Feeding and assessment of nutritional status

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Assesment of nutritional status

Normal growth is a sign of good health in children.
Monitoring growth allows early detection of the causes of poor growth.
Early recognition of poor growth allows early intervention optimizing the possibility of achieving good health and a normal adult height.

Factors afecting growth & development

- Genes
- Racial/ethnic differences
- Hormones
- Nutrition

PediatricNutritionin Practice, KoletzkoB, KargerPublishers, 2008

Nutritional assessment

- Growth assessment (anthropometric measurements)
- Dietary, medical, and medication history
- Physical examination
- Laboratory tests

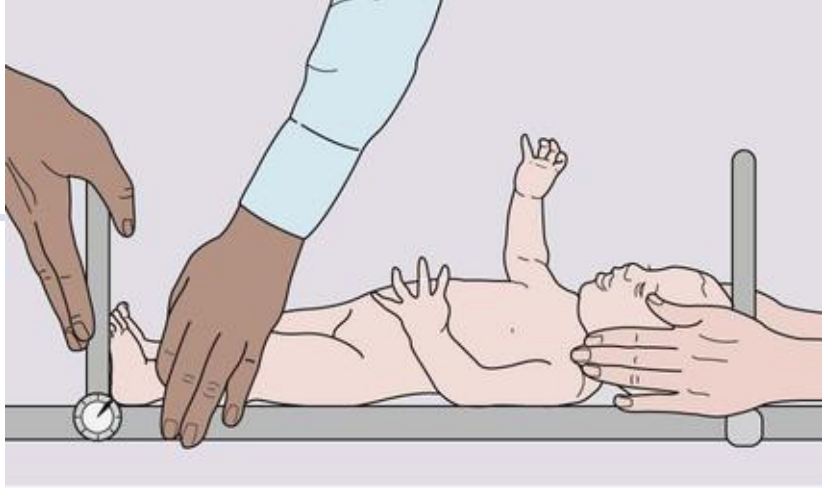
Growth evaluation

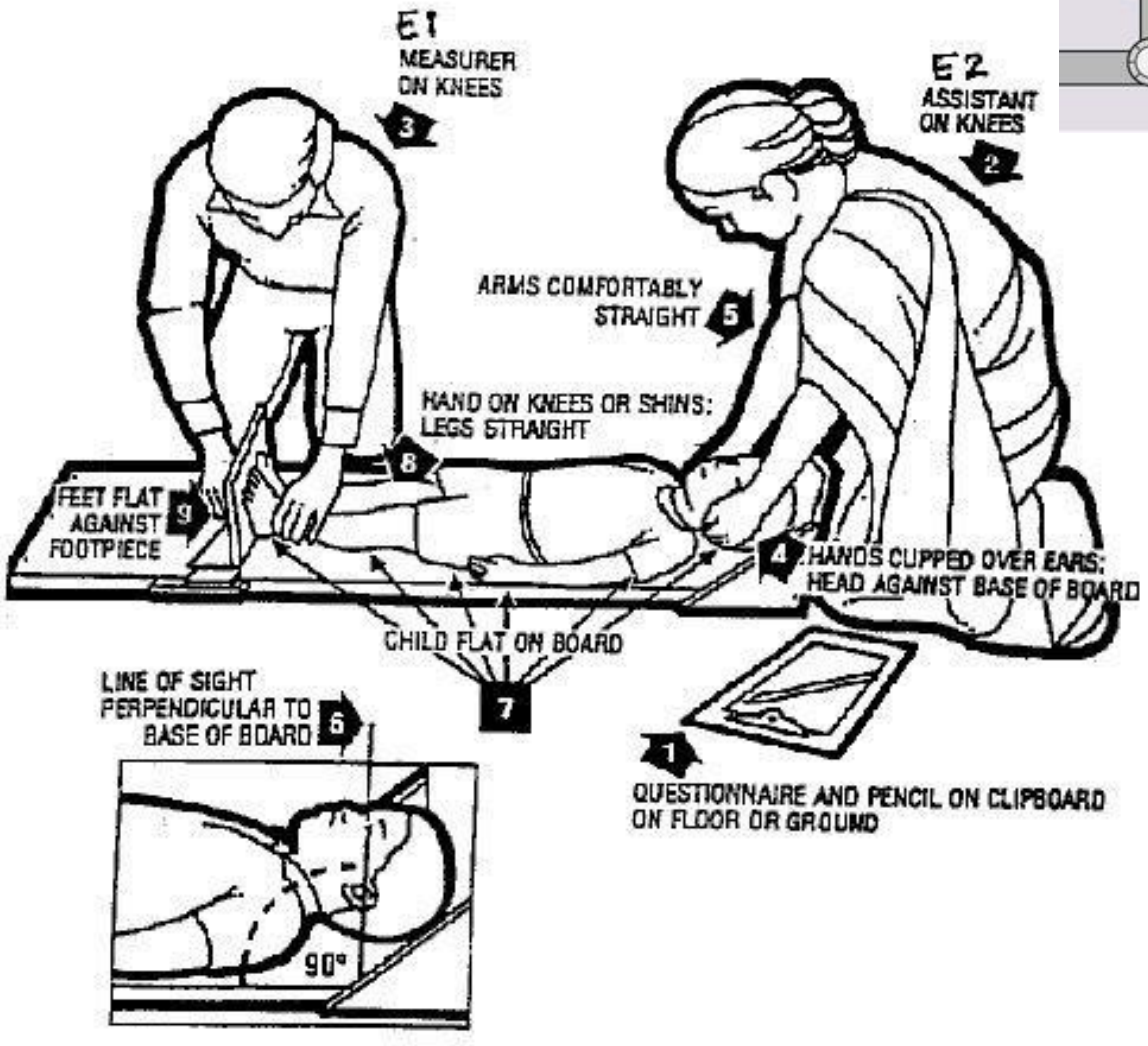
- obtaining, plotting and interpreting
- weight,
- length,
- head circumference

Standardized equipement

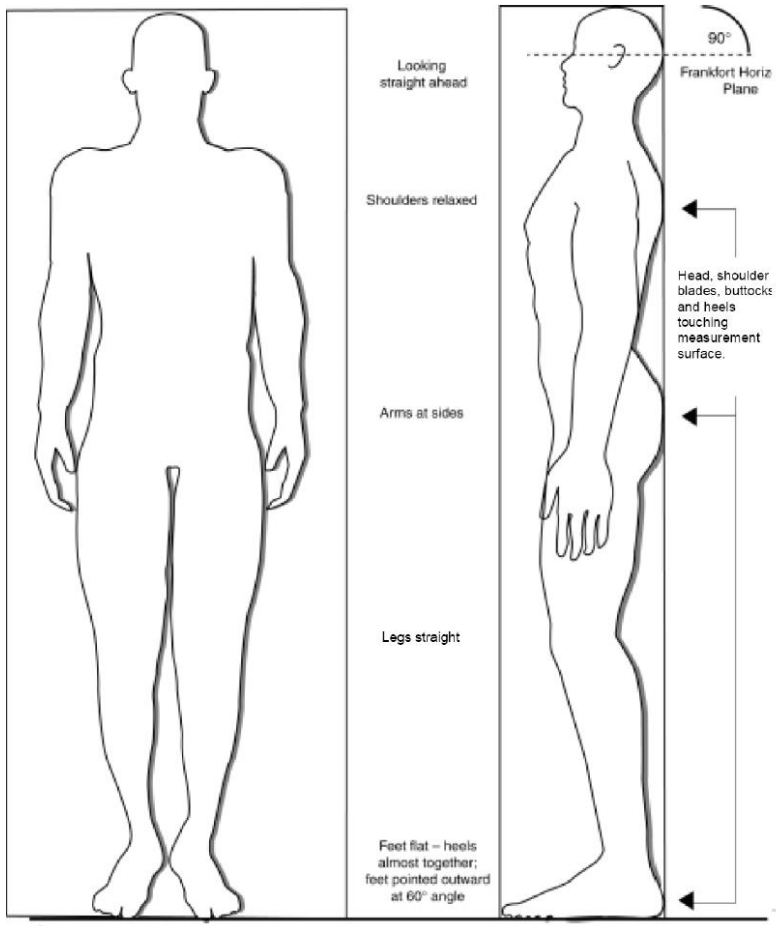
Growth charts

Heigh/ lenght

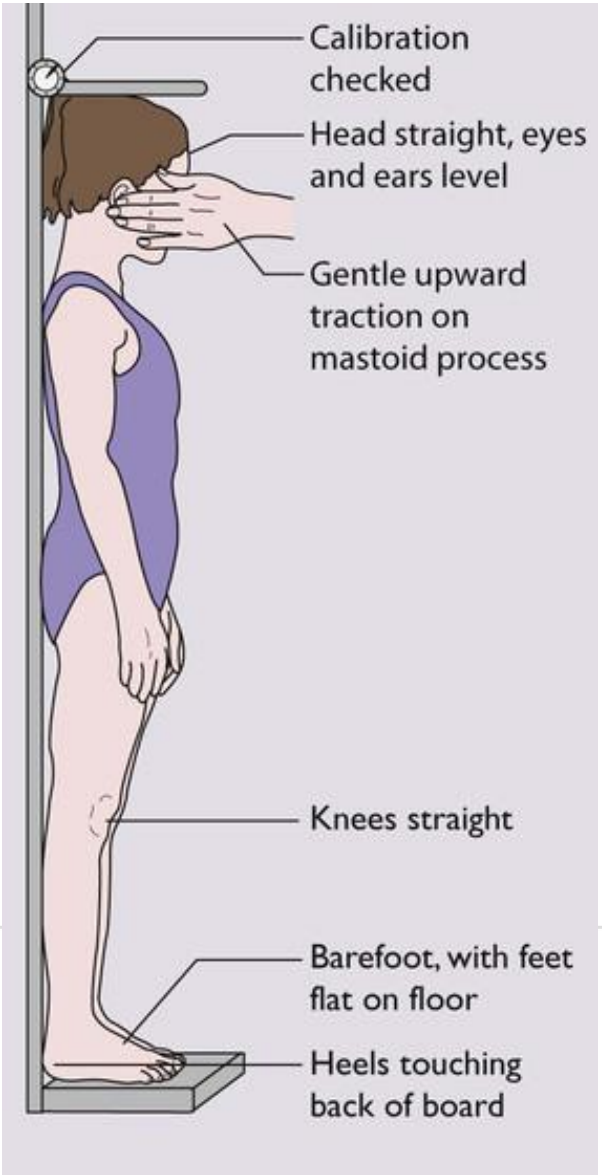




Heigh



Height



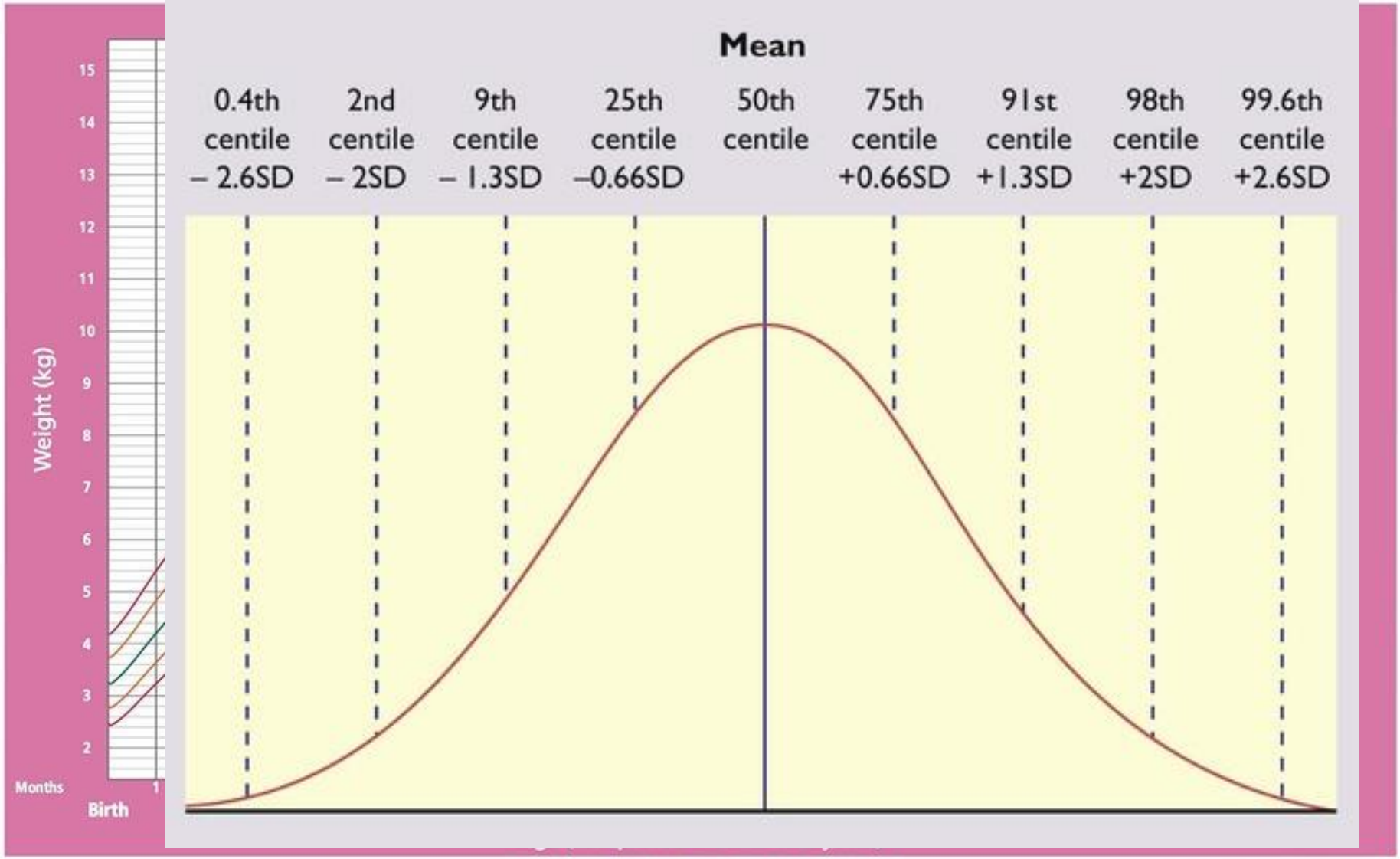
Growth charts

- WHO (Growth standards< 5 yo, growth reference: 5-19 yo)
- OLA/OLAF (3-18 yo) –Polish population
- Specific groups of patients(cerebralpalsy, prematureinfants, Down syndrome)

Weight-for-age GIRLS

Birth to 2 years (percentiles)

World Health Organization



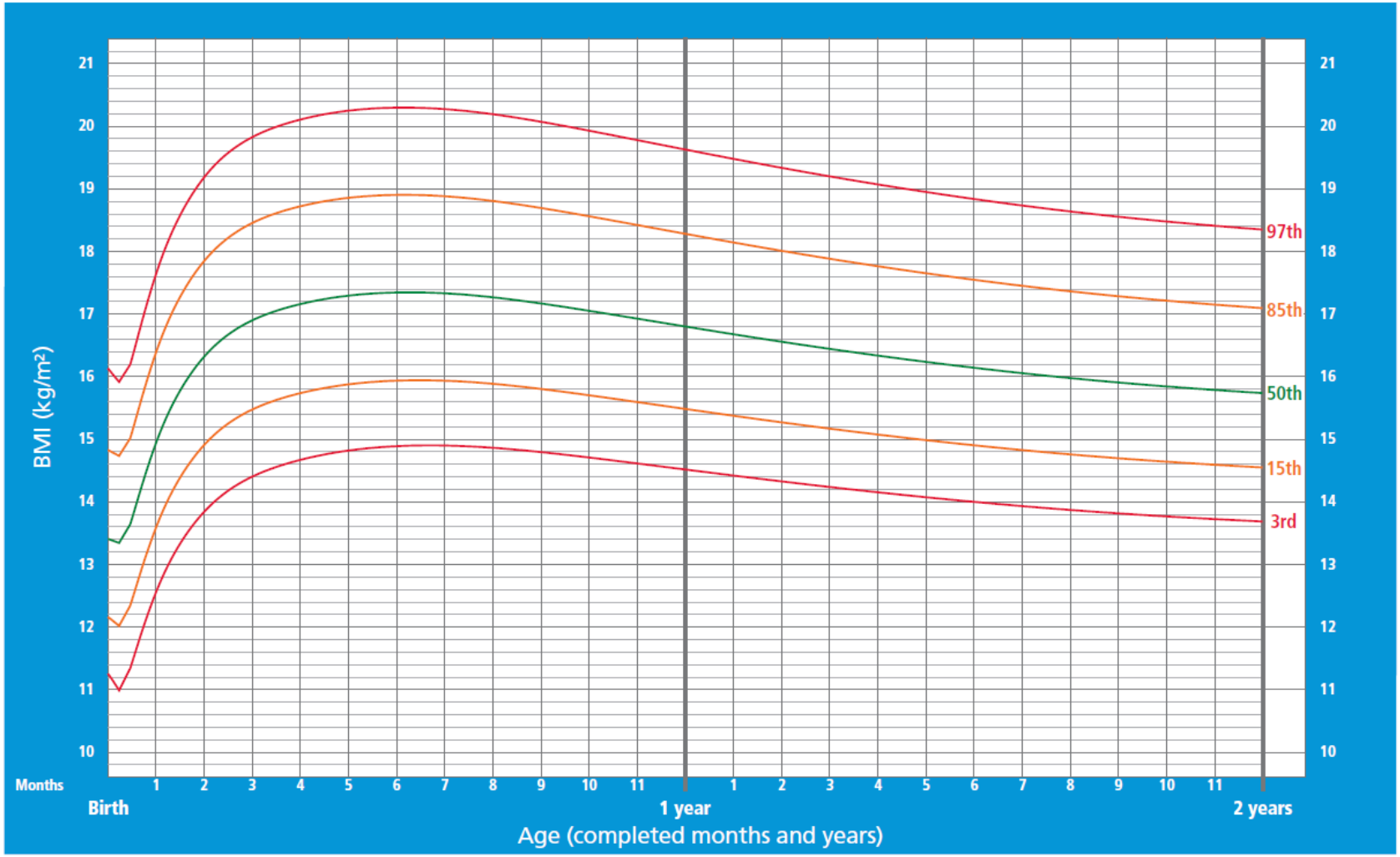
WHO Child Growth Standards

BMI in children

BMI-for-age BOYS

Birth to 2 years (percentiles)

World Health Organization



Malnutrition – failure to thrive in childhood is a state of undernutrition due to:

- inadequate caloric intake,
- inadequate caloric absorption,
- excessive caloric expenditure

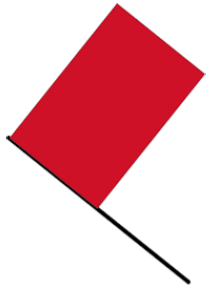
In children without obvious organic symptoms 92 percent were diagnosed with a behavioral cause of FTT.

The absence of obvious nonorganic symptoms does not completely exclude a nonorganic cause of FTT.

Differential Diagnosis of Failure to Thrive

INADEQUATE CALORIC INTAKE	*INADEQUATE CALORIC ABSORPTION*	*EXCESSIVE CALORIC EXPENDITURE*
Infant or toddler		
Breastfeeding problem	Food allergy	Thyroid disease
Improper formula preparation	Malabsorption	Chronic infection or immunodeficiency
Gastroesophageal reflux	Pyloric stenosis	Chronic pulmonary disease
Caregiver depression	Gastrointestinal atresia or malformation	Congenital heart disease or heart failure
Lack of food availability	Inborn error of metabolism	Malignancy
Cleft lip or palate		
Child or adolescent		
Mood disorder	Food allergy	Thyroid disease
Eating disorder	Celiac disease	Chronic infection or immunodeficiency
Gastroesophageal reflux	Malabsorption	Chronic pulmonary disease
Irritable bowel syndrome	Inflammatory bowel disease	Congenital heart disease or heart failure
	Inborn error of metabolism	

Red Flag Signs and Symptoms Suggesting Medical Causes of Failure to Thrive



Symptoms

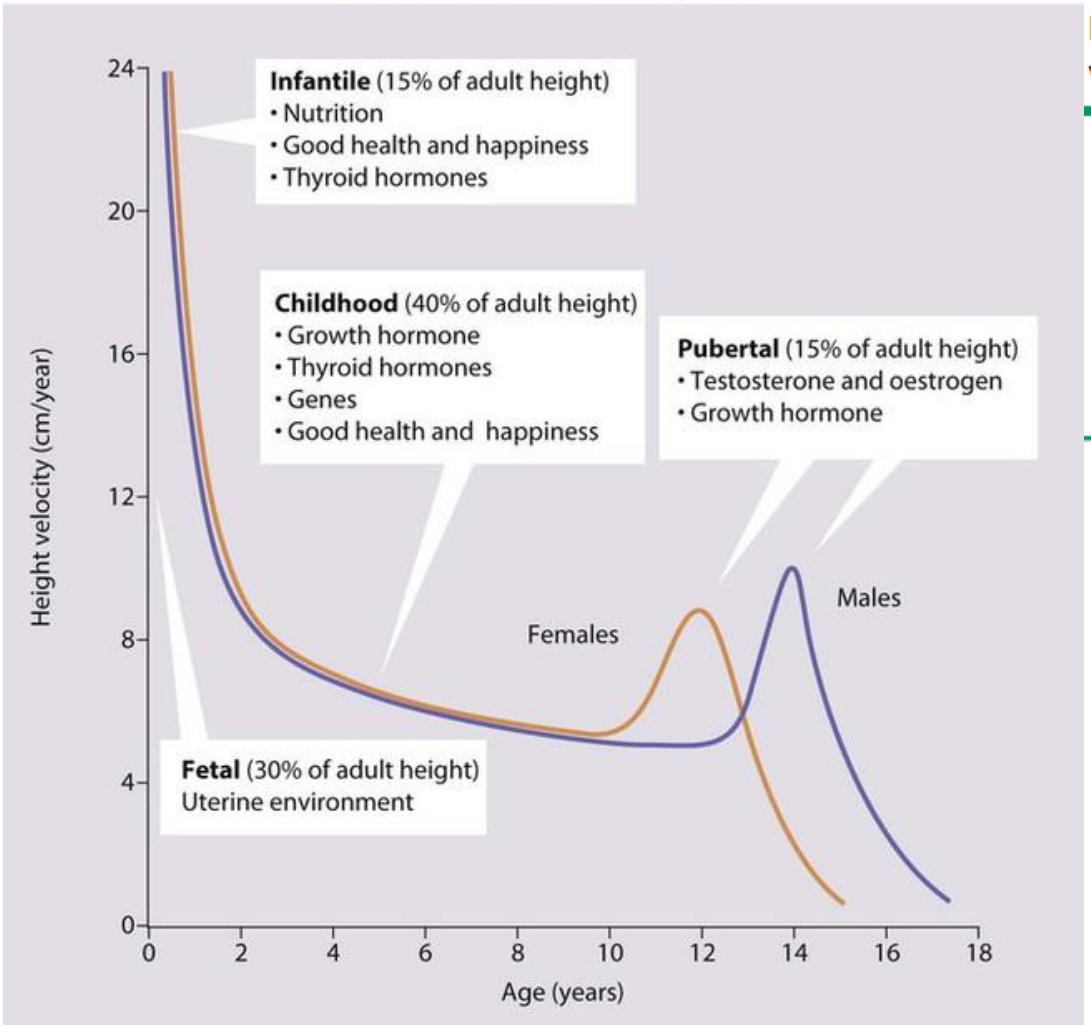
- Cardiac findings suggesting congenital heart disease or heart failure (e.g., murmur, edema, jugular venous distention)
- Developmental delay
- Dysmorphic features
- Organomegaly or lymphadenopathy

Signs

- Failure to gain weight despite adequate caloric intake
- Recurrent or severe respiratory, mucocutaneous, or urinary infection
- Recurrent vomiting, diarrhea, or dehydration

Cole S, Am Fam Physician, 2011

Determinants of childhood growth



Expected daily weight gain for children younger than three years

Age	Expected weight gain, g/day
0 to 3 months	26 to 31
3 to 6 months	17 to 18
6 to 9 months	12 to 13
9 to 12 months	9
1 to 3 years	7 to 9

NUTRITION

Human milk

- nutrients, such as proteins, lipids, carbohydrates, minerals, vitamins, and trace
- immune-related components such as sIgA, leukocytes, oligosaccharides, lysozyme, lactoferrin, interferon-g, nucleotides, cytokines, and others.

Breastfeeding

Breast-feeding is the natural and advisable way of supporting the healthy growth and development of young children.

> The definition of exclusive breast-feeding by the World Health Organisation (WHO) implies that the infant receives only breast milk and no other liquids or solids except for drops or syrups consisting of vitamins, mineralsupplements, or medicines.

Exclusive breast-feeding for around 6 months is a desirable goal, but partial breast-feeding as well as breast-feeding for shorter periods of time are also valuable.

> Continuation of breast-feeding after the introduction of complementary feeding is to be encouraged as long as mutually desired by mother and child.

Exclusive breastfeeding

0-6 months!

- Infants should be exclusively breastfed for the first six months of life to achieve optimal growth, development and health.
- Thereafter, to meet their evolving nutritional requirements, infants should receive nutritionally adequate and safe complementary foods, while continuing to breastfeed for up to two years or beyond.

World Health Organization

Exclusive breastfeeding – reality in Europe

AT START (0 m/o)

- initiation of breast-feeding ≥90% in 14 countries; 60% to 80% in 6 other countries; <60% in France, Ireland, and Malta.

AT THE END (6 m/o)

- rate of ANY breast-feeding at 6 months was more than 50% in only 6 countries.

HOW TO DEAL WITH IT?

Breastfeeding in Europe

Table 3 Rates (%) of breast-feeding by age and country

Country	Year	Initiation			Discharge			3–4 months			6 months			12 months
		Any	Full	Exclusive	Any	Full	Exclusive	Any	Full	Exclusive	Any	Full	Exclusive	Any
Austria	1998	96					95			79			46	10
Belgium	1998–2000	63–72						30–37			10			4
Bulgaria	2001	97								49	36			
Switzerland	1994	92						73		62	41		11	
Czech Republic	1999–2001						91				53		23	
Germany	1997–1998	96			86		73	60†		33†	48		10	13
Denmark	2000	98						75†	60†					
Estonia	2001							61			40			
Spain	2001	71						58		42	40		23	
Finland	2000				91		65	74		41	51		1	
France	2000				53			15						
UK	2000	69						28†			21			13‡
Hungary	2001									62†			35	
Ireland	1999						36							
Iceland	2000				98		93	75†		47†	65		13	13
Italy	2000	89				78					62	45		
Lithuania	2000–2002	98						46			26		14	7
Luxembourg	2001	88					65	58†		40†	32		4	
Malta	2002						52							
Netherlands	2002			80			72	47		35	34		17	
Norway	1998	99					94	90		70	80		7	36
Poland	1997–2002						71			31†			9	
Portugal	1998–1999		90			85			63			34		16
Sweden	2000				98*	93*		83†	68†		72	33		
Slovenia	2000					96	90							
Slovak Republic	2000			93						55			30	

No information available from Greece and Romania. Data from Latvia are not included, since they do not allow estimation of age prevalence.
* Data at 1 week.

Breastfeeding - benefits

Main results in infants	WHO, 2007	US Agency for Healthcare Research and Quality, 2007	Dutch State Institute for Nutrition and Health, 2005
Otitis media	—	↓	Convincing evidence ↓
GI infections	—	↓	Convincing evidence ↓
Respiratory infections	—	—	Possible evidence ↓
Severe lower RTI	—	↓	—
Atopy	—	—	Possible evidence ↓
Atopic dermatitis	—	↓	Eczema Probable evidence ↓
Asthma (young children)	—	↓	Probable evidence ↓
Wheezing	—	—	Probable evidence ↓
Obesity	↓ OR 0.78 (0.72 to 0.84)	↓	Convincing evidence ↓
Type 1 diabetes		↓	Possible evidence ↓
Type 2 diabetes	↓ OR 0.63 (0.45 to 0.89)	↓	—
Childhood leukaemia	—	↓	Possible evidence ↓
SIDS	—	↓	Insufficient evidence
NEC	—	↓	—
Cardiovascular diseases	—	Not clear	No evidence
Crohn disease	—	—	Possible evidence ↓
Ulcerative colitis	—	—	Insufficient evidence
Infant mortality	—	—	—
High blood pressure	↓systolic MD −1.2 mmHg (−1.7 to −0.7) ↓diastolic MD −0.49 mmHg (−0.87 to −0.11)	—	Convincing evidence ↓
Serum cholesterol	Adulthood ↓ MD −0.18 mmol/l (−0.3 to −0.06) Children and adolescents NS	—	—
Intelligence and schooling	↑ MD 4.9 (2.97 to 6.92)	—	—
Intellectual and motor development	—	—	Probable evidence ↑

Breastfeeding contraindications

1. HIV infection in mother:

- Transmission of HIV during breast-feeding.
- To minimise the risk of HIV-transmission, WHO recommends “when replacement feeding is acceptable, feasible, affordable, sustainable and safe, avoidance ofall breast-feeding by HIV-infected mothers is recommended, otherwise, exclusive breast-feeding is recommended during the first months of life”. In Europe.

2. HTLV – 1/2 infection in mother

3. Herpes simplex lesions on a breast

4. Mothers who are receiving diagnostic or therapeutic radioactive isotopes or have had exposure to radioactive materials, and in those who are receiving specific medications @LactMed®

5. Classic variant of galactosaemia,

Supplementation in breast-fed infants

- Breast-fed infants should receive daily vitamin D supplementation regardless of maternal vitamin D status.
- During the complementary feeding period, >90% of the iron requirements of a breast-fed infant must be met by complementary foods.
- All infants should receive an oral supplementation of 400 IU/day of vitamin D. The implementation should be ensured and supervised by paediatricians and other health care professionals.
- In accordance with the European Food Safety Authority, the upper limit of safety is set at 1000 IU/day for infants.

Complementary Feeding

Age - months	Meals no. per day	Meal volume (ml)	Feeding ability	Feeding basis	Meal consistency	Meal examples
1	7	110	Sucking, swallowing	Breastfeeding or formula	Liquid	Human milk, formula
2-4	6	120-140				
5-6	5	150-160	Initial shredding with tongue. Strong sucking reflex. Push food out from the mouth using the tongue (transient reaction) Opening the mouth when approaching a teaspoon		Firm puree 4 – milk meals	Cooked mixed vegetables (e.g. carrots) or fruit (e.g. apple, banana), meat, egg or mashed potatoes Gluten-free porridges / gruel Cereal products in small quantities not earlier than in the age of 5 months, not later than in the age of 6 months (e.g. cereal / gluten) Unlimited water 100% juice, puree, without added sugar, up to 150 ml per day (portion calculated from the amount of fruit consumed)
7-8	5	170-180	Pobieranie wargami pokarmu z łyżeczki Rozwój umiejętności i koordynacji umożliwiających samodzielne jedzenie		Increased variety of crushed or chopped foods Products served on hand 3 dairy meals from 7-8. to m/o	Mixed / finely chopped meat, fish Crushed cooked vegetables and fruits Chopped raw vegetables and fruits (e.g. apple, pear, tomato) Soft pieces / particles of vegetables, fruits, meat served in your hand Groats, bread Natural yogurt, cheese, kefir Whole cow's milk after 12 m/o Water and juices - as before
9-12	4-5	190-220				

Complementary Feeding

- The term “complementary feeding” should embrace all solid foods and liquids other than breast milk or infant formula and follow-on formula.
- Avoidance or delayed introduction of potentially allergenic foods, such as fish and eggs, has not been convincingly shown to reduce allergies, either in infants considered at risk for the development of allergy or in those not considered to be at risk.
- During the complementary feeding period, >90% of the iron requirements of a breast-fed infant must be met by complementary foods. These should provide sufficient bioavailable iron.
- Cow’s milk is a poor iron source. It should not be used as the main drink before 12 months, although small volumes may be added to complementary foods.
- Infants and young children receiving a vegetarian diet should receive a sufficient amount (500 mL) of milk (breast milk or formula) and dairy products.
- Infants and young children should not receive a vegan diet.

Recommendations on obesity- ESPGHAN

1. The origin of obesity is multifactorial. Dietary interventions should be incorporated into a multidisciplinary strategy for obesity prevention.

2. No single nutrient has been unequivocally associated with the development of overweight and obesity.

3. Methodological limitations in study design and the complex nature of obesity must be taken into account when interpreting the association with some of the reported dietary factors.

4. Energy intake should be individually determined, taking into account energy expenditure and growth.

5. Preferential intake of slowly absorbed carbohydrates, along with limiting the supply of rapidly absorbed carbohydrates and simple sugars, should be promoted.

6. With respect to obesity prevention, no recommendations on fat quantity and quality, protein or amino acid intake, or calcium and dairy product intake can be made.

7. No dietary modulators of gut microbiota can be recommended for obesity prevention.

8. Plant foods can be used as the main food contributors to a wellbalanced diet. When a vegetarian diet is practiced, appropriate planning (taking into account recommended macro- and micronutrient intakes) and monitoring (growth and potentially zinc, iron, vitamin B12, and vitamin D status) should be executed by a health care professional.

9. Sugar-sweetened beverages are a significant contributor to energy intake. Plain water should be promoted as the main source of fluids for children.

10. Children should eat at least 4 meals, including breakfast, every day. Regular family meals should be encouraged.

11. Fast food with large portion sizes and high energy density should be avoided.

12. Healthy food options should be promoted for snacking.

13. Food portion sizes should be appropriate for age and body size.

14. Nutrition and lifestyle education aimed at the prevention of obesity should be included in the routine care of children by general paediatricians and other health professionals.

Dziękuję