

# The principles of the proper nutrition in childhood

Agnieszka Oknińska/Monika Sugalska



# Main stages of eating development

Playing with food, grabbing, chewing, „messing” are normal in child’s development

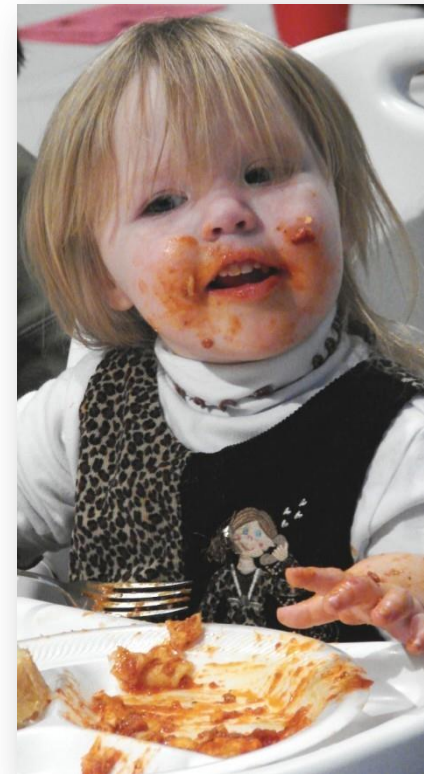
1-4 months



5-6 months



7-12 months



# Breastfeeding – WHO & UNICEF recommendations

- Children initiate breastfeeding within the first hour of birth
- Children should be exclusively breastfed for the first 6 months of life – meaning no other foods or liquids are provided, including water.
- Infants should be breastfed on demand – that is as often as the child wants, day and night.
- No bottles, teats or pacifiers should be used.
- From the age of 6 months, children should begin eating safe and adequate complementary foods.  
According to WHO, there is no age when breastfeeding should be stopped – it may be continued as long as a child and mother want. However, sociological factors should be also taken into consideration.



# Breastfeeding

- Production of milk is controlled by prolactin
- Prolactin release is stimulated by breastfeeding = the more baby suckles the breast, the higher the concentration of prolactin and a greater quantity of milk
- Exclusive breastfeeding and frequent taking baby to the breast is the most effective way to maintain lactation



# Breast milk

- Colostrum - colostrum is produced for the first 5 days
- Composition: High-protein antibodies, minerals and growth modulators
- Milk temporary - until the end of the second week after birth
- Milk "mature"
- During feeding initially secreted milk is more diluted and sweet, then a higher content of protein and fat



# Breastfeeding advantages

- Better contact the mother-child
- Prevention of infectious diseases, eg. lower incidence of diarrhea
- Prevention of food allergy
- Less frequent occurrence of diseases associated with the development of the immune system, eg. type I diabetes, lymphomas
- Lower incidence of lifestyle diseases eg. hypertension, obesity
- Improved intellectual development of children



# Contraindications to breastfeeding

Maternal	Infant
<ul style="list-style-type: none"><li>• HIV</li><li>• active untreated tuberculosis disease</li><li>• human T-cell lymphotropic virus type I–or II</li><li>• mothers who are receiving diagnostic or therapeutic radioactive isotopes or have had exposure to radioactive materials (for as long as there is radioactivity in the milk);</li><li>• mothers who are receiving antimetabolites or chemotherapeutic agents or a small number of other medications until they clear the milk;</li><li>• mothers who have herpes simplex lesions on a breast (infant may feed from the other breast if clear of lesions)</li></ul>	<ul style="list-style-type: none"><li>• Galactosaemia</li><li>• Congenital lactase deficiency</li></ul>

# Donor human milk (DHM)

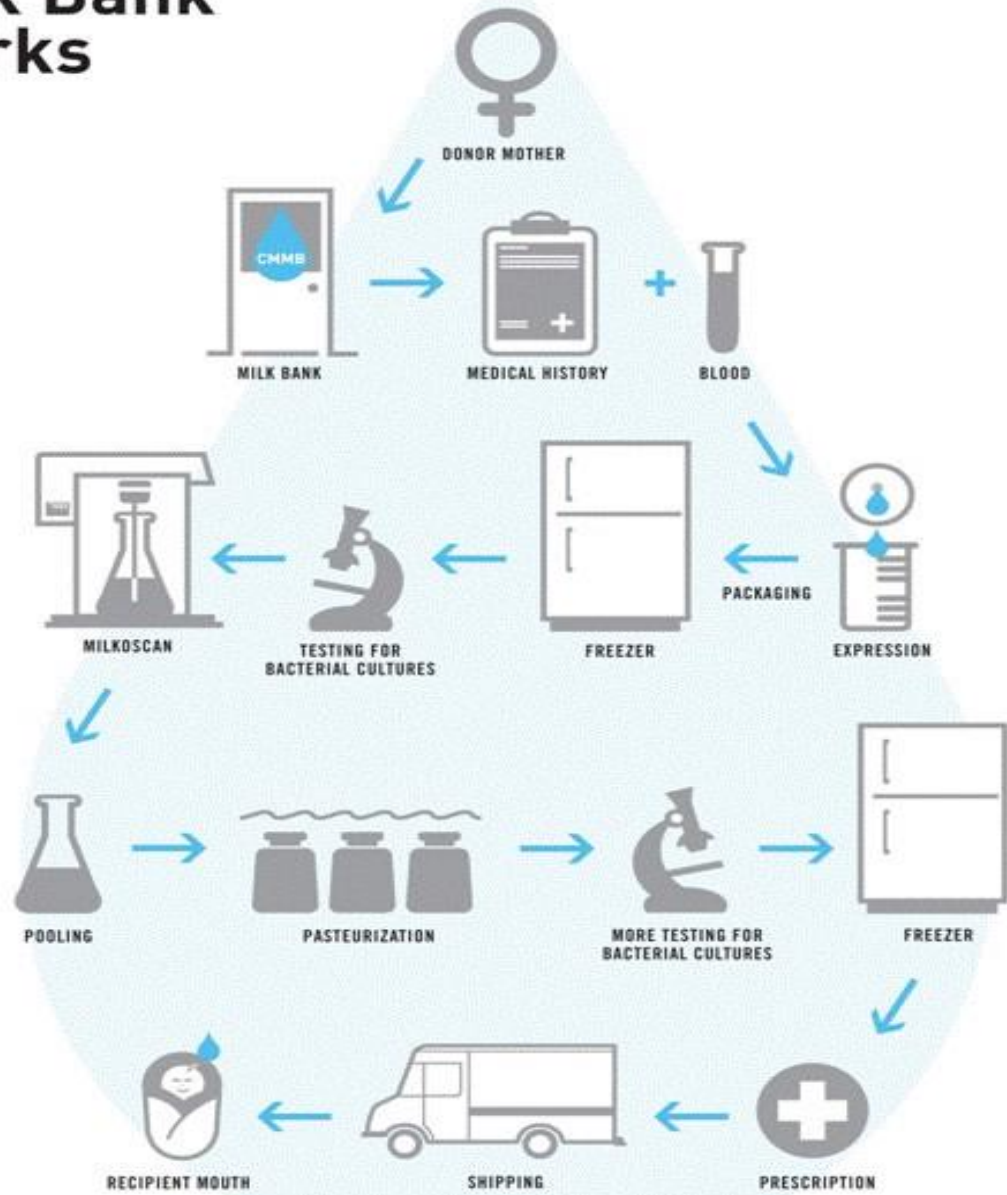
- There is a possibility to donor human milk in special banks
- After donation DHM is tested in many ways including microbiological testing
- DHM is highly beneficial in premature and low-birth weight newborns
- WHO recommends that low-birth weight infants who cannot be fed mother's own milk should be fed donor human milk

Global Breastfeeding Collective





# How a Human Milk Bank Works



## Formula versus donor breast milk for feeding preterm or low birth weight infants (Review)

Quigley M, Embleton ND, McGuire W

Quigley M, Embleton ND, McGuire W.  
Formula versus donor breast milk for feeding preterm or low birth weight infants.  
*Cochrane Database of Systematic Reviews* 2019, Issue 7. Art. No.: CD002971.  
DOI: [10.1002/14651858.CD002971.pub5](https://doi.org/10.1002/14651858.CD002971.pub5).

## AUTHORS' CONCLUSIONS

### Implications for practice

There is moderate-certainty evidence that feeding with formula, particularly preterm formula, compared with donor breast milk increases rates of weight gain, linear growth, and head growth in preterm or low birth weight (LBW) infants in hospital. Formula feeding is associated with a near-doubling of the risk of necrotising enterocolitis. There is no evidence of an effect on all-cause mortality, or on long-term growth and neurodevelopment. There are limited data from RCTs on the comparison of feeding with formula milk versus nutrient-fortified human milk. This limits the implications for practice from this review as nutrient fortification of human milk is now a common practice in neonatal care ([Williams 2016](#)).

# Formula feeding

Modification of cow's milk->

- Reduction of the total protein and changing its quality
- Modified amount and quality of fat by the addition of plant-based fats (unsaturated fatty acids)
- Supplemented with lactose, vitamins and some microelements elements (i.e. iron)



**Infant formula does not contain the antibodies found in breast milk**

# Types of formula

- Formula from 0 to 6 months of age
  - Their composition should be very close to breast milk
  - Bebiko 1, Bebilon 1, Nan 1, Humana 1, Gerber 1, Enfamil 1
- Formula from 6 to 12 months
  - enriched the taurine, carnitine, iron
  - Bebiko 2, Bebilon 2, Nan 2, Humana 2, Gerber 2, Enfamil 2
- Formula Junior for children over 1 year of age



## Summary of differences between milks

	HUMAN MILK	ANIMAL MILK	FORMULA
<i>Bacterial contaminants</i>	none	likely	likely when mixed
<i>Anti-infective factors</i>	present	not present	not present
<i>Growth factors</i>	present	not present	not present
<i>Protein</i>	correct amount easy to digest	too much difficult to digest	partly corrected
<i>Fat</i>	enough essential fatty acids lipase to digest	lacks essential fatty acids no lipase	lacks essential fatty acids no lipase
<i>Iron</i>	small amount well absorbed	small amount not well absorbed	extra added not well absorbed
<i>Vitamins</i>	enough	not enough A and C	vitamins added
<i>Water</i>	enough	extra needed	may need extra

# HOW MANY OUNCES?



## **0 - 2 days:**

- about 1 to 2 oz (30-60 mL)
- every 2-3 hours
- approx. 10x a day



## **3 days - 4 weeks:**

- about 2 to 3 oz (60-90 mL)
- every 3-4 hours
- approx. 8x a day



## **4 weeks - 12 weeks:**

- about 4 to 5 oz (120-150 mL)
- every 4-5 hours
- approx. 6x a day



## **12 weeks - 24 weeks:**

- about 6 to 8 (180-240 mL)
- every 5-6 hours
- approx. 5x a day

It works out to about 2 ounces (75 mL) per pound per day

Breastfeeding – on child's demand

# Preterm infants

- Both enteral and parenteral feeding are provided
- Enteral nutrition is introduced after hearing gut motility (premature infants > 1500g usually in the first day of life)
- The early introduction of even small amounts of enteral nutrition results in a better stimulation of the development of the digestive tract, better weight gain
- In most infants enteral nutrition can be started within the first 3 days of life coming to full enteral nutrition at 2-3 weeks of age, even in the smallest premature babies
- It is important to start with small amounts. Too intense enteral nutrition can lead to the development of necrotizing enterocolitis

# Preterm infants

- Loses more Ca and P due to immaturity of excretory system
- Concentration of Ca and P in mature milk is insufficient to balance the demand and losses
- Breast milk may be enriched with BMF - Breast Milk Fortifier
- NOTE - The preparation BMF can not be given to mixtures



# Preterm infants

- Special formulas: Nenatal, Humana O, Enfamil Premature, Bebilon Nenatal Home Proexpert
- These formulas are high in calories - 70-81kcal /100ml
- They include taurine, MCT, linoleic acid, vitamin, iron, mikroelements
- After reaching 2500g weight it should be changed to infantmilk

## — Current Feeding Guidelines —



## Key Terms



### **Complementary feeding:**

a process that starts when human milk or infant formula is complemented by other foods and drinks and ends when the child transitions fully to table foods (typically to 24 months of age).<sup>3</sup>

### **Complementary foods:**

any food (solid or liquid) other than breast milk or infant formula that are provided when milk alone is no longer sufficient.<sup>4,5</sup>

### **Exclusive breastfeeding:**

feeding only breast milk (human milk), not any other foods or liquids (including infant formula or water), except for medications or vitamin and mineral supplements (CDC - Breastfeeding Support)

### **Weaning:**

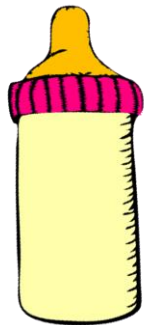
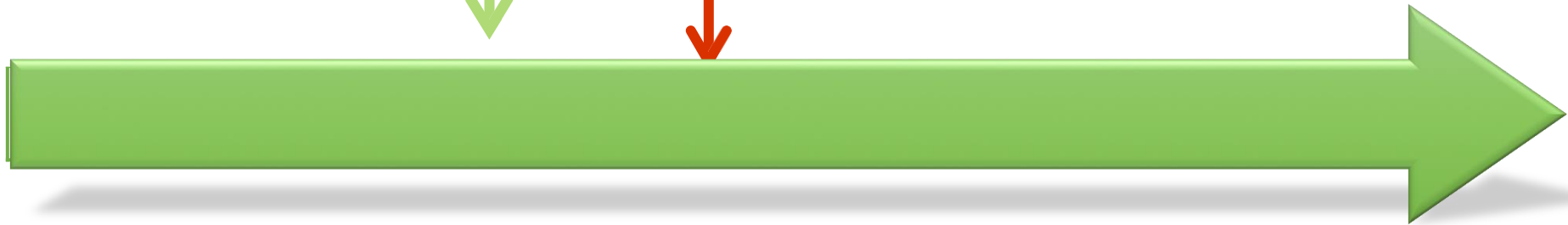
process of changing an infant's diet from breast milk to other foods and drinks (CDC - Breastfeeding Support)

“WHO recommends that infants start receiving complementary foods at 6 months of age in addition to breast milk, initially 2-3 times a day between 6-8 months, increasing to 3-4 times daily between 9-11 months and 12-24 months with additional nutritious snacks offered 1-2 times per day, as desired.”

# Complementary food

Not earlier than 17 week of life

not later than 26 week of life.



## Signs of Readiness to Introduce Solid Food (based on AAP guidelines):

- The infant can sit up mostly on their own
- They can hold their head up for a long time
- They seem interested in mealtime—watching others eat, opening their mouth or reaching out when food is nearby, etc.
- The infant is hungry between nursing or bottle feeding
- The “tongue-thrust” reflex (where young infants automatically push food out of their mouth with their tongue) has faded



## Textures of food for baby

6 months	7 to 8 months	9 to 12 months
Strained, pureed, smooth foods	Mashed, minced, grated, finely chopped foods; table and finger foods	Diced, cubed, table and finger foods



Between 6-9 months of age babies begin to chew

# Types and time of meals

## Feeding Guide

Remember! Every baby is different.

This is only a guide.

Time of Day	6 Months	7 Months	8 - 9 Months	10-11 Months	12 Months
Early Morning	Breastmilk or formula*	Breastmilk or formula*	Breastmilk or formula*	Breastmilk or formula*	<ul style="list-style-type: none"> <li>Breastfeeding provides lots of benefits to you and your baby – keep going!</li> <li>Offer a variety of table foods (watch for choking).</li> <li>Wean your baby from the bottle</li> <li>Aim for three meals and two to three snacks a day</li> </ul>
Morning	Breastmilk or formula* Iron-rich foods*	Breastmilk or formula* Iron-rich foods** Vegetables Fruit	Breastmilk or formula* Iron-rich foods* Vegetables Fruit Grains	Breastmilk, formula* or homo milk 3.25% MF Iron-rich foods** Vegetables Fruit, Yogurt, Grains	
Noon	Breastmilk or formula* Iron-rich foods*	Breastmilk or formula* Iron-rich foods** Vegetables Fruit	Breastmilk or formula* Iron-rich foods* Vegetables Fruit Grains	Breastmilk, formula* or homo milk 3.25% MF Iron-rich foods** Vegetables Fruit, Grains	
Afternoon	Breastmilk or formula*	Breastmilk or formula*	Breastmilk or formula*	Breastmilk, formula* or homo milk 3.25% MF Snack	
Late Afternoon / Early Evening	Breastmilk or formula* Iron-rich foods*	Breastmilk or formula* Iron-rich foods** Vegetables Fruit	Breastmilk or formula* Iron-rich foods* Vegetables Fruit Grains	Breastmilk, formula* or homo milk 3.25% MF Iron-rich foods** Vegetables Fruit, Grains	
Evening	Breastmilk or formula*	Breastmilk or formula*	Breastmilk or formula*	Breastmilk or formula* Snack	
Night Time	Breastmilk or formula*	Breastmilk or formula*	Breastmilk or formula*	Breastmilk or formula*	

\* formula, with iron

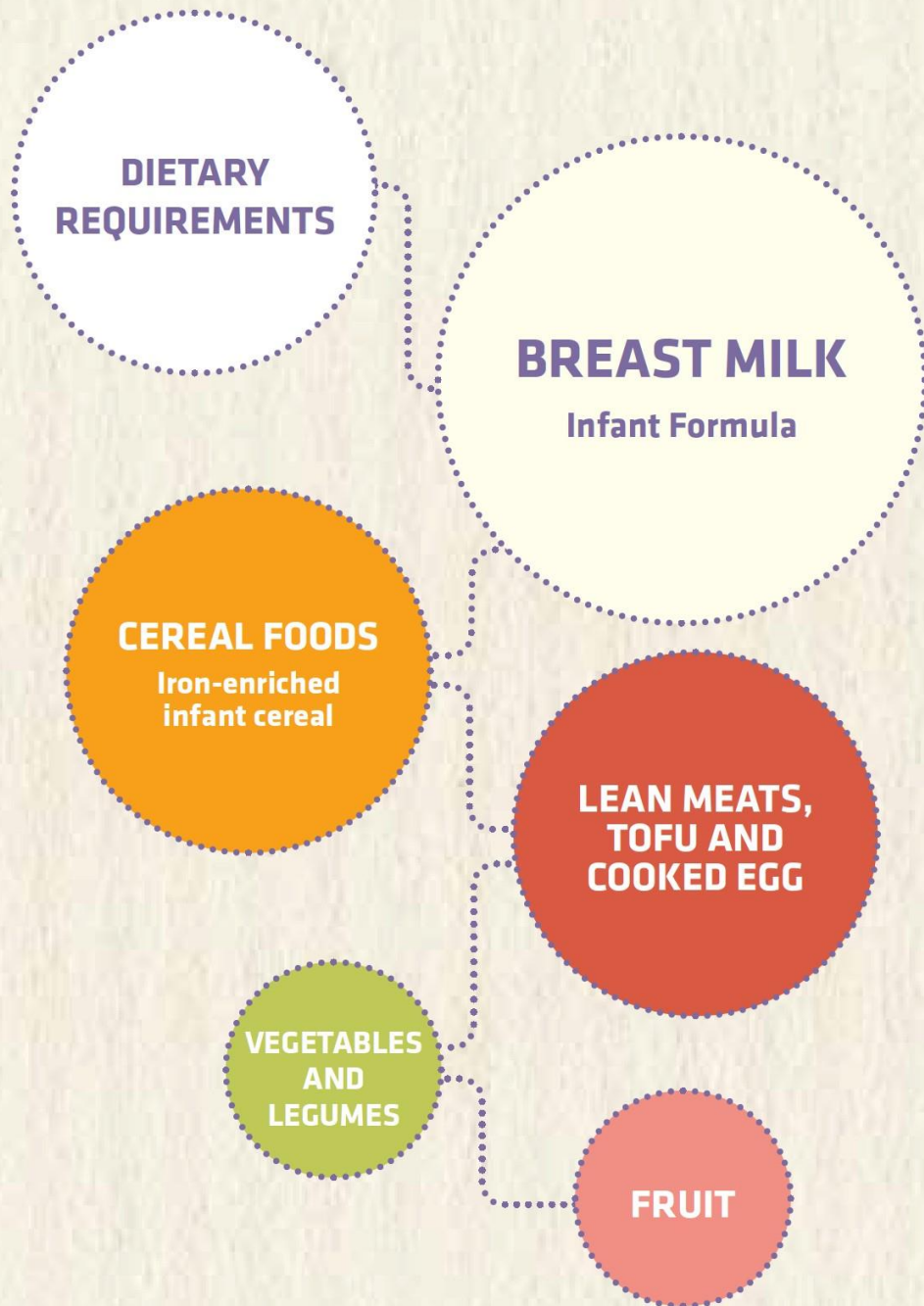
\*\*Iron-rich foods: poultry, beef, eggs, legumes, infant cereal

- Every baby is different
- Generally, in the morning and in the evening (when baby is sleepy) breastmilk or formula should be provided
- Complementary food may be given during the day

## INTRODUCING SOLIDS TOO LATE (>6 MONTHS) MAY:

- Result in poorer growth if energy intake is not adequate
- Increase the risk of nutrient deficiencies – particularly iron and zinc in breastfed infants
- Delay jaw and muscle development which may lead to fussy eating down the track
- Miss an important window where your baby is willing to try new tastes and textures, potentially increasing the chance of later food refusal





Proportion of particular types of food in the infant's diet  
Milk (breast or formula) should be a basic food  
Fruits are on the last position!



# Complementary Feeding: A Position Paper by the European Society for Paediatric Gastroenterology, Hepatology, and Nutrition (ESPGHAN) Committee on Nutrition

*\*Mary Fewtrell, †Jiri Bronsky, ‡Cristina Campoy, §Magnus Domellöf, ||Nicholas Embleton, ¶Nataša Fidler Mis, #Iva Hojsak, \*\*Jessie M. Hulst, ††Flavia Indrio, ‡‡§§Alexandre Lapillonne, and |||¶¶Christian Molgaard*

*JPGN • Volume 64, Number 1, January 2017*

# Complementary feeding (CF)

- Continued breastfeeding is recommended alongside with CF
- All infants should receive iron-rich CF e.g. meat, salmon
- No sugar or salt or fruit juices or sweet beverages
- Cow's milk should not be used as a drink until 12 months of age (excess protein and fat)
- Allergic foods (e.g. peanuts) should be given between 4 and 11 months of age
- Gluten should be introduced between 4 and 12 months of age. Large amounts should be avoided
- Vegetarian or vegan diets are not recommended
- Prolonged use of pureed food should be avoided – it may delay the psychomotor development

**TABLE 1. Nutrients that may become deficient in different vegetarian and vegan diets**

Nutrient	Type of diet			
	Vegetarian			Vegan
	Lacto-ovo	Lacto	Ovo	
Iron	X	x	x	x
Zinc	X	x	x	x
Calcium			x	x
B12			x	x
B2				x
Vitamin D	X	x	x	x
Vitamin A				x
n-3 fats (DHA)	X	x	x	x
Protein	X	x	x	x

- Lacto-ovo may eat milk products e.g. cheese and eggs
- Lacto may eat milk products
- Ovo may eat eggs
- Vegans do not eat any animal-derived food

DHA = docosahexaenoic acid.

## These foods are NOT good choices during baby's first year:

- honey may cause botulism, a type of food poisoning, that could make your baby sick
- candies and chocolate
- soft drinks, drink crystals, sport drinks, slushy-type drinks
- tea, coffee, herbal teas
- salt, pickles, olives
- low-fat and diet foods sweetened with sugar substitutes
- snack foods such as potato chips, pretzels, cheese puffs, french fries
- cakes, cookies, marshmallows, sugar-coated cereal, jello
- salad dressings, mayonnaise, ketchup
- processed meats



# FEEDING Children 1-3 years old

- Change of growth rate - at 12 months of age the infant usually triples its birth weight, and 2-3-year-old year gaining weight 2-3 kg
- Independent way of eating
- Variety of meals
- Selection of appropriate foods



# Diet of toddlers

1. Variety of ingredients
2. To 2 years old - low fat and low-cholesterol diets should be avoided -> the development of CNS
3. Driving the appetite and physical activity of the child prevents the overfeeding or malnutrition
4. 3-5 meals a day and avoid snacks
5. Vegetarian diet and other non-conventional diets are inappropriate for the child
6. The best source of simple sugars are fruits and vegetables

## These foods can cause **CHOKING** and should be avoided until your child is about 4 years old:

- raisins, gum and hard candies (including cough drops)
- popcorn, nuts and seeds
- fish with bones
- snacks with toothpicks or skewers





# Diet of Preschoolers (3-5 years old children)

- 4-5 meals a day - 3 meals basic, second breakfast and afternoon tea meal
- Diet: dairy products, lean meats, fish and poultry, varied species of bread, flour products, cereal, pasta, fruit, vegetables
- Number of eggs: 3-4 week
- Restrict foods rich in saturated fats and cholesterol
- Control the intake of sweets, drinking fizzy drinks and snacking between meals

# Diet of Schoolers

- Importance of physical activity
- Principles of rational nutrition
- Variety - a wide range of food products
- Moderation - not overfeeding
- Avoiding - excess salt and sugar use
- Regular - fixed date and the number of meals per day



# — Allergies —





## Allergies: Introduction and Timing of Complementary Feeding

Introduce certain foods (eggs, peanuts, etc.) earlier, but not before 4 months and not past 11 months. Further assessments and discussion with the physician is required.

# Food allergy

- 8-10% of the population are hypersensitive to various foods
- 2.2-2.8% of children up to 4 years of age are allergic to cow's milk protein
- Cow's milk protein 20 different fractions of potential allergenic
- $\beta$ -lactoglobulin
- Symptoms of allergy: atopic dermatitis, urticaria, angioedema, vomiting, diarrhea, asthma, chronic rhinitis, cough, otitis, emotional disorders

# Food allergy

- Elimination of the food or the ingredient that causing problems
- Elimination diet must be balanced
- Breastfeeding – changing of mother's diet
- Artificial nutrition:
  - Hydrolysates of cows' milk protein ( casein and whey proteins)
  - Free amino acids formula

The higher the degree of hydrolysis, the more favorable are the characteristics of a drug, but worsens the flavor and increasing osmolality. Also more expensive.

# Prevention of the food allergy

- Breastfeeding for at least 6 months of age
- Introduction of potential allergens in specific time (between 4th and 11th month of life)

# Sugar in Infants, Children and Adolescents: A Position Paper of the European Society for Paediatric Gastroenterology, Hepatology and Nutrition Committee on Nutrition

*ESPGHAN Committee on Nutrition: \*Nataša Fidler Mis, †Christian Braegger, ‡Jiri Bronsky, §Cristina Campoy, ||Magnus Domellöf, ¶Nicholas D. Embleton, #Iva Hojsak, \*\*Jessie Hulst, ††Flavia Indrio, ‡‡§§Alexandre Lapillonne, ||||Walter Mihatsch, ¶¶Christian Molgaard, ##Rakesh Vora, and \*\*\*Mary Fewtrell*

*(JPGN 2017;65: 681–696)*



- Free sugar – monosachrydes and disacharydes additionally added to food or sugar present in honey, syrups, unsweetened juices
- The intake of free sugars should be reduced

# What about fruit juice?

- Juice is not recommended in the first year of life  
In a diet, juices are preserved as meals not liquids!  
Excessive intake of juices may cause diarrhoea

Water should be the basic drink

There are more nutritional benefits in giving whole fruits and vegetables

- For children ages 2 to 3 years <100 ml of juice/day
- For children ages 4 to <10 years 150 ml of juice/day
- For children ages 10-18 years maximum 200 ml of juice/day

Standardy Medyczne: Pediatria 2019 T16; 561-570



# Daily (maintenance) fluid requirement in children

Bodyweight: < 10 kg: 100 ml/kg/day

Bodyweight: 11 – 20 kg: 1000 ml + 50 ml/every kg above 10 kg

Bodyweight: > 20 kg: 1500 ml + 20 ml/every kg above 20 kg

It means that if a child's body weight is 11 kg, its daily fluid requirement is:  
 $10 \times 100 \text{ ml (for the first 10 kg)} + 1 \times 50 \text{ ml (for this 1 kg between 10-20 kg)} =$   
 $1000 \text{ ml} + 50 \text{ ml} = 1050 \text{ ml}$

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## — Anemia and Iron —





Fish



Beef



Lentils



Chicken

**I**ron deficiency (ID) is the most common micronutrient deficiency worldwide and young children are a special risk group because their rapid growth leads to high iron requirements.



# Iron deficiency – risk factors

- Low birth weight
- High cow's milk intake
- Low intake of iron-rich complementary foods
- Low socioeconomic status
- Immigrant status

Term, healthy infants have sufficient iron for at least first 4 months of life

## POSITION PAPER

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# Iron Requirements of Infants and Toddlers

*\*Magnus Domellöf, †Christian Braegger, ‡Cristina Campoy, §Virginie Colomb, ||Tamas Decsi,  
¶Mary Fewtrell, #Iva Hojsak, \*\*Walter Mihatsch, ††Christian Molgaard, §§Raanan Shamir,  
|||Dominique Turck, and ¶¶Johannes van Goudoever, on Behalf of the ESPGHAN  
Committee on Nutrition:*

*JPGN • Volume 58, Number 1, January 2014*

TABLE 1. Summary of conclusions

Definitions of IDA	A combination of hemoglobin and ferritin is recommended. Age-specific cutoffs should be used, see Table 2.
General prevalence of IDA in European infants and toddlers	<2% before 6 mo, 2%–3% at 6–9 mo, and 3%–9% at 1–3 y of age
Theoretical iron requirements	Low before 6 months of age 0.9–1.3 mg · kg <sup>-1</sup> · day <sup>-1</sup> at 6–12 mo 0.5–0.8 mg · kg <sup>-1</sup> · day <sup>-1</sup> at 1–3 y
Iron absorption	Generally low, depends on diet, but infants and toddlers can upregulate absorption when iron stores decrease
Health effects related to iron deficiency	IDA in young children is associated with long-lasting poor neurodevelopment
Adverse effects of excessive iron	Possibly poor growth, increased risk of infections, and even poor neurodevelopment
Iron supplementation of pregnant women	Does not improve infant iron status in European setting
Delayed umbilical cord clamping	Improves iron status of infants
Breast-fed infants <6 mo	Iron supplements do not reduce IDA in populations with already low (<5%–10%) prevalence of IDA at 6 months
Formula-fed infants <6 mo	Iron-fortified formula prevents IDA and possibly improves neurodevelopment
Low-birth-weight infants <6 mo	Iron supplements (1–3 mg · kg <sup>-1</sup> · day <sup>-1</sup> depending on birth weight) prevent IDA and possibly improve neurodevelopment
Follow-on formulas 6–12 mo	Iron fortification prevents IDA. Conflicting evidence with regard to neurodevelopment
Complementary foods 4–12 mo	Iron-rich complementary foods and avoidance of unmodified cow's milk prevents IDA
Iron supplements 4–12 mo	Prevents IDA and may improve neurodevelopment but only in populations with high (>10%) prevalence of IDA at 6–12 mo of age
Toddlers (12–36 mo)	Few studies, but iron-rich complementary foods and a restriction of unmodified cow's-milk intake to <500 mL may prevent IDA

IDA = iron-deficiency anemia.



# Prevention of Iron deficiency

- Testing and treatment of anemia in pregnant women
- Delayed umbilical cord clamping
- Iron-fortified formula
- Iron-rich complementary food (meat, eggs, salmon)
- Avoidance of cow's milk – it should not be the main milk drink before 12 months of age and intake in toddlers should be limited to max. 500 ml/day

# Indications for iron supplementation

- Iron deficiency anemia
- Preterm infants
- Low birth weight neonates
- Twins etc.
- Children exposed on blood loss during perinatal period
- Children of mothers with anemia during pregnancy

Currently, there is no evidence supporting general iron supplementation in all infants

# Vitamin supplementation

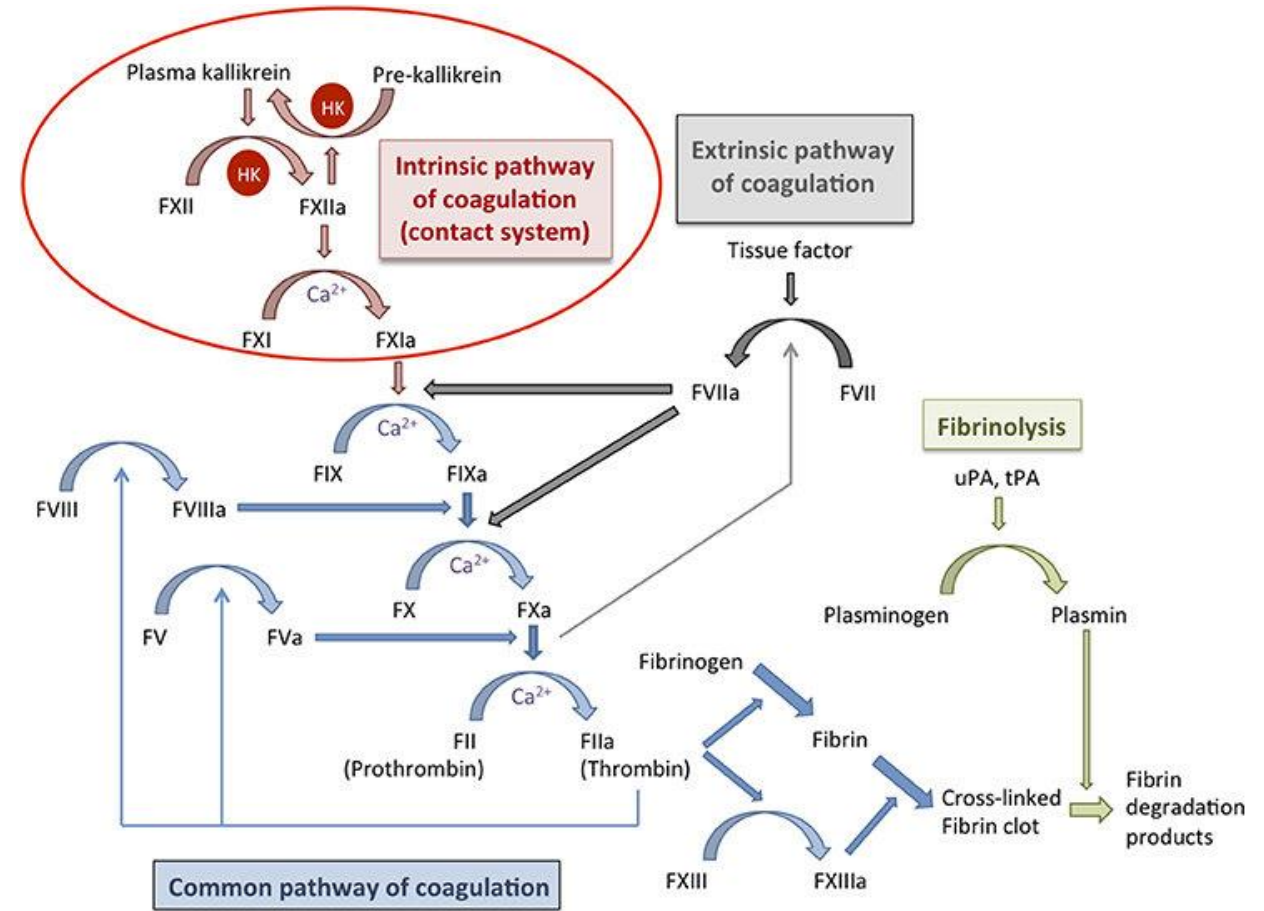


# Prevention of Vitamin K Deficiency Bleeding in Newborn Infants: A Position Paper by the ESPGHAN Committee on Nutrition

*\*Walter A. Mihatsch, †Christian Braegger, ‡Jiri Bronsky, §Cristina Campoy, ||Magnus Domellöf, ¶Mary Fewtrell, #Nataša F. Mis, \*\*Iva Hojsak, ††Jessie Hulst, ‡‡Flavia Indrio, §§|||Alexandre Lapillonne, ¶¶##Christian Mølgaard, \*\*\*Nicholas Embleton, and †††‡‡‡Johannes van Goudoever, ESPGHAN Committee on Nutrition*

# Vitamin K

- Is essential for coagulology -> required for synthesis of some proteins involved in coagulation cascade (factors II, VII, IX, X, protein C and S)



# Vitamin K deficiency bleeding (VKDB)

- Bleeding in child aged < 6 months of life
- Prolonged protrombin time (PT ). Elevated INR
- Fibrinogen levels and a platelet count within normal range for newborns

The diagnosis is confirmed if the INR/PT normalizes in 20-30 minutes after administration of vitamin K iv and the bleeding is stopped.

Bleeding to the brain, gastrointestinal tract, skin etc.

# RECOMMENDATIONS

- (1) All newborn infants should receive vitamin K prophylaxis.
- (2) Vitamin K prophylaxis and the mode of administration should be documented.
- (3) Parental refusal of vitamin K prophylaxis after adequate information is provided should be documented especially because of the risk of late VKDB (96,97).
- (4) Healthy newborn infants should either receive:
  - (a) 1 mg of Vitamin K<sub>1</sub> by IM injection at birth,  
or
  - (b) 3 × 2 mg Vitamin K<sub>1</sub> orally at birth, at 4 to 6 days and at 4 to 6 weeks.  
or
  - (c) 2 mg Vitamin K<sub>1</sub> orally at birth, and a weekly dose of 1 mg orally for 3 months.
- (5) The success of an oral policy depends on compliance with the protocol and this may vary between populations and healthcare settings. If the infant vomits or regurgitates the formulation within 1 hour of administration, repeating the oral dose may be appropriate.
- (6) The oral route is not appropriate for preterm infants and for newborns who are unwell, have cholestasis or impaired intestinal absorption or are unable to take oral vitamin K, or those whose mothers have taken medications that interfere with vitamin K metabolism.

In Poland every newborn receives intramuscular injection of vitamin K (1 mg) just after birth. Low birth weight newborns receive lower dose

## CONSENSUS STATEMENT

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# Vitamin D in the Healthy European Paediatric Population

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¶Mary Fewtrell, #Iva Hojsak, \*\*<sup>1</sup>Walter Mihatsch, ††Christian Molgaard,  
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on Behalf of the ESPGHAN Committee on Nutrition*

*JPGN • Volume 56, Number 6, June 2013*



- i. In healthy children sunbathing with uncovered forearms and legs for at least 15 min between 10.00 and 15.00 h, without sunscreen in the period from May to September, supplementation is not necessary, although still recommended and safe

# Daily vitamin D supplementation

Preterm newborns	400 - 800 IU until they reach 40th gestation week
Newborns and infants	400 IU within first 6 months, 400-600 IU between 6 and 12 months Most of formula milks contain vitamin D – it is important to check it
Children and teenagers	600 - 1000 IU/day from September to April (or all year if sun exposure is insufficient)
Children with obesity	1200 – 2000 IU
Adults	800 – 1000 IU from September to April (or all year if sun exposure is insufficient)
Obese adults	1600 – 4000 IU/day
Pregnant and breast feeding women	1500 – 2000 IU/day

**TABLE 3** | Vitamin D content in selected nutritional products in Poland (9, 11).

<b>Product</b>	<b>Vitamin D content (40 IU = 1 µg)</b>
Fresh eel	1,200 IU/100 g
Fresh wild salmon	600–1,000 IU/100 g
Herring in oil	808 IU/100 g
Marinated herring	480 IU/100 g
Salmon (cooked/baked)	540 IU/100 g
Fresh farmed salmon	100–250 IU/100 g
Canned fish (tuna, sardines)	200 IU/100 g
Mackerel (cooked/baked)	152 IU/100 g
Fresh codfish	40 IU/100 g
Shiitake mushrooms	100 IU/100 g
Egg yolk	54 IU/egg yolk
Cheese	7.6–28 IU/100 g
Human milk	1.5–8 IU/100 ml
Human milk during vitamin D supplementation	~20 IU/100 ml
Cow's milk	0.4–1.2 IU/100 ml
First infant formula (0–6 months)	40–60 IU/100 ml
Follow-on formula (7–12 months)	56–76 IU/100 ml
Growing-up formula (2–3 years)	70–80 IU/100 ml

**Fish!**

## BREASTFEED BABIES AND YOUNG CHILDREN

- From birth to 6 months of age, feed babies exclusively with breast milk (i.e. give them no other food or drink), and feed them "on demand" (i.e. as often as they want, day and night)
- At 6 months of age, introduce a variety of safe and nutritious foods to complement breastfeeding, and continue to breastfeed until babies are 2 years of age or beyond
- Do not add salt or sugars to foods for babies and young children

**Why?** On its own, breast milk provides all the nutrients and fluids that babies need for their first 6 months of healthy growth and development. Exclusively breastfed babies have better resistance against common childhood illnesses such as diarrhoea, respiratory infections and ear infections. In later life, those who were breastfed as infants are less likely to become overweight or obese, or to suffer from noncommunicable diseases, such as diabetes, heart disease and stroke.



## EAT A VARIETY OF FOODS

- Eat a combination of different foods, including staple foods (e.g. cereals such as wheat, barley, rye, maize and rice; or starchy tubers or roots such as potato, yam, taro and cassava), legumes (e.g. lentils and beans), vegetables, fruit and foods from animal sources (e.g. meat, fish, eggs and milk)

**Why?** Eating a variety of whole (i.e. unprocessed) and fresh foods every day helps children and adults to obtain the right amounts of essential nutrients. It also helps them to avoid a diet that is high in sugars, fats and salt, which can lead to unhealthy weight gain (i.e. overweight and obesity) and noncommunicable diseases. Eating a healthy, balanced diet is especially important for young children's growth and development; it also helps older people to have healthier and more active lives.



## EAT PLENTY OF VEGETABLES AND FRUIT

- Eat a wide variety of vegetables and fruit
- For snacks, choose raw vegetables and fresh fruit, rather than foods that are high in sugars, fats or salt
- Avoid overcooking vegetables and fruit because this can lead to the loss of important vitamins
- When using canned or dried vegetables and fruit, choose varieties without added salt and sugars

**Why?** Vegetables and fruit are important sources of vitamins, minerals, dietary fibre, plant protein and antioxidants. People whose diets are rich in vegetables and fruit have a significantly lower risk of obesity, heart disease, stroke, diabetes and certain types of cancer.



## EAT MODERATE AMOUNTS OF FATS AND OILS

- Use unsaturated vegetable oils (e.g. olive, soy, sunflower or corn oil) rather than animal fats or oils high in saturated fats (e.g. butter, ghee, lard, coconut and palm oil)
- Choose white meat (e.g. poultry) and fish, which are generally low in fats, in preference to red meat
- Eat only limited amounts of processed meats because these are high in fat and salt
- Where possible, opt for low-fat or reduced-fat versions of milk and dairy products
- Avoid processed, baked and fried foods that contain industrially produced trans-fat

**Why?** Fats and oils are concentrated sources of energy, and eating too much fat, particularly the wrong kinds of fat, can be harmful to health. For example, people who eat too much saturated fat and trans-fat are at higher risk of heart disease and stroke. Trans-fat may occur naturally in certain meat and milk products, but the industrially produced trans-fat (e.g. partially hydrogenated oils) present in various processed foods is the main source.



## EAT LESS SALT AND SUGARS

- When cooking and preparing foods, limit the amount of salt and high-sodium condiments (e.g. soy sauce and fish sauce)
- Avoid foods (e.g. snacks), that are high in salt and sugars
- Limit intake of soft drinks or soda and other drinks that are high in sugars (e.g. fruit juices, cordials and syrups, flavoured milks and yogurt drinks)
- Choose fresh fruits instead of sweet snacks such as cookies, cakes and chocolate

**Why?** People whose diets are high in sodium (including salt) have a greater risk of high blood pressure, which can increase their risk of heart disease and stroke. Similarly, those whose diets are high in sugars have a greater risk of becoming overweight or obese, and an increased risk of tooth decay. People who reduce the amount of sugars in their diet may also reduce their risk of noncommunicable diseases such as heart disease and stroke.



# 5 keys to a healthy diet

Thank You for Your attention

