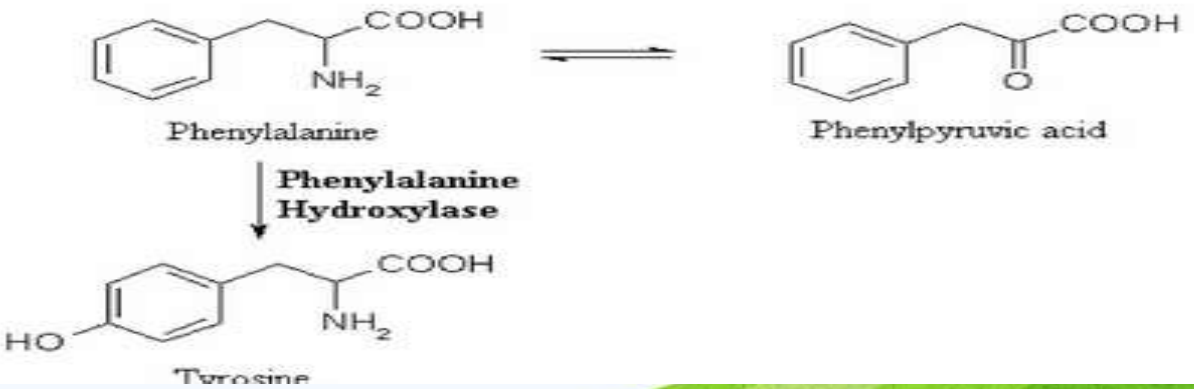
Treatment

- Total elimination of galactose from the diet ..
- Soy based / lactose free formula

Phenyl ketouria

Overview

- Autosomal recessive metabolic genetic disorder
- Mutation in the gene for phenylalanine hydroxylase(PAH).
- When PAH activity is reduced, phenylalanine accumulates and is converted into phenylpyruvate(phenylketone), which can be detected in the urine.



Symptoms

- Most babies with phenylketonuria appear healthy at birth.
- Symptoms usually only develop due to complications that arise if the condition is not treated properly.
- If it isn't treated, damage to the brain and nervous system can lead to:
  1. learning disabilities
  2. behavioural difficulties
  3. epilepsy

Symptoms

- Often have lighter skin, hair, and eyes than brothers or sisters without the disease.
- Other symptoms include:
  - ✓ Eczema
  - ✓ Recurrent vomiting
  - ✓ Jerking movements in arms and legs
  - ✓ Tremors
  - ✓ Mood disorders
  - ✓ Microcephaly,

PKU SCREENING

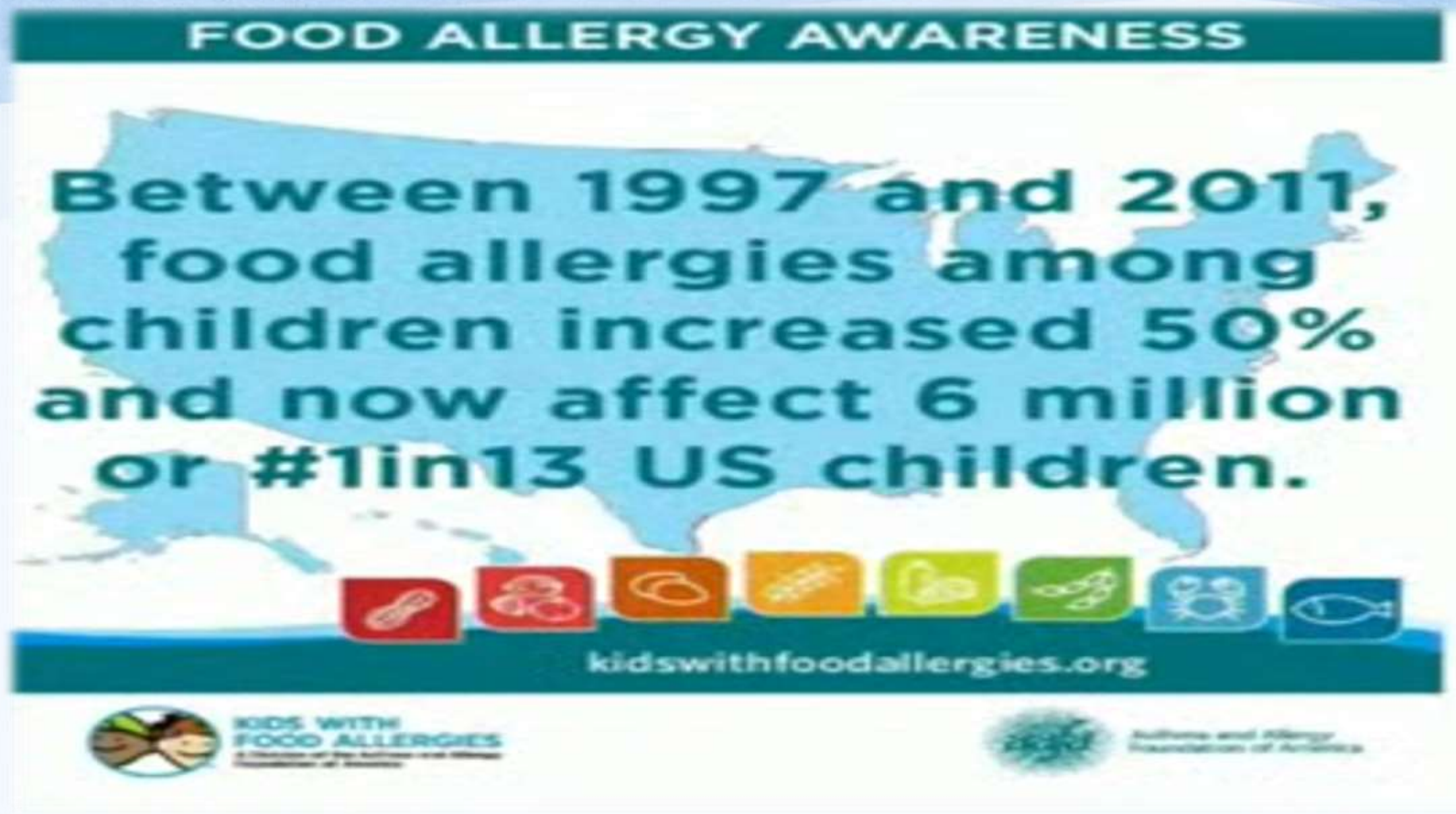
Treatment …

BABY FORMULA FOR PKU


Food allergy

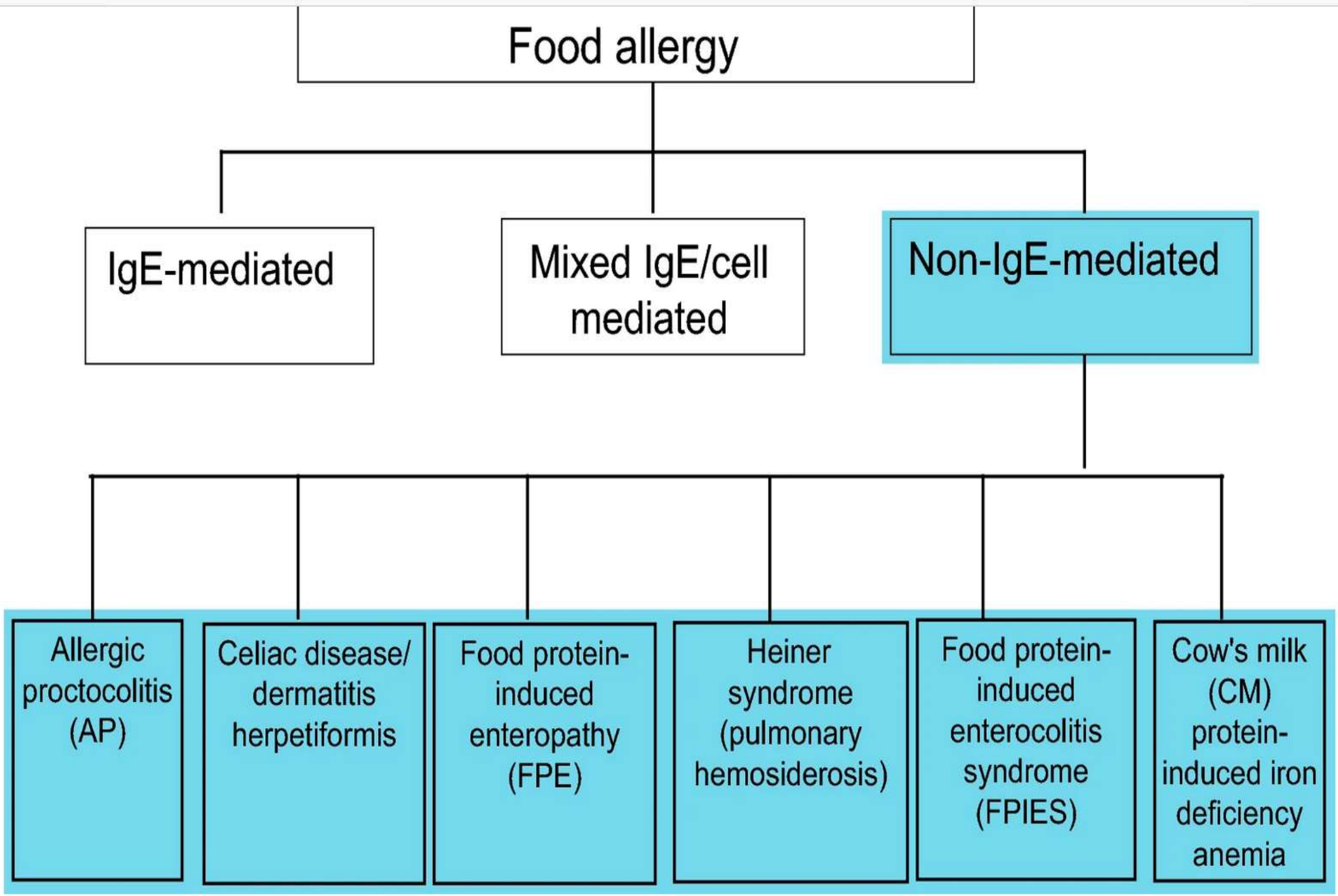
HISTORY OF FOOD ALLERGY ..

- In Hippocrates' writings (460–377 BC), he referred to the presence of "hostile humors" (now known as IgE antibodies) in some men that made them "suffer badly" following ingestion of cheese.[1]
- An often quoted line from a poem of Titus Lucretius Cato (98–55 BC), "What is food to one, to another is rank poison,"[1] strongly suggests an understanding of adverse reactions to foods over 2000 years ago.


FOOD ALLERGY AWARENESS
Between 1997 and 2011, food allergies among children increased 50% and now affect 6 million or #1in13 US children.
kidswithfoodallergies.org
KIDS WITH FOOD ALLERGIES

Defenition ..

- Food allergy is an immune system reaction that occurs soon after eating a certain food. Even a tiny amount of the allergy-causing food can trigger signs and symptoms such as digestive problems, hives or swollen airways. In some people, a food allergy can cause severe symptoms or even a life-threatening reaction known as anaphylaxis.


Food allergy
IgE-mediated
Mixed IgE/cell mediated
Non-IgE-mediated
Allergic proctocolitis (AP)
Celiac disease/ dermatitis herpetiformis
Food protein-induced enteropathy (FPE)
Heiner syndrome (pulmonary hemosiderosis)
Food protein-induced enterocolitis syndrome (FPIES)
Cow's milk (CM) protein-induced iron deficiency anemia

Possible Symptoms of an Allergic Reaction

CENTRAL NERVOUS SYSTEM

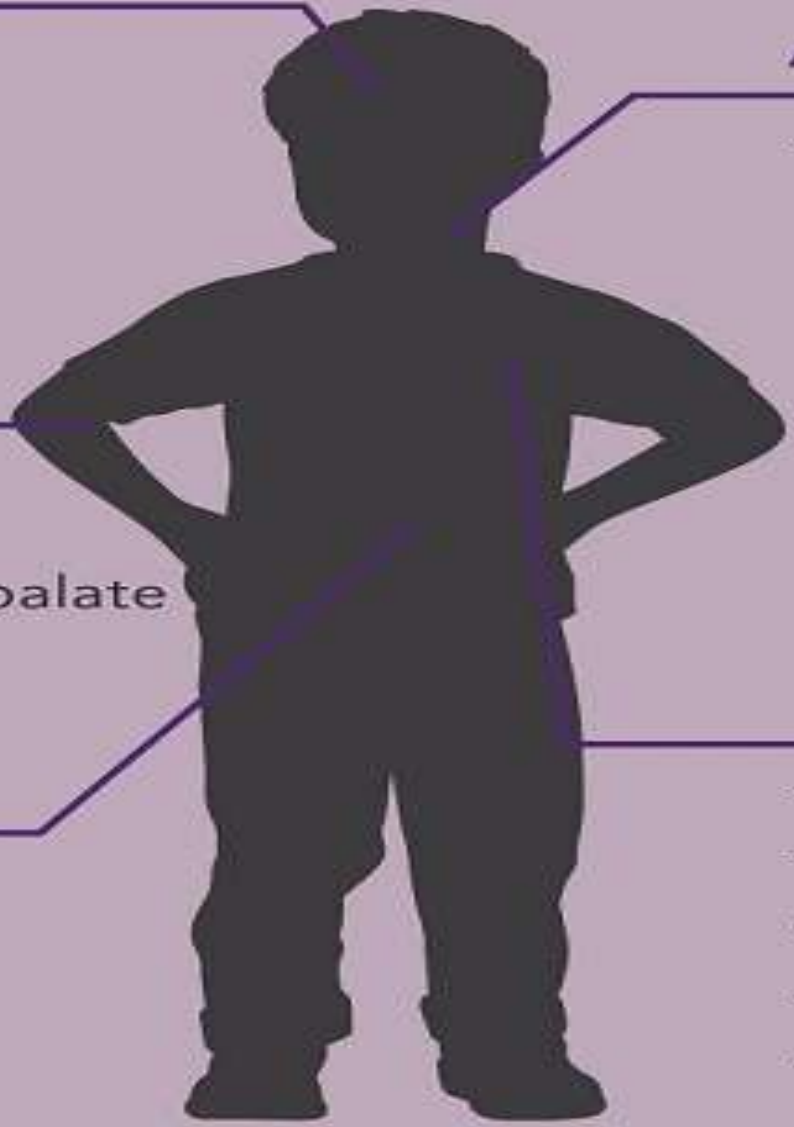
- Uneasiness
- Confusion
- Throbbing headache
- Tunnel vision
- Dizziness

SKIN & MUCOSAL TISSUE

- Hives
- Pruritus and swelling of lips, tongue, and uvula/palate
- Itching
- Flushing

GI TRACT

- Nausea
- Cramping
- Abdominal pain
- Vomiting
- Diarrhea



AIRWAY (LARYNX & LUNGS)

- Larynx: pruritus and tightness in throat, dysphonia, and hoarseness
- Lung: dyspnea, chest tightness, and wheezing/ bronchospasm

CARDIOVASCULAR SYSTEM

- Chest pain
- Weak pulse
- Hypotension
- Dizziness
- Tachycardia
- Fainting


MILK
TREE NUTS
EGGS
PEANUTS
8
MAJOR FOOD
ALLERGENS
FISH
WHEAT
SHELLFISH
90 %
SOYBEANS
FDA

Diagnosis

- Diet History .

- Skin prick test

- Rast test .

Treatment

- Avoidance
- Desensitization
- Epinephrin (Epi-pen)
- Anti-histamine / steroids

allergies
Learn
symptoms
Allergy
Asthma
Find
reaction
food
foods
children
list
Allerg
Infection
Poison
warning
contain
shellfish
common
Health
Latex
Fish
Rhinitis
Eye
Know
Hives
look
Wheat
Ivy
Bee
Milk
Sinus
Hay
Fever
signs
Related
Eczema
Mold
roducts
heck
difference
severe
people
problems
tell
Drug
Sting
Soy
Nut
treat
help
Pet
cat
dog
causing
Sulfite
infants
Egg
Plant
potential
spot
normal
Get
response
types
tips
Fall
Urticaria
called
Cosmetic
Assess
article
Click
Dermatitis
Conjunctivitis
anaphylaxis
Sinusitis
Complications
specialist
affects
keep
specific
depend
key
trigger
photosensitivity
avoid
Salicylate
causes
pollen
lungs
season
side
shares
serious
outgrow
Aspirin
dealing
Sun
Center
fatal
spaces
must
Watch
looks
outdoor
got
eat
known
become
sunlight
case
pink
think
problem
Knowing
among
contagious
breathing
treatment
Understanding
attacks
involved
life-threatening
difficulty
blockage
triggers
family
Site
microscopic
Guide
started
avoided
indoor
identify
main
body
cause
early
ve
age
effect
even
vomiting
sources
majority
attack
lives
also
way
prevent
Sneezing
mild
prepared
Allergic
part
best
true
emergency
child
different
cramps
substances
Typical
members
Atopic
ingredients
may
unexpected
See
unsuspected
unsuspecting
itchy rash
sulfites
rapidly
safe
two
skin
avoiding
severity
treated
present
bad
like
nuts


Infant formula ..

History ..

The Bible Quran notes several examples of wet nurses, perhaps the most famous being prophet Moses story .

(fig.17)

Child sucking bottle (Early Ptolemaic period) Egypt

Egyptian Museum- Cairo

Arthur F. Abt and Fielding Hudson,

History of Pediatrics (New York, 1923),

16.

Infant formula

- Can be classified according to their content :-
- Reguler / special formula
- Protein content
- Carbohydrate content
- Fat content

Summary of differences between milks

	Human milk	Animal milks	Infant formula
Protein	correct amount, easy to digest	too much, difficult to digest	partly corrected
Fat	enough essential fatty acids, lipase to digest	lacks essential fatty acids, no lipase	no lipase
Water	enough	extra needed	may need extra
Anti-infective properties	present	absent	absent

Adapted from: Breastfeeding counselling: A training course. Geneva, World Health Organization, 1993 (WHO/CDR/93.6).

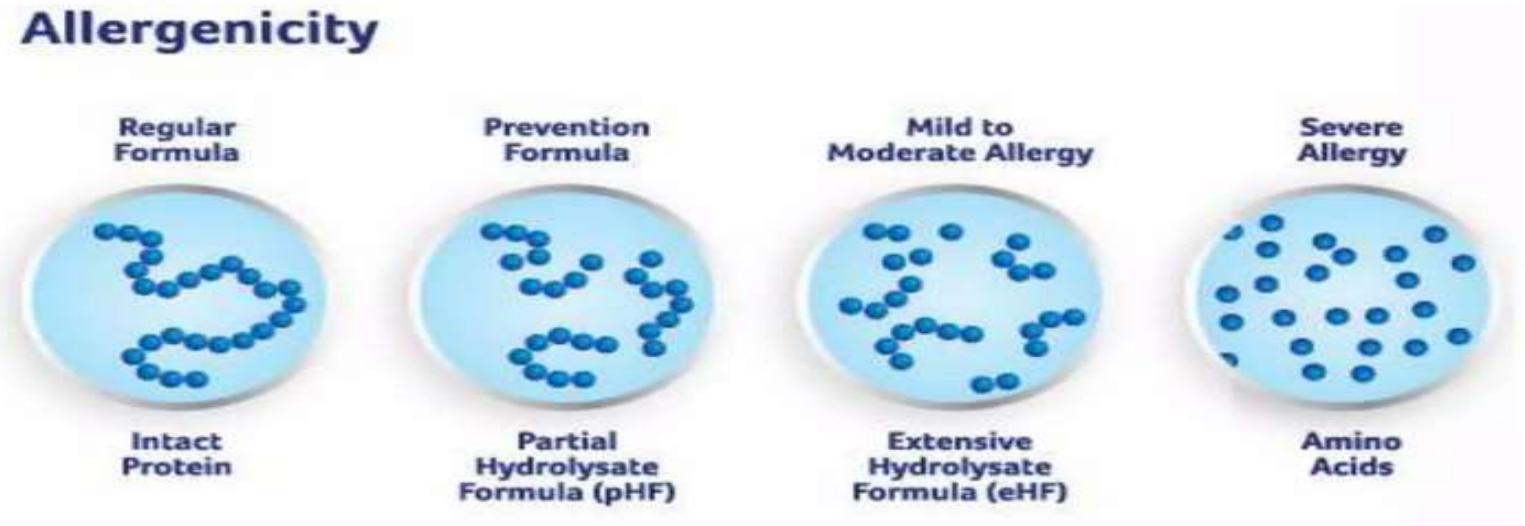
Infant Formulas – Protein Content

- Divided into 4 classes of formulas
  - Cow's milk based formulas
  - Soy formula
  - Casein hydrolyzed formula (partially hydrolyzed)
  - Total hydrolyzed formula
  - Amino acid based formula

Category	Example	Special indication
Cow's milk based formulas	S26 Nan Saha Similac bebelc AR formulas "Sensitive" / LF	
Soy formulas	Isomil ProSobee,	Galactosemia Lactase deficiency
Casein hydrolysate formulas	Babylac HA Nan HA Alfare (LF) Alimentum Prigistamil Cma -	Cow's milk protein allergy
Amino acids based formula (elemental(	Neocate Elcare	Cow's milk protein allergy not responding to Casein hydrolysate formulas

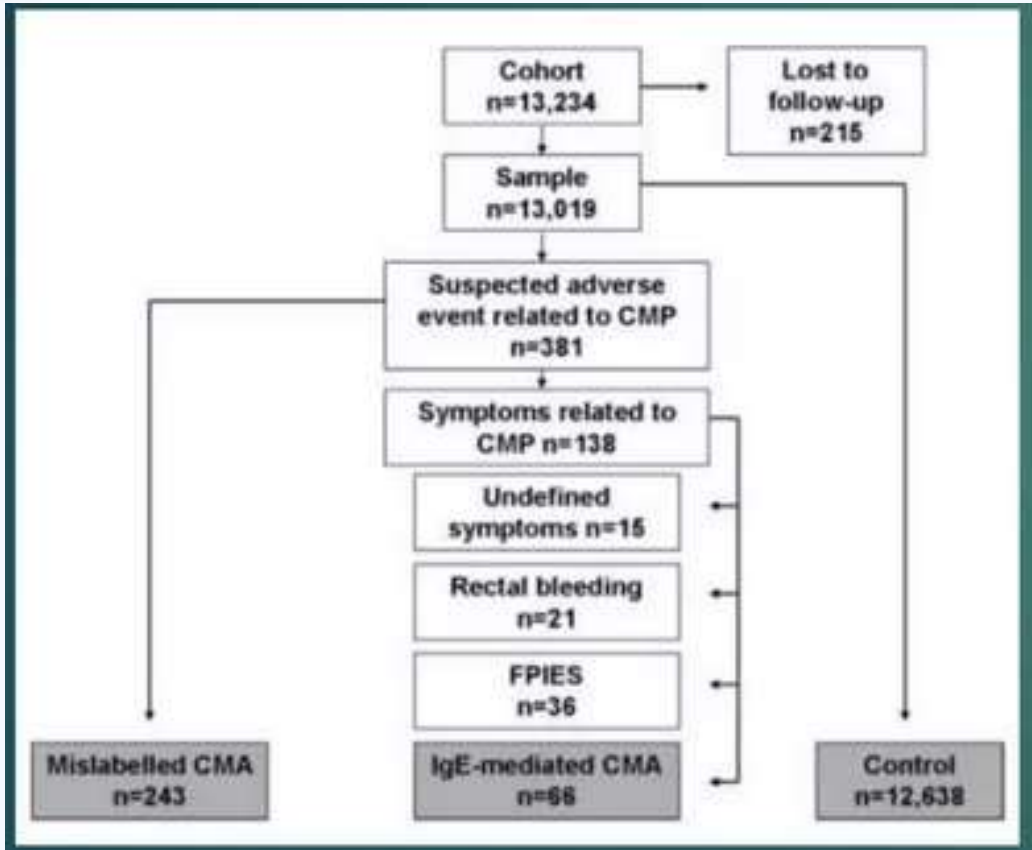
Cow's milk protein allergy CMPA ..

Formula feed: Allergenicity decrease with decreasing chain length



- Food allergy is an adverse health effect arising from a specific immune response that occurs reproducibly following exposure to proteins in food .
- CMA is the most common food allergy of young children , affecting 2- 6 % of infants . (9000/per yr baby in Jordan)
- CMA may be IG-E or Non – IgE .
- Symptomes are nonspacific and easily confused with gerd lactose intolerance or functional abdominal pain .

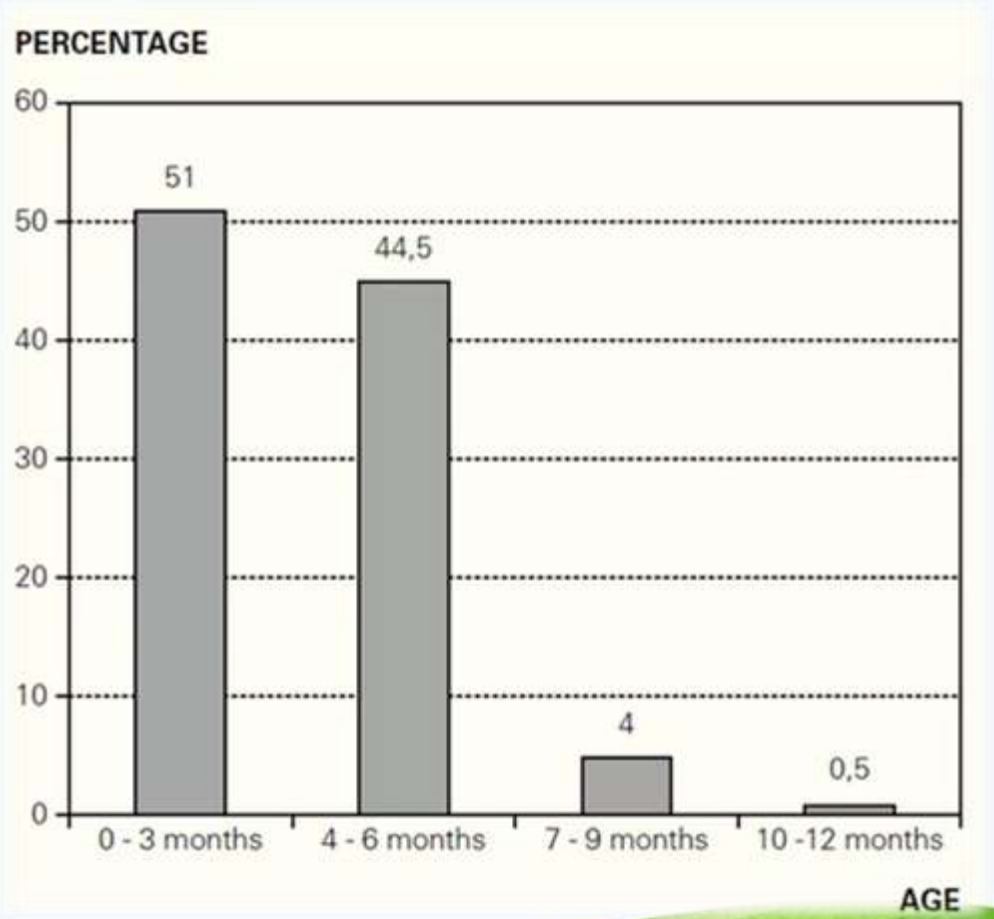
Mislabeled cow's milk allergy in infants a prospective cohort studt



Total Suspected CMPA	381	100%
IgE-mediated	66	17.4%
Non IgE-mediated	72	18.9%
Mislabeled	243	63.7%

CMPA : epidemiological aspect

- Patients diagnosed with cmp allergy
- Percentage distribution in relation to the age when the first reaction to cmp took place .
- 95 % would manifest their first symptoms before 6 months of age .



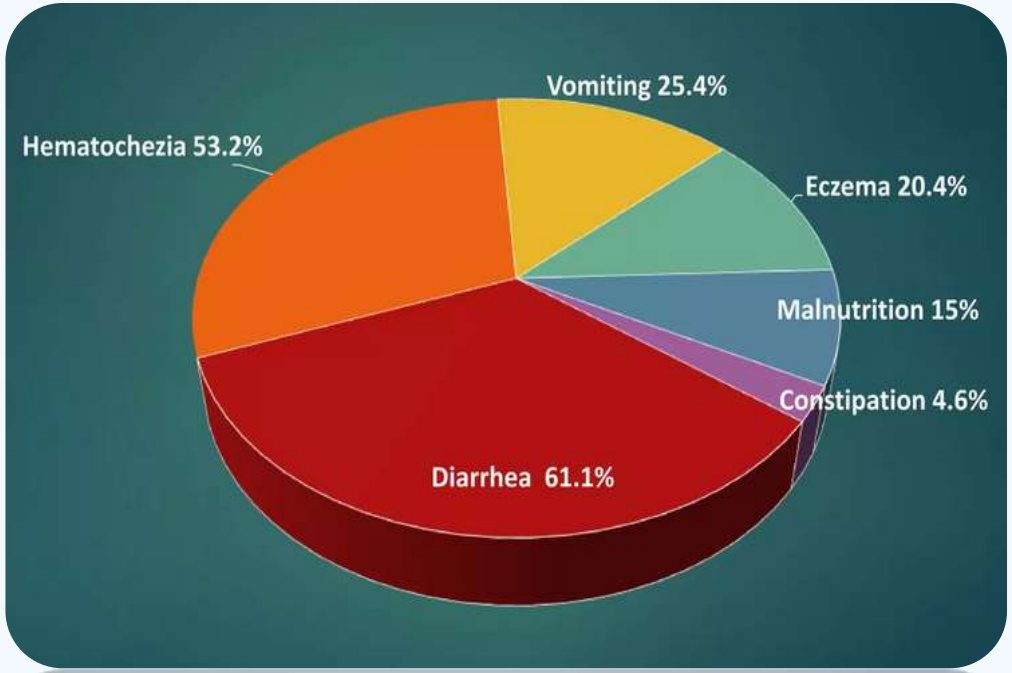
Presentation of cow's milk allergy

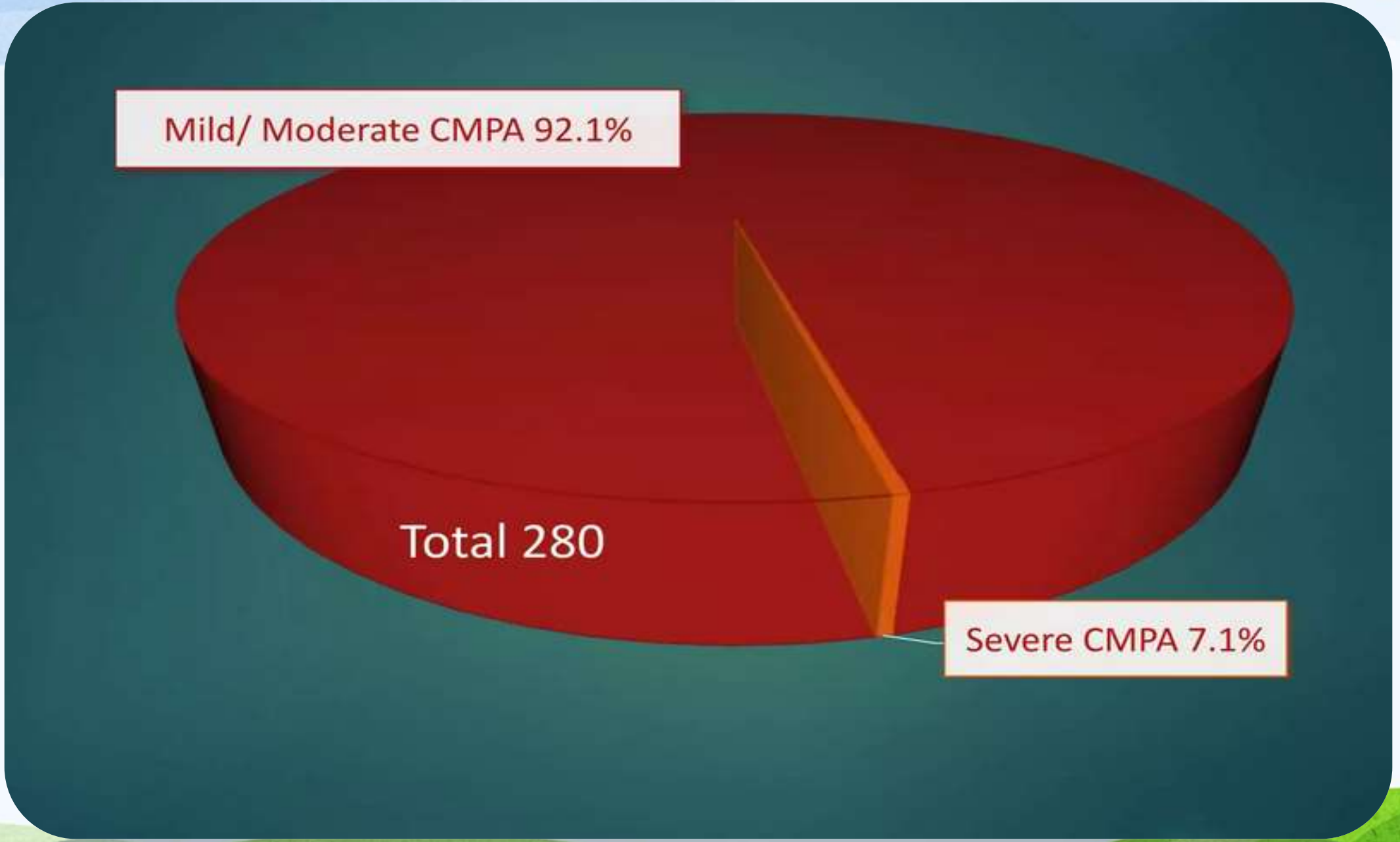
IgE mediated	Mixed IgE and non-IgE mediated	Non-IgE mediated
Anaphylaxis	Eosinophilic gastrointestinal disorders	Food protein-induced enterocolitis syndrome
Urticaria and angioedema	Atopic dermatitis	Food protein-induced proctitis/proctocolitis
Immediate oropharyngeal and gastrointestinal reactions		Food protein-induced enteropathy
Food-associated, exercise-induced anaphylaxis		Gastroesophageal reflux
		Colic
		Constipation
		Heiner syndrome (pulmonary hemosiderosis)

Gi sings & symptoms

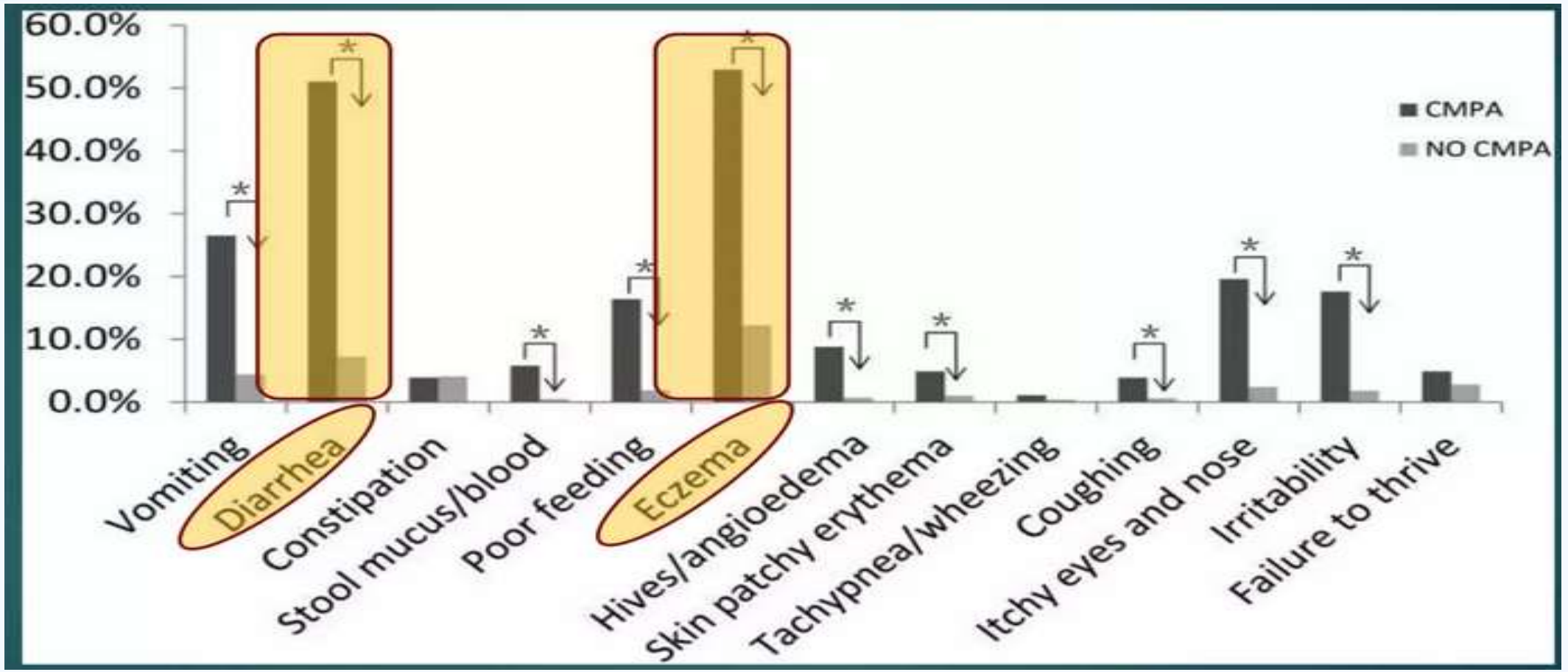
- Due to inflammation , dysmotility , malabsorption or a combination of all : -

- Dysphagia , vomiting and regurgitation
- Anorexia and food refusal
- Diarrhea with or without malabsorption
- Rectal bleeding
- Failure to thrive




Mild/ Moderate CMPA 92.1%
Total 280
Severe CMPA 7.1%

Symptoms in 182 pt less than 1 yr with confirmed cmpa



What Factors May Help Explain an Increase in Food Allergy Prevalence?

Changes in Diet

- **Vitamin D:** An association between low Vitamin D levels and increased risk of food allergy.
- **Obesity:** Obesity is associated with an inflammatory state; mostly studied in asthma
- **Dietary Fat:** Despite the earlier results, recent meta-analysis found no clear evidence to support the use of Omega 3 and Omega 6 fatty acids for the primary prevention of atopic allergic disease development or sensitization

Hygiene Hypothesis: Lack of exposure to infectious agents and gut flora increases susceptibility to allergic diseases; limited data for FA, except for mild effect of cesarean delivery

Hygiene Hypothesis

DIAGNOSTIC PROCEDURES

DIAGNOSTIC PROCEDURES

- The first step is a thorough history and physical examination.

- In most cases with suspected CMA, the diagnosis needs to be confirmed or excluded by an allergen elimination and challenge procedure.

DIAGNOSTIC PROCEDURES

- Children with gastrointestinal manifestations of CMA are more likely to have negative specific IgE test results compared with patients with skin manifestations.

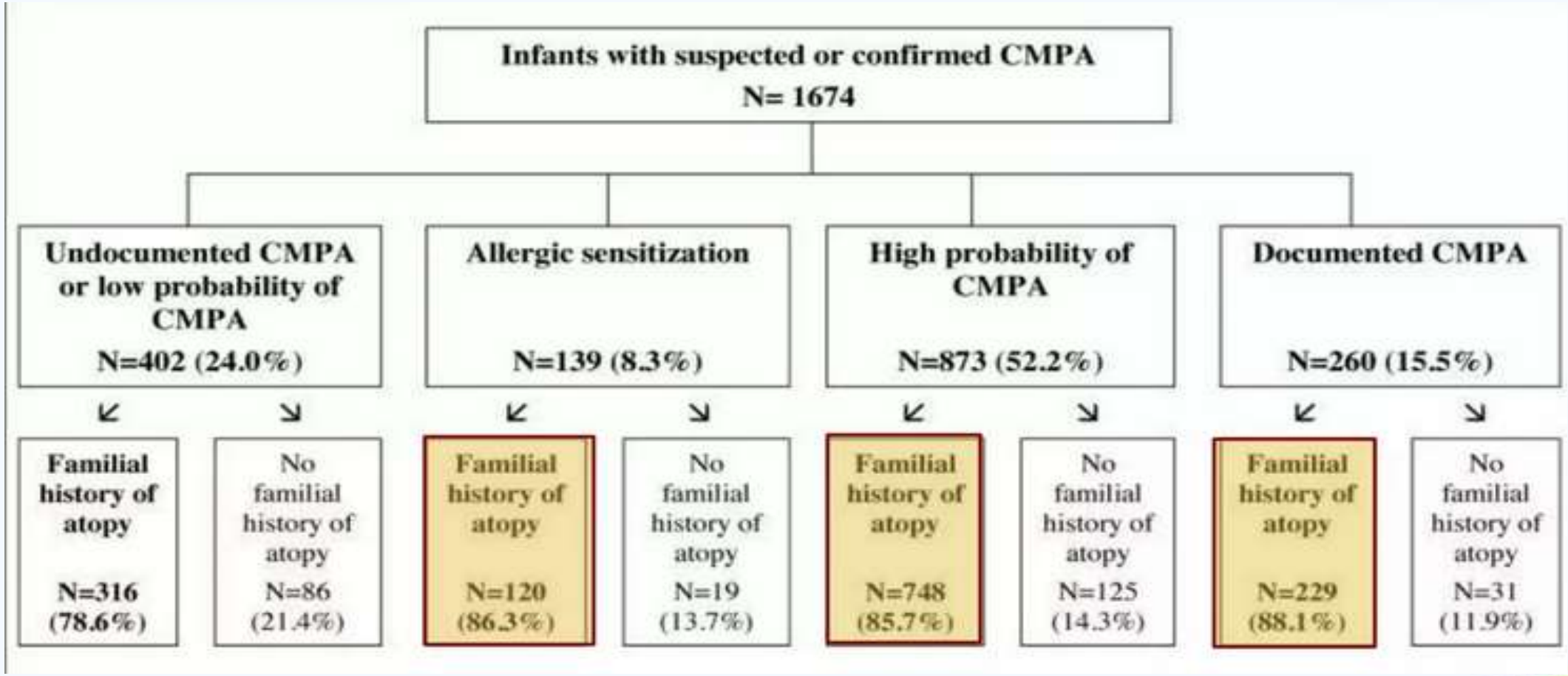
- Specific IgG Antibodies or Determination of IgG antibodies or IgG subclass antibodies against CMP has no role in diagnosing CMPA & not recommended.

Babies at high risk for developing allergy

First degree relatives with either :

- Food allergy
- Asthma
- OR moderate to severe atopic dermatitis (AD).

Family hx of atopy in infants with cmpa a French population – based study



Allergy 2009: 64: 884–889

DOI: 10.1111/j.1398-9995.2008.01931.x

Original article

The impact of caesarean delivery and type of feeding on cow's milk allergy in infants and subsequent development of allergic march in childhood

formula used was recorded. A cross sectional study on the prevalence of allergic diseases in this cohort was performed in 2004.
Results: We compared IgE-mediated CMA patients with non-IgE-mediated CMA patients and found that IgE-mediated CMA is associated with caesarean delivery (OR = 2.14 95% CI: 1.02–4.49), duration of breast feeding (>2 months, OR = 4.14; 95% CI: 2.17–7.89) and the use of supplementary artificial formula whilst breast feeding (OR = 2.86; 95% CI: 1.33–6.13). The factors associated with AM in IgE-mediated CMA patients were caesarean delivery (OR = 0.42; 95% CI: 0.19–0.92) and the use of more extensively hydrolysed high grade hydrolysates (+EH/HGH) (OR = 0.44; 95% CI: 0.20–0.98), both as protective factors.
Conclusions: Caesarean delivery is demonstrated as being a risk factor for IgE-mediated CMA, but it does not increase the risk of AM in these infants. The use of +EH/HGH appears to protect IgE-mediated CMA patients from eventually developing AM.

Conclusions: Caesarean delivery is demonstrated as being a risk factor for IgE-mediated CMA, but it does not increase the risk of AM in these infants. The use of +EH/HGH appears to protect IgE-mediated CMA patients from eventually developing AM.

Key words: allergic march; caesarean delivery; cow's milk allergy; hydrolysed formulas.

F. Sánchez-Valverde
Sección de Gastroenterología y Nutrición Pediátrica
Servicio de Pediatría
c/Irunlarrea 4
31008 Pamplona
Spain

Accepted for publication 14 September 2008

COMISS score

Bristol stool chart

SYMPTOM	SCORE		
Crying*	0	≤ 1 hour/day	
	1	1 to 1.5 hours/day	
	2	1.5 to 2 hours/day	
	3	2 to 3 hours/day	
	4	3 to 4 hours/day	SCORE ☐
	5	4 to 5 hours/day	
	6	≥ 5 hours/day	
Regurgitation	0	0 to 2 episodes/day	
	1	≥ 3 to ≤5 of small volume	
	2	> 5 episodes of >1 coffee spoon	
	3	> 5 episodes of ± half of the feeds in <half of the feeds	
	4	Continuous regurgitations of small volumes >30 min after each feed	SCORE ☐
	5	Regurgitation of half to complete volume of a feed in at least half of the feeds	
	6	Regurgitation of the complete feed after each feeding	
Stools (Bristol scale)	4	Type 1 and 2 (hard stools)	
	0	Type 3 and 4 (normal stools)	
	2	Type 5 (soft stool)	SCORE ☐
	4	Type 6 (liquid stool, if unrelated to infection)	
	6	Type 7 (watery stools)	
Skin symptoms	0 to 6	Atopic eczema — HEAD-NECK-TRUNK / ARMS-HANDS-LEGS-FEET	
		Absent: 0 / 0	
		Mild: 1 / 1	SCORE ☐
		Moderate: 2 / 2	
		Severe: 3 / 3	
	0 or 6	Urticaria — NO: 0 / YES: 6	☐
Respiratory symptoms	0	No respiratory symptoms	
	1	Slight symptoms	SCORE ☐
	2	Mild symptoms	
	3	Severe symptoms	

* Crying only considered if the child has been crying for 1 week or more, assessed by the parents, without any other obvious cause.

TOTAL SCORE ☐

READING THE RESULT

The scoring ranges from 0 to 33. Each symptom has a maximal score of 6, except respiratory symptoms where the maximal score is 3.

If final score ≥ 12, the symptoms are likely cow's milk related. This could potentially be CMPA.

If final score < 12, the symptoms are less likely related to cow's milk. Look for other causes.

COMISS Score Algorithm

Visit 0: Screening (formula-fed infants < 6 months)

Medical history and informed written consent
Blood tests (total IgE, sIgE cow's milk) and skin prick test cow's milk

Day 0 — Visit 1: Baseline assessment and **CoMiSS 1**

2-week elimination diet with amino acid-based formula

Day 15 — Visit 2: **CoMiSS 2**
Oral food challenge in hospital (cow's milk formula)

Positive
CMPA confirmed

Re-commence amino acid-based formula

Negative
CMPA not confirmed

Home challenge with cow's milk formula

Positive

Negative

Remain on cow's milk formula

Day 29 — Visit 3: **CoMiSS 3** and final review

MANAGEMENT

Oral food challnge

- A Double blind placebo controlled food challenge DBPCFC is the gold standard for diagnosing CMPA , though it has the disadvantage of requiring a longer time to perform , needing patient and parants co-operation and being expensive .

- - open food challenge .

Clinical Practice Treatment

- Those breastfeeding infants who develop symptoms of food allergy may benefit from:

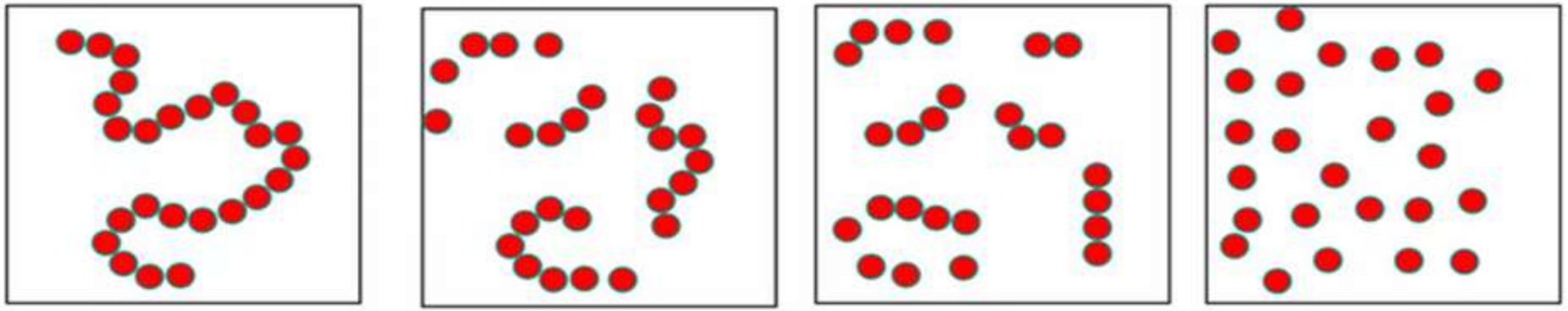
a) maternal restriction of cow's milk, egg, fish, peanuts and tree nuts and if this is unsuccessful,

b) use of a hypoallergenic (extensively hydrolyzed or if allergic symptoms persist, a free amino acid-based formula) as an alternative to breastfeeding.

Clinical Practice Treatment

Those infants with IgE-associated symptoms of allergy may benefit from a soy formula, either as the initial treatment or instituted after 6 months of age after the use of a hypoallergenic formula. Concomitant allergy to soy and cow's milk in these infants is lower compared with those with non–IgE-associated syndromes such as enterocolitis, proctocolitis, malabsorption syndrome, or esophagitis. Benefits should be seen within 2 to 4 weeks and the formula continued until the infant is 1 year of age or older.

Hydrolysed Formulas



Intact protein | Partial hydrolysis | Extensive hydrolysis | Aminoacids

ALLERGENICITY

COST

TOLERANCE

Palatability

- Recommended management of CMPA includes the initiation of an extensive HF.
- Although 90% of infants exhibit healthy growth and reduced allergic symptoms on an EHF, 10% of infants with CMPA still react to the residual allergens in EHF.
- ESPGHAN guidelines indicate that the risk to react to EHF may be higher in the presence of severe enteropathy or with multiple food allergies. For that reason, AAF is considered as first-line treatment in infants who fail to thrive, suffer from macronutrients deficiencies and other life-threatening symptoms.

Prognosis

- Most cases of CMPS resolve by the age of 3 years , with resolution in :
- 56 % at 1 year
- 77 % at 2 years
- 87 % at 3 years
- 92 % at 5 and 10 years
- 97 % at 15 years of age

Endoscopy and Histology

- In patients with otherwise **unexplained significant and persistent gastrointestinal symptoms**, failure to thrive, or irondeficiency anemia, upper and/or lower endoscopies with multiple biopsies are appropriate;
- Neither sensitive nor specific for CMPA.
- The diagnostic yield of these procedures is higher for finding diagnoses **other than CMPA**.

Notes

Soy formulas are not indicated in:

- ✓ Premature infants < 1800g (increases risk of osteoporosis and rickets)
- ✓ CF patients
- ✓ Infantile colic
- ✓ Patients with cow milk protein allergy frequently are as sensitive to soy protein and should not be given isolated soy protein-based formula routinely.


#RogueNation
DESPERATE TIMES
DESPERATE MEASURES
- Ethan Hunt
theQuotes.me

❑ **Soy formulae have nutritional disadvantages because:**

- their absorption of minerals and trace elements may be lower because of their phytate content , and
- they contain appreciable amounts of isoflavones with a weak estrogenic action that can lead to high serum concentrations in infants.

- however, a **soy formula may be considered** in an infant with CMPA:

- **older than 6 months if eHF is not accepted or tolerated by the child,**
- **if these formulae are too expensive for the parents, or**
- **if there are strong parental preferences (eg, vegan diet).**

Infant Formulas – Carbohydrate Content

- Main types of carbohydrates in formulas
  - Lactose
  - Sucrose
  - Glucose polymers
- What type of formula should be used in patients with galactosemia? Why?

  * l.f
  - Soy formulas because they do not contain lactose
- Which formulas contain sucrose?
  - Alimentum and soy formulas

  - Lactose free formula : - primary / secondary lactose intolerance

Infant Formulas – Fat Content

- Main types of fats in formulas
  - Long chain triglycerides (LCTs)
  - Medium chain triglycerides (MCTs)
- When are MCTs beneficial?
  - Impaired fat absorption or lymphatic abnormalities as chylothorax
- Which formulas contain MCTs?
  - Alimentum (33%), Pregestimil (55%) , Alfare 38%
  - Elecare (33%)
  - Portagen (87%)
  - Enfaport, Monogen

Use of “Other Milks” During Infancy

- Cow’s milk
  - Has excessive protein, sodium
  - Deficient in iron
  - Allergy risk
- Goat’s milk
  - Deficient in B12 and folate
  - Up to 50% of kids with cow’s milk allergy also have goat’s milk allergy

Cleopatra, Queen of Ancient Egypt, took baths in donkey milk to preserve her beauty and youth

Supplemets

- Vitamin D
- Iron
- Fluoride

Weaning

- Weaning an infant is a gradual process. The American Academy of Pediatrics (AAP) recommends feeding infants only breast milk for the first 6 months after birth.

Weaning

- Solid food should be introduced at 6 mths
- ? Not before 4 months:
  - -milk meets all nutrient requirements
  - -immature GIT & limited renal capacity
  - -Poor neuromuscular co-ordination
- ? by 6 months:
  - -increasing energy & nutrient needs
  - -decreased body stores : Fe & Zn
  - -aids chewing & speech development
  - -food refusal less likely

Feeding Skills Development

- 4-6 mos - experience new tastes.
  - Give rice cereal with iron.
- 6-7 mos - sits with minimal support.
  - Add fruits and vegetables.
- 8-9 mos - improved pincer grasp.
  - Add protein foods and finger foods: food served in such a form and style that it can conveniently be eaten with the fingers
- 10-12 mos - pulls to stand, reaches for food.
  - Add soft table food, allow to self-feed.

- Never give honey to your baby. It may contain bacteria that can cause botulism, a rare, but serious illness.

- Never put your child to bed with a bottle. This can cause tooth decay.

- It is fine to start to give your baby water between feedings.

- Avoid foods with added salt or sugar.
- Avoid foods that may cause choking, such as apple chunks or slices, grapes, berries, raisins, dry flake cereals, hot dogs, sausages, peanut butter, popcorn, nuts, seeds, round candies, and raw vegetables.
- Early egg administration prevent allergy
- You can offer small amounts of cheese, cottage cheese, and yogurt, but no cow's milk.
- By age 1, most children are off the bottle. If your child still uses a bottle, it should contain water only.