A BETTER LIFE

PRACTICAL GUIDANCE TO HELP FIGHT CHILD MALNUTRITION

"…the right start in life is a healthy start – and that is the only start from which children can realize their promise and potential. We owe that to every child, everywhere"

Anthony Lake, UNICEF, 2013.

Bhalobasa Organizzazione Non Lucrativa di Utilità Sociale

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FOREWORD

Malnutrition, with its different facets, is a condition affecting more than two hundred million children under the age of 5 around the world.

International agencies, like World Health Organization (WHO) and United Nations Children's Fund (UNICEF), periodically publish reports on this topic, with the aim of providing data and information, and sensitizing people.

These works have constantly inspired and guided our researches on child malnutrition, and have represented a knowledge base from which to start when planning and writing this booklet. We largely used publications by WHO and UNICEF, selecting and reassembling parts of them for the specific topics we were going to consider, and combined with personal comments and iconographic material.

The aim of this publication is to offer a simple and practical guide on the main – but simple – daily habits that may contribute to fight child malnutrition. In fact, besides the

big national and international programmes, even simple good practises and small daily changes may lead to big results.

An important step for fighting malnutrition is the assessment and monitoring of nutritional status, thus allowing the evaluation of child health and the introduction of possible nutritional corrections.

Another relevant step is giving appropriate information: a woman, a future mother, should always be aware that her health status will determine the health status of her children. The way she will breastfeed, and, later in time, she will nourish her children, constitutes the very basis for their future. All the basic actions, from giving the child the right to a name and nationality (through birth registration), to offering him a healthy environment, will influence his future.

This booklet is a guide for mothers, young women, teachers, health operators, and for anyone that daily interacts with babies and children.

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July 1st 2014

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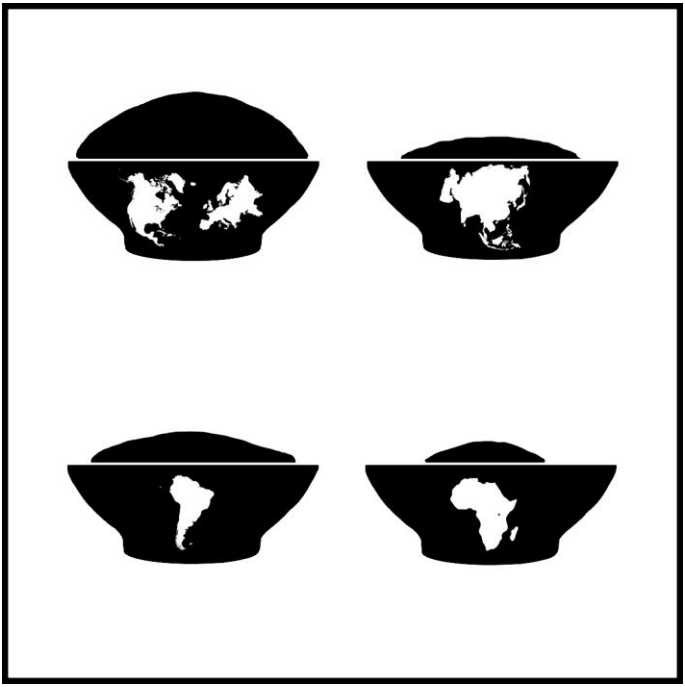
A FEW WORDS ON MALNUTRITION



"*Many of the things we need can wait. The child cannot. Right now is the time his bones are being formed, his blood is being made and his senses are being developed. To him we cannot answer 'Tomorrow', his name is Today.*"

Gabriela Mistral, Su nombre es Hoy, 1948.

In early childhood correct nutrition is fundamental for a healthy physical and cognitive development. In fact, properly nourished children are likely to be healthy, and they will likely be healthy adults as well.

All deviations from adequate nutrition (including deficiencies or excesses of essential nutrients, such as vitamins and minerals) can cause a condition of malnutrition: undernutrition results from an insufficient intake of nutrients, and overnutrition from excessive diets. Conditions such as obesity also constitute malnutrition. Both the opposite expressions of malnutrition lead to health problems and higher risk of mortality. Malnourished children also have a lower performance at school and less probability to succeed in working life.

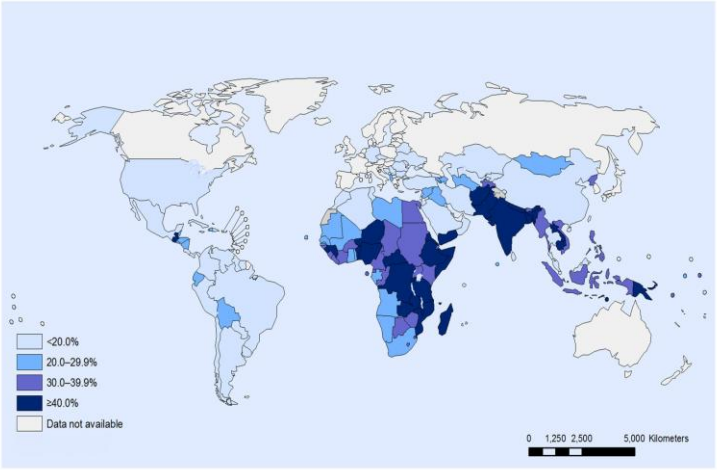
High malnutrition rates are observable all over the world, with different distribution according to the type of malnutrition considered. In fact, if we focus on denutrition, the highest prevalence is found in Sub–Saharan and South Asian countries. Globally, 162 million under–five years old children were stunted in 2012 (UNICEF–WHO –World Bank, 2013).

On the other hand, in the same period, 44 million of children under–five years of age were overweight (UNICEF–

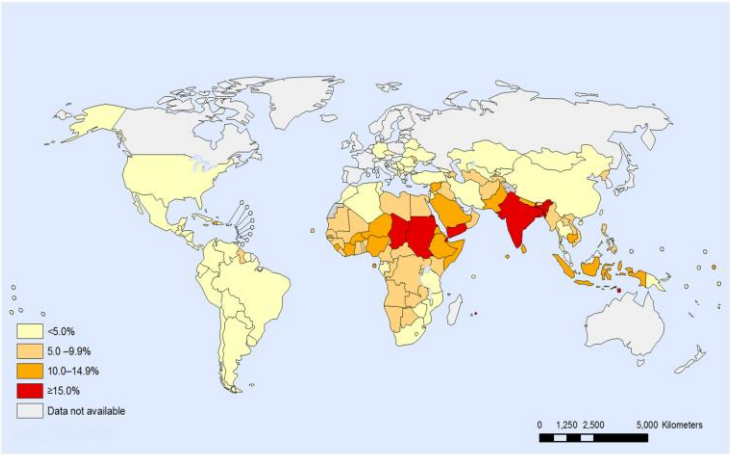
WHO–World Bank, 2013), with the highest values in Northern and Southern Africa, and Central and Western Asia.

Global trend in undernutrition prevalence is decreasing (in the period 2000–2012 stunting prevalence declined from 33% to 25%), while that of overweight is rising (from 5% to 7% over the same period) (UNICEF–WHO–World Bank, 2013). The growing prevalence of overweight and obesity is also observable in low– and middle–income countries, where it is due to the globalization of food production, commerce and the progressive adoption of a 'Western' life style, with the decline of traditional diets and reduced physical activities.

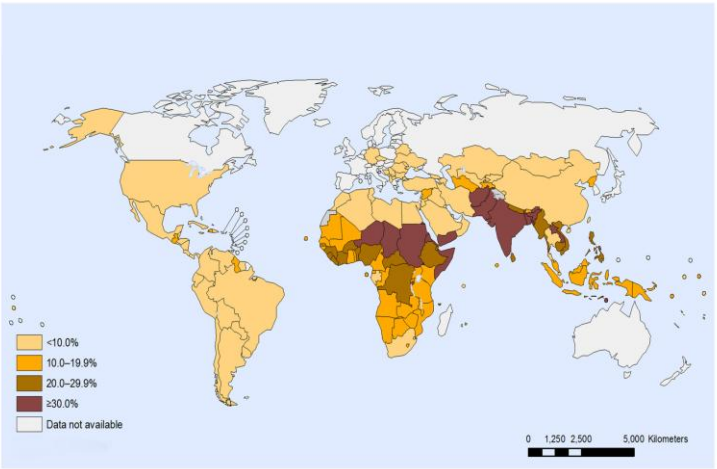
The problem of malnutrition in the world has drawn, in the last decades, the attention of international organizations and political summits, and of many national governments, that made significant efforts, putting nutrition high in their development agendas. In fact, the first Millennium Development Goal "*Eradicate extreme poverty and hunger*", target 1.C aims to "*Halve, between 1990 and 2015, the proportion of people who suffer from hunger*".



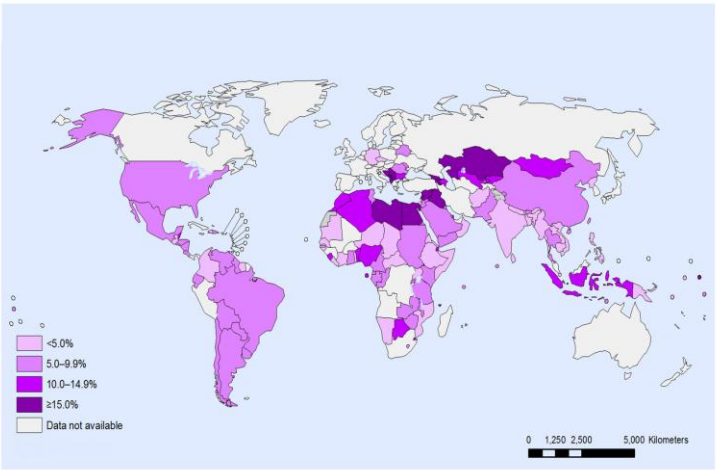
a. *stunting (low stature–for–age)*



b. *wasting (low weight–for–stature)*



c. underweight (low weight–for–age)



d. *overweight (high weight–for–stature)*

Global prevalence estimates for malnutrition among children under–five years. Detailed information about nutrition indicators can be found in chapter "Measuring and monitoring nutritional status".
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BREASTFEEDING

Babies who are breastfed are generally healthier and achieve optimal growth and development compared to those who are fed formula milk.

KEY MESSAGES

1. *Breast–milk alone is the best food and drink for an infant for the first six months of life.*

2. *Almost every mother can breastfeed successfully. Breastfeeding the baby frequently stimulates the production of more milk.*

3. *Bottle feeding and breast–milk substitutes can threaten the baby's health.*

4. *A woman employed away from home should continue, as far as possible, to breastfeed her child.*

1. Breast–milk *alone* is the best food and drink for an infant for the first six months of life.

Breast–milk is the best food for any baby. It contains the perfect balance of nutrients, unlike infant formula, powdered milk or animal milk.

Nutritional composition of breast–milk (100 ml)*	
Water	90 gr
Carbohydrates (mainly lactose)	7.5 gr
Fat	4 gr
Protein	1.3 gr
Calories	70 gr

*http://www.parentingscience.com/calories–in–breast–milk.html

Breast–milk promotes optimal growth and development and protects against illness because it contains antibodies that transfer to the child the mother's resistance to disease. Breast–milk helps to protect against diarrhoea, ear and chest infections, and other health problems.

Colostrum, the thick yellowish milk the mother produces in the first few days after giving birth, is the perfect food for newborn babies. It is very nutritious and full of antibodies that help protect the baby against infections.

A baby should feed only with breast–milk and on demand during the first six months. The baby does not need water or other drinks or foods (such as tea, juice, sugar water, gripe water, rice water, other milks, formula or porridge). Even in hot, dry climates, breast–milk fully meets a baby's need for fluids. Moreover, water and other liquids or foods may be contaminated, and can cause diarrhoea.

After 6 months of age, when babies begin to eat foods, breastfeeding should continue for up to two years and beyond because breast–milk continues to represent an important source of nutrition, energy and protection from illness.

The quality of a mother' breast–milk depends on her nutrition. For this reason, it is fundamental that she eats properly and healthily and includes all the principal nutrients in her diet.

On the other hand, the quality of breast–milk may be compromised by the mother's smoking, and by the use of alcoholic beverages, caffeinated drinks, medicines and drugs.

2. Almost every mother can breastfeed successfully. Breastfeeding the baby frequently stimulates the production of more milk.

From birth, the baby should breastfeed whenever they want. A baby should be fed on demand approximately every three hours during both the day and the night. More suckling produces more breast–milk, which helps satisfy the baby's feeding needs.

If the baby cries a lot and does not settle after feeding, the mother may need additional breastfeeding support or the baby might not be well. A trained health worker should be consulted in these cases.

Mothers need encouragement and support from the child's father and their families, neighbours, friends, health workers, employers and women's organizations.

A mother who has undergone a Caesarean birth may require extra help to begin breastfeeding her baby.

A HIV–positive mother should be counseled by trained health workers and provided with information to help her decide which feeding option is best for her baby and most manageable for her.

3. Bottle feeding and breast–milk substitutes can threaten the baby's health.

Breast–milk substitutes can cause poor growth or illness if they are not properly diluted in water, or if water, bottles and teats are contaminated with harmful bacteria.

Studies suggest that children fed with breast–milk substitutes, as compared to breastfed children, are at greater risk of childhood obesity and some chronic illnesses, such as heart disease, later in life.

The use of breast–milk substitutes can be expensive and particularly risky if parents cannot afford to buy enough of a quality breast–milk substitute.

Nevertheless, if the use of substitutes is necessary, these precautions must be followed:

- All types of milk must be stored in a clean, covered container, preferably in a refrigerator. In fact, animal milk and infant formula go bad if left at room temperature (around 20–25 degrees Celsius) for more than two hours;
- Dilutions of powdered milk must be done with boiled water;
- The breast–milk substitute should be fed to the baby by cup, because the cup can be easily cleaned with soap and water. Even newborn babies can be fed with an open cup.

4. A woman employed away from home should continue, as far as possible, to breastfeed her child.

If a mother works away from home she should breastfeed whenever she is with her baby. With frequent breastfeeding, she will continue to produce breast–milk.

STORAGE OF EXPRESSED MILK*			
Type of storage	Temperature		Max storage time
Room	25° C	77° F	6–8 hours
Refregerator	4° C	39° F	up to 5 days
Refregerator freezer	–15° C	5° F	2 weeks

* *http://www.caringforkids.cps.ca/handouts/breastfeeding*

If a woman cannot breastfeed at her workplace, she can express her milk during the workday and refrigerate it or store it at room temperature for up to 6–8 hours in a clean, covered container. The expressed milk can be given to the child by another caregiver from a clean cup.

NUTRITION AND FOOD DURING CHILD GROWTH

Malnutrition develops when the body does not get the proper amount of energy and nutrients required to keep the organs and tissues healthy and functioning well.

KEY MESSAGES

1. After six months, a baby needs a variety of foods in addition to breast–milk to ensure his healthy growth and development.

2. Children should include all the fundamental nutrients in their diet in order to have a proper growth and health status.

3. Children need vitamin A, iron–rich food, iodine and calcium to help resistance to illness and to ensure their healthy growth and development.

4. The main food should be low cost but well represented by good sources of proteins, carbohydrates and fat.

5. During and after an illness, children need additional fluids and encouragement to eat regular meals.

1. After six months, a baby needs a variety of foods in addition to breast–milk to ensure his healthy growth and development.

Inadequate nutrition during the first two years of a child's life deeply influences their growth. If food is insufficient or of low nutritional value, the child's physical and mental development can be compromised. On the other hand, too much food, especially junk food (food that is of little nutritional value and high in fat, sugar, salt, and calories), can compromise the child's growth and future.

A variety of food helps to meet the child's nutrition needs.

Breastfeeding for up to two years and beyond provides an important source of nutrients that protects the child against diseases.

Nevertheless, if soft, semi–solid or solid foods are introduced too late, the child may not achieve the nutrients necessary for their growth and development.

Parents should start with soft or mushy foods (such as porridge) and gradually increase the consistency (thickness) of the food. It is necessary to start introducing proteins from

animal sources such as meat, fish, eggs, or from vegetarian sources, such as pulses.

In addition to breastfeeding, a child aged 6–8 months needs to eat 2/3 times per day and 3/4 times per day starting at 9 months.

A child aged 6–8 months needs to receive initially 2–3 spoonfuls of food, increasing gradually to 1/2 cup (250 ml) at each meal. A child 9–12 months old needs to receive 1/2 cup at each meal. If the quality or amount of food per meal is low, or the child is no longer breastfed, 1–2 cups of milk plus one or two extra meals each day is recommended.

Most children by 12 months are able to consume 'family foods' of a solid consistency. They can still be offered semi–solid foods, which are easier for young children to eat. A child 12–23 months old requires 3/4 to 1 whole cup of 'family foods' at each meal.

Children 2 years and older need to receive at least 1 whole cup at each meal. If the child finishes his or her food and wants more, the child needs to be offered more.

Girls and boys require the same amount of attention and time for feeding. They should receive the same quantity and quality of food and drink.

2. Children should include all the fundamental nutrients in their diet in order to have a proper growth and health status.

The essential nutrients for correct body functions are carbohydrates, fat, proteins, vitamins, minerals and water. Some of these nutrients we need in small amounts (fat rich food), some others we need in larger amounts (carbohydrate and vitamin rich food).

Carbohydrates are 'energy helpers' since they provide energy to keep us active and strong. Carbohydrate rich foods include: rice, wheat, maize, millet, quinoa, cassava, yam, potatoes, plantain and breadfruit.

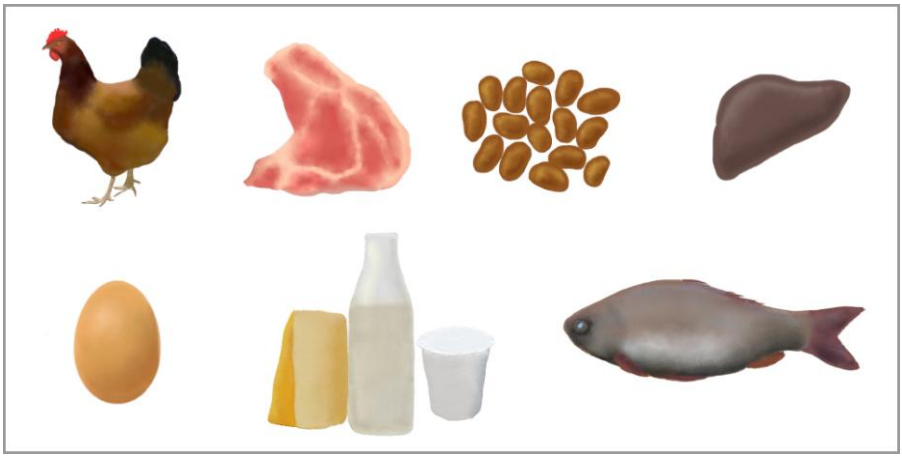
Carbohydrates–rich foods

Also fats are 'energy helpers', in the sense that they are energy–rich foods. Fat–rich foods are oils, especially rapeseed oil, soy oil, red palm oil, butter or margarine.

Fat–rich foods

Proteins are 'body–building helpers' because they build and repair our body daily.

Protein foods include: red meat, poultry, fish, liver, eggs, cheese, milk, yogurt, and pulses.



Protein–rich foods

3. Children need vitamin A, iron–rich food, iodine and calcium to help resistance to illness and to ensure their healthy growth and development.

Food contains nutrients which are extremely important to prevent diseases. Vitamins, for example, are essential for a normal growth of a child and a health status of an adult.

Vitamins are 'protective helpers' since their absence in diet can lead to serious illness. Vitamins are present in green leafy and orange–coloured vegetables, and all kinds of fruit.

Vitamin A is particularly important since it helps children to resist illness, protects their eyesight and reduces the risk of death. When children do not have enough vitamin A they are less able to fight potentially fatal diseases and are at risk of night blindness. A child who has difficulty seeing in the early evening and at night is probably deficient in vitamin A.

Vitamin A can be found in many fruits and vegetables, red palm oil, eggs, dairy products, liver, fish, meat, fortified foods and breast–milk. In areas where vitamin A deficiency is common, high–dose of vitamin A supplements can be given to children aged 6 months to 5 years every four to six months.

Children also need iron–rich foods. Indeed, a lack of iron in the diet is a common cause of anaemia. Children can also become anaemic after malaria fever and hookworm infection. Even mild iron deficiency can impair physical and mental development in infants and young children.

Foods rich in vitamin A

However, children living in malarial areas should not take iron and iron–folic acid supplements, unless the malaria has been diagnosed and treated and they have been screened for anaemia.

Iron can be introduced with animal sources, such as liver, lean meats and fish. It is also present in some vegetarian foods, such as pulses.

Small amounts of iodine are essential for children's growth and development. If a woman does not have enough iodine during pregnancy, her child could be born with some disability. If the child does not get enough iodine during infancy and

childhood, they may have delayed physical, mental or cognitive development. Even mild deficiency can reduce learning ability and intelligence. The use of iodized salt, instead of ordinary salt, provides pregnant women, children and all the family with as much iodine as they all need.

Foods rich in iron

A proper amount of calcium is necessary, to both children and breastfeeding mothers, for building and maintaining strong bones. Children with low calcium intake are at an increased risk of developing rickets, a bone–softening disease that causes

severe bowing of the legs, poor growth, and sometimes muscle pain and weakness. Breastfeeding women need extra amounts of calcium for milk production that should be introduced by consuming calcium–rich food, such as milk and its derivates.

4. The main food should be low in cost but well represented by good sources of proteins, carbohydrates and fat.

The main food consumed daily by a family should provide most of the body's energy, but it should also be a low cost nutritious meal.

Around the world, the most common food sources are cereals and starch–rich foods, like wheat, rice, maize, millet, potatoes, cassava, banana, plantain, and breadfruit.

Consumption of the following 'helper foods' could be added to the main meal encouraging a better balanced diet:

– Pulses, such as chickpeas, lentils, cowpeas, black–eyed peas, kidney beans, and lima beans represent an excellent variety of healthy food and provide protein, energy and some iron;

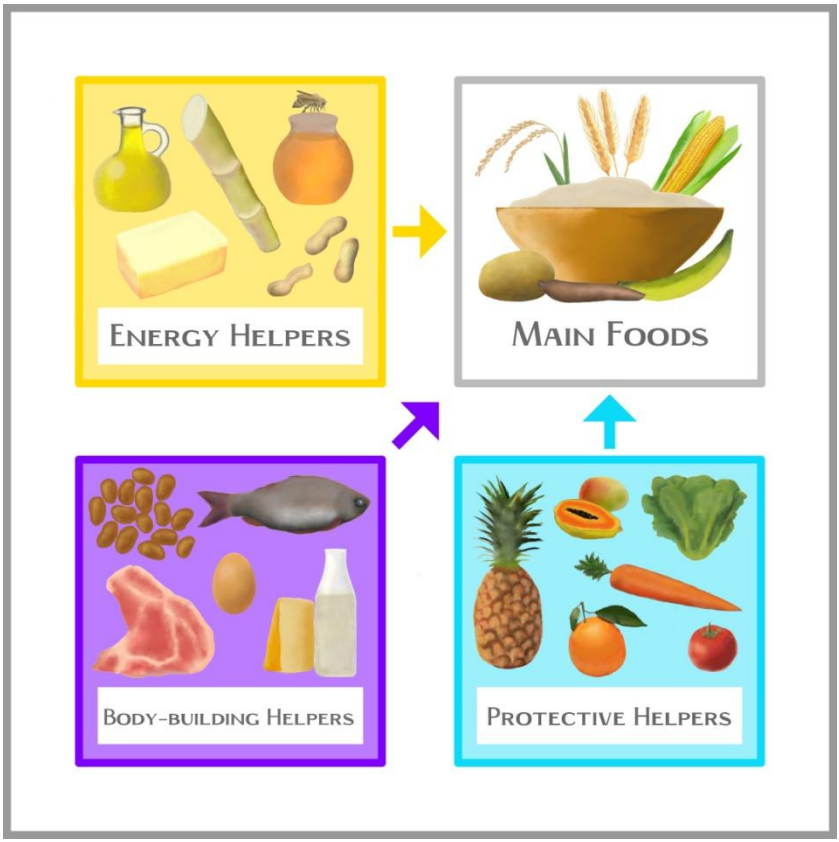
– Seeds, including nut pastes and soaked or germinated seeds, such as pumpkin, sunflower, melon or sesame seeds, are a good source of energy and of some vitamins.

5. During and after an illness, children need additional fluids and encouragement to eat regular meals.

The risk of malnutrition increases when diarrhoea and other acute illnesses or chronic diseases, such as HIV, sap the body of the proteins, minerals and nutrients required to stay healthy.

If diarrhoea and poor appetite persist for more than a few days, the mother, father or other caregiver needs to consult a trained health worker.

Children with developmental delays or disabilities may require extra help and time for feeding.



Main and 'helper foods' to fulfill nutritional requirements.

HYGIENIC RULES FOR A BETTER GROWTH

Young children are more vulnerable than any other age group to the ill effects of unsafe water, poor sanitation and lack of hygiene.

KEY MESSAGES

1. *Children are particularly vulnerable to poor hygienic conditions.*

2. *All family members, including children, need to wash their hands and faces with soap and water to prevent infections and diseases.*

3. *All family members, including children, have to take care of their teeth and gums.*

4. *All water that people drink and use should come from a safe source or be purified.*

5. *Food should be properly prepared, cooked and stored.*

6. *Safe disposal of household refuse and organic waste helps prevent illness.*

1. Children are particularly vulnerable to poor hygienic conditions.

Unsafe water, poor sanitation and lack of hygiene can cause diarrhoeal diseases, respiratory and parasitic infections, being among the major causes of death in children.

2. All family members, including children, need to wash their hands and faces with soap and water to prevent infections and diseases.

The simple habit of hand–washing with soap strongly reduces the incidence of diseases.

Hands should always be washed with soap and water before and after each contact with food and in hygiene practices, especially after defecating, dealing with refuse or cleaning a child, and before touching food and feeding young children.

Where soap is not available, a substitute, such as ash and water, can be used. Both hands should be accurately scrubbed.

Children need to know the importance of washing hands and should develop this practice before eating and after using the latrine or toilet.

A dirty face attracts flies that carry pathogens. Washing the face helps to prevent eye infections that could cause blindness. A child with healthy vision can see clearly. Healthy eyes are moist, shiny, and the white part is clear. If the eyes are very dry, red, and sore and there is impaired vision, the child requires a medical examination.

3. All family members, including children, have to take care of their teeth and gums.

Proper dental care is very important to prevent teeth and gums diseases. Only when teeth are strong and healthy can we chew and digest the food well. Moreover, serious oral infections may affect other parts of the body. There are only two basic rules to follow to prevent teeth and gum diseases:

a) to avoid sweets: eating any kind of sweets (including soft drinks) rots the teeth, so it is better to avoid children to be accustomed to their use;

b) to brush teeth daily: caregivers should start brushing children's teeth as soon as teeth grow. When children are 3–4 years old, they should start learning how to do this by themselves.

If a toothbrush is not available, the twig of a tree, with one of the ends sharpened (so to clean between teeth) and the other chewed (so to make it stringy for brushing teeth), can be used.

If the toothpaste is not available, it can be replaced with powdered charcoal, with salt, or with a mix of equal amounts of salt and bicarbonate of soda.

An example of a home–made toothbrush

4. All water that people drink and use should come from a safe source or be purified.

An adequate and safe water supply is of prime importance. The water must be kept clean and free of germs.

Safe water sources include properly constructed and protected pipes, boreholes, wells, springs and rainwater harvesting systems.

Unsafe water sources like ponds, rivers and irrigation channels, and lakes are best avoided. Where necessary, home–based water treatment, such as boiling, filtering, adding chlorine or disinfecting with sunlight (strong sunlight for six hours) should be used to purify the water.

Containers for transport and storage of water must be kept clean both inside and outside, avoiding anyone to put their fingers inside. The water should be stored in closed containers.

Animals should be kept away from water sources for human use.

5. Food should be properly prepared, cooked and stored.

Raw or leftover cooked food can be dangerous, because its contamination causes diseases of the gastrointestinal tract.

Vegetables and fruits should be washed or peeled with clean water.

Food should be stored in covered containers to prevent contamination by insects and germs. Utensils and preparation surfaces must be kept clean and away from animals.

Cooking kills germs.

It is important to cook the food very well, especially meat and seafood. Cooked food should be eaten without delay to prevent germ proliferation. If food has to be kept for more than two hours, it should be kept very hot or very cool, and thoroughly reheated afterwards.

Animal milk should be boiled or pasteurized.

6. Safe disposal of household refuse and organic waste helps prevent illness.

Many diseases, especially diarrhoea, are caused by bacteria present in human faeces.

All faeces, *including* those of babies and young children, need to be put down a toilet or latrine, or buried in a secure area. Even animal faeces must be disposed of.

Toilets and latrines should be cleaned frequently. Latrines should be kept covered and toilets should be flushed. A clean latrine attracts fewer flies. They should be away from water sources used for drinking, cooking or washing.

Children should not play near a toilet or latrine, especially without shoes or sandals.

Safe disposal of all household refuse waste helps to maintain a clean and healthy environment. If there is no community–wide refuse collection, each family needs a garbage pit where household refuse is buried or burned every day.

Chemicals such as pesticides or herbicides can be very dangerous, even if small quantities get into the water supply or onto food, hands or feet. All chemicals should not be used around the household, near a water source, near drinking water containers or near food.

A HEALTHY MOTHER

The risks associated with pregnancy, for both the mother and the child, may be reduced if a woman is healthy, if she has regular maternity care, and if the birth is assisted by a skilled health professional.

KEY MESSAGES

1. Adolescent girls, women, pregnant women and new mothers need the best foods available during pregnancy and while breastfeeding.

2. Smoking, alcohol, drugs, poisons and pollutants are particularly harmful to pregnant women, the fetus, babies, and young children.

3. All pregnant women need at least 4 prenatal visits and the birth has to be assisted by a skilled health professional.

4. Postnatal care for both the mother and the baby reduces the risk of complications.

1. Adolescent girls, women, pregnant women and new mothers need the best foods available during pregnancy and while breastfeeding.

The risks associated with childbearing for the mother and her baby can be greatly reduced if a woman is healthy and well nourished before becoming pregnant.

During pregnancy, all women need more nutritious meals, increased quantities of food, and more rest than usual.

Breastfeeding mothers need about 500 extra calories per day, the equivalent of an additional meal.

Milk, fresh fruits and vegetables, meat, fish, eggs, grains, peas and beans are rich in vitamins and proteins, which help fetal growth and mother health.

Nutritious foods rich in iron, vitamin A and folic acid (meat, fish, eggs, green leafy vegetables, and orange or yellow fruits and vegetables) are also fundamental.

Salt consumed by families should be iodized. Iodine in the woman's diet is fundamental for the healthy development of the child's brain.

Iron–folic acid or multiple micronutrient supplements can be provided to pregnant women by trained health workers to

prevent or treat anaemia. If necessary, an adequate dosage of vitamin A can also be prescribed.

2. Smoking, alcohol, drugs, poisons and pollutants are particularly harmful to pregnant women, the fetus, babies and young children.

If a pregnant woman smokes, her child is more likely to be born underweight and to have breathing problems.

A pregnant woman can damage her own health and the health of the fetus by drinking alcohol or using narcotics, which severely affect the child's physical and mental development.

If the mother has difficulty to stop using these substances, she should seek medical advice and support from a trained health worker, a health centre or a substance–abuse organization.

A pregnant woman should not take medicines during pregnancy unless they are absolutely necessary and prescribed by a trained health worker.

3. All pregnant women need at least 4 prenatal visits, and the birth has to be assisted by skilled birth attendant.

Every pregnancy deserves attention because there is always a risk of complications with the mother, baby or both.

The first prenatal visit should take place in the first three months of pregnancy, and the other three visits can be scheduled to take place at predetermined times during the remainder of the pregnancy.

It is recommended that women give birth in a maternity clinic or hospital with a skilled birth attendant, since complications cannot be predicted.

Health workers, families and communities need to give special attention to pregnant adolescent girls, particularly those under 15 years old, because they are at much higher risk of pregnancy complications.

When a young woman begins to be sexually active, she needs information about pregnancy and the risks of sexually transmitted infections, including HIV. She should be able to recognize the early signs of pregnancy.

A pregnant woman who is HIV–positive should consult a trained health worker for counseling on how to reduce the risk of infecting her baby during pregnancy, childbirth and breastfeeding and how to care for herself and her baby.

4. Postnatal care for both the mother and the baby reduces the risk of complications.

Newborns need to be carefully cared for around the clock, loved, kept clean and warm, and fed.

During the first hours after childbirth and the first week and month of life, newborn babies are particularly vulnerable. The first days and weeks are especially risky for low–birthweight babies.

MEASURING AND MONITORING NUTRITIONAL STATUS

Basic nutritional assessment involves measuring the child's weight and length or height, and comparing these measurements with growth standards.

KEY MESSAGES

1. *Methods for assessing nutritional status.*

2. *Children should be weighed and measured regularly.*

3. *Mothers or caregivers should always be involved and made aware of their child's growth.*

1. Methods for assessing nutritional status.

The standard procedure for the anthropometric assessment of nutritional status involves:

- accurate anthropometric measurements;
- selection of reference values;
- interpretation of growth indices.

Accurate anthropometric measurements

Weight and height or length are the most informative measurements for assessing child growth.

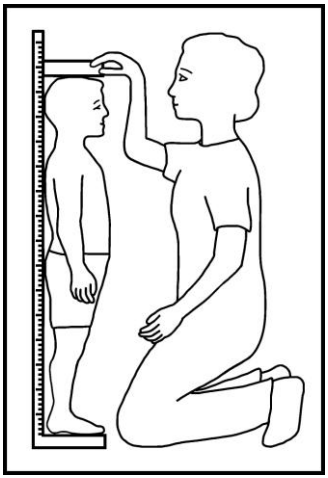
Anthropometric measurements have to be taken after removing shoes and outer clothing.

All equipment needs to be well maintained.

How to measure length or height

If a child is less than 2 years old (or they can't stand) the length (recumbent length) should be measured lying down. The baby has to be measured from the top of the head to the heel, with a flexible measuring tape. The use of a pencil, for marking the two points on the surface where the baby lies, should be of

some help in case of uncooperative or particularly nervous babies.



If a child is 2 years or older and able to stand, height can be measured with an anthropometer (figure).

If the anthropometer is not available, a height board could be used. This should be placed on a flat surface and mounted at a right angle between the floor and a vertical wall.

How to measure weight

If a child is less than 2 years old, or not stable, it is recommended to take the measurement together with the mother. It means that the mother should be weighed first and then she should be measured holding the child.

If a child is 2 years old or older and able to stand still, they can be weighed alone.

For more information about accurate weighing and measuring procedures, see "Training course and other tools" on the WHO website.

Selection of reference values

The assessment of nutritional status implies the comparison of anthropometric values in relation to a set of reference values. The most commonly used are the WHO international growth standards (http://www.who.int/childgrowth/en/), developed by the WHO Multicentre Growth Reference Study. These standards are based on a large sample of children from a diverse set of countries (Brazil, Ghana, India, Norway, Oman, USA), who

were fed and raised in environments that favoured optimal growth.

Hence, these charts show how healthy children should grow. In fact, the effect of ethnic differences is considered small compared with the effects of the environment.

There are specific growth charts for the two sexes, for different age–classes (0–2, 2–5, or 5–19 years), and for different nutritional indices. The most commonly used indices are:

- Length/height for age:
- Weight for age;
- Weight for length/height.

Interpretation of growth indices

The growth charts show the distribution of reference data, in terms of percentiles or z–scores (or standard deviation scores). In the following, we will describe the z–score option.

In each chart, the curved line labelled 0 represents the median, which is the central value. The other curves are z–score lines which are numbered positively (1, 2, 3) or

negatively (–1, –2, –3) and indicate the distance from the median value.

The anthropometric measurement values have to be plotted on the appropriate chart, based on the child's sex and age, and on the nutritional index considered.

When the dot is plotted between –1 and 1 Z–score lines, it means that the child has a normal growth.

A plotted point that is far from the median in either direction generally represents abnormal growth and nutritional risk, although other factors must be considered, such as the health condition of the child and the height of the parents. In such cases additional monitoring and assessment are recommended.

Length/height for age

To plot the dot on the chart, the child's age has to be found on the horizontal axis and the length or height value on the vertical axis. The dot has to be made where the two perpendicular lines starting from these points intersect each other.

Plotted points falling below –2 Z–scores indicate a condition of stunting, which represents a long–term inadequacy of health or nutrition.

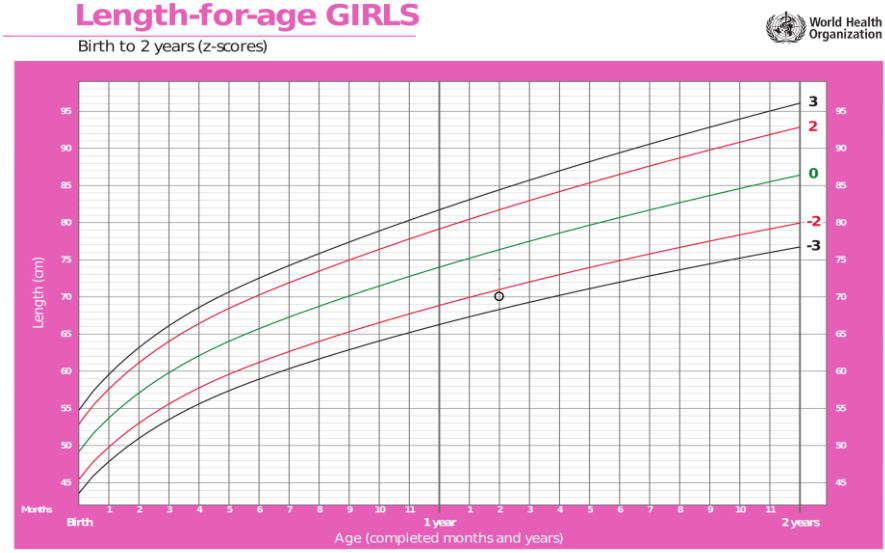
Plotted points below –3 Z–scores indicate severely stunted children, who urgently need medical attention.

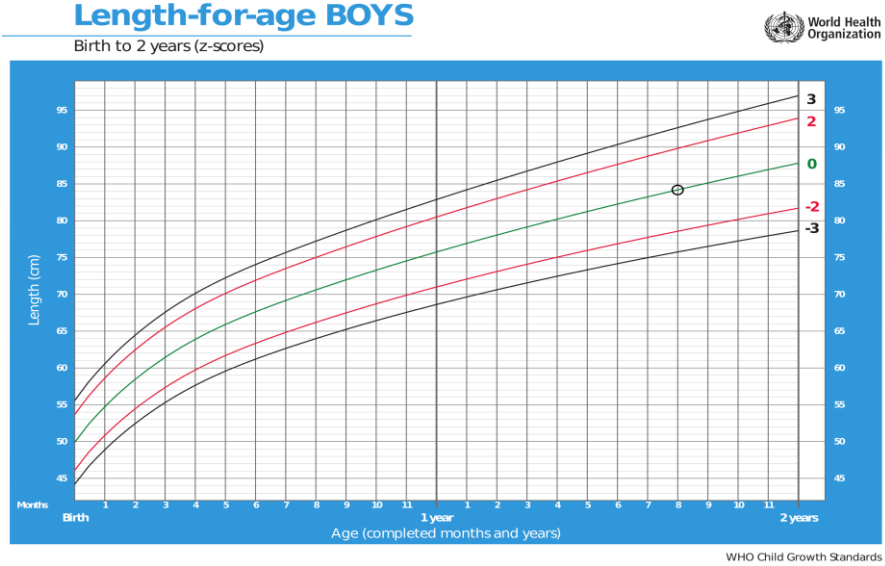
Values falling over 1 Z–score lines do not represent a health problem, except that tallness is excessive and may indicate endocrine disorders.

Practical examples:

– a 14 months girl is 70–cm–high: she is stunted since the dot falls below the –2 line;

– a 20 months, 84–cm–high boy presents a normal nutritional status.





Length –for–age charts, birth to 2 years, girls and boys

Reproduced with the permission of WHO

(http://www.who.int/childgrowth/standards/en/)

Weight–for–age

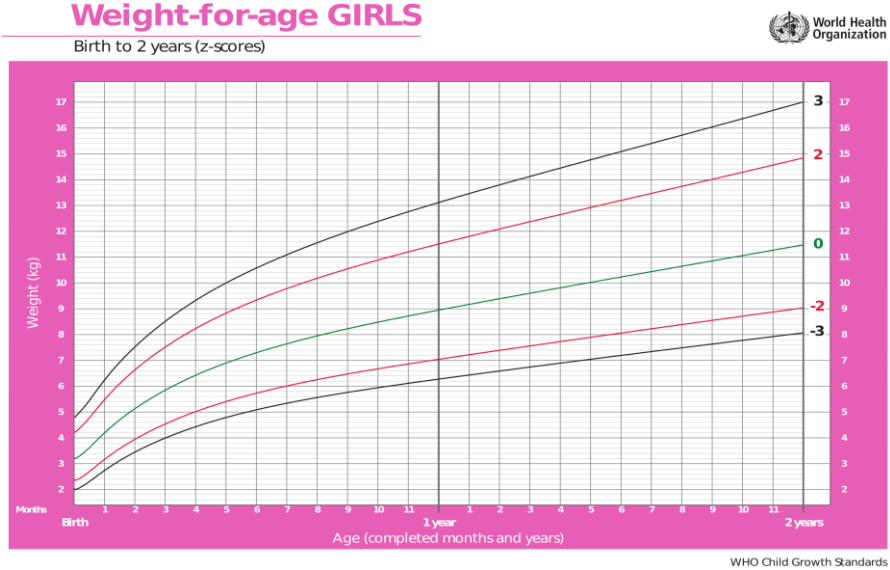
Weight–for–age is a composite index influenced by both the height and weight of the child. It can reflect both long–term and short–term nutritional problems.

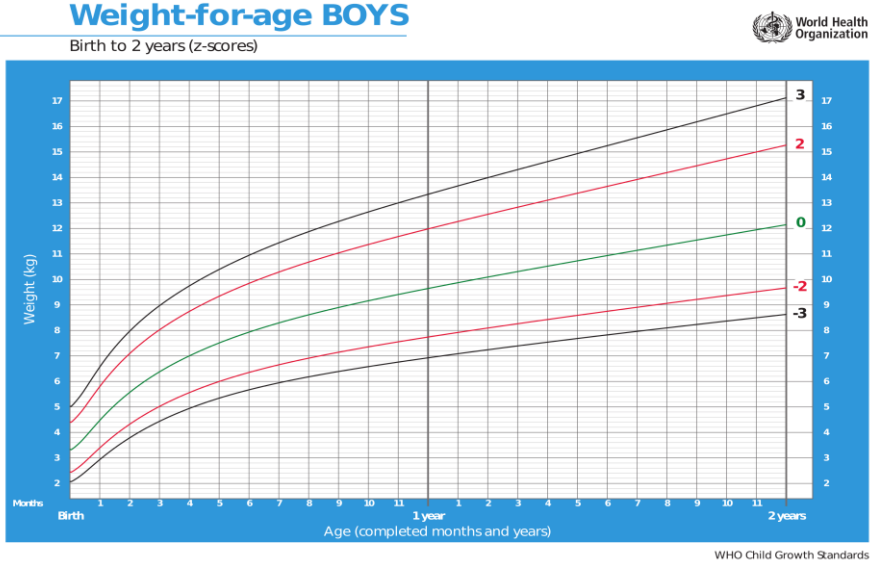
The dot's plot can be made with the same procedure as for length/height–for–age, but founding on the vertical axis the weight value.

Plotted points below –2 Z–scores indicate that the child is underweight.

Plotted points below –3 Z–scores indicate that the child is severely underweight, and urgently needs medical attention.

High values of weight–for–age may indicate a growth problem and a condition of overweight or obesity, but these are better assessed using weight–for–length/height.





Weight–for–age charts, birth to 2 years, girls and boys

Reproduced with the permission of WHO

(http://www.who.int/childgrowth/standards/en/)

Weight for length/height

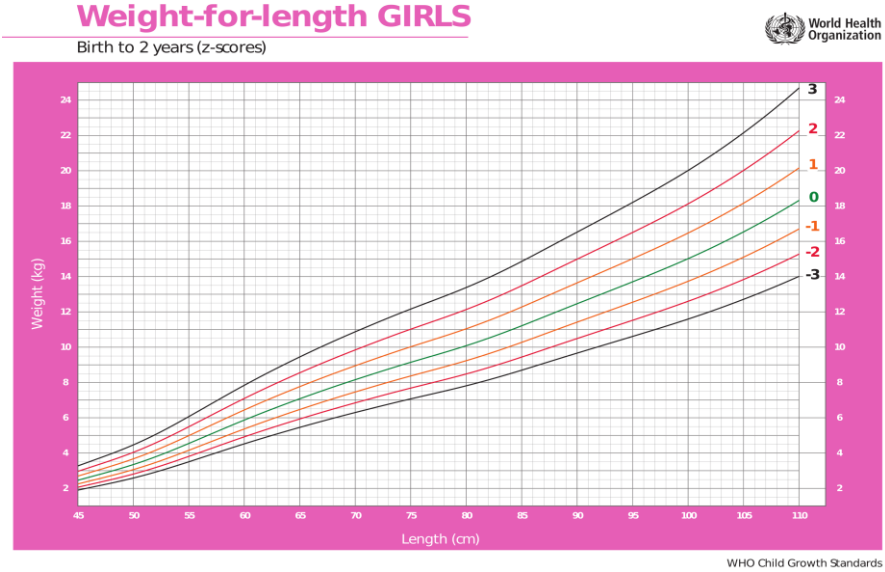
Weight–for–length/height has the advantage of requiring no knowledge of age. Similar information is given by the BMI–for–age index, where BMI is equal to weight in kilograms divided by height in meters squared.

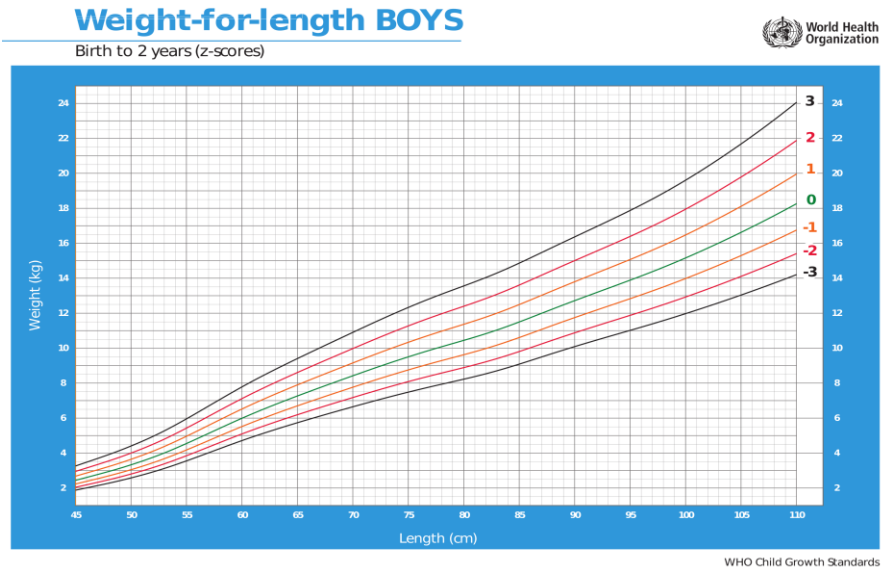
When plotting weight–for–length or weight–for–height, the weight has to be found on the vertical axis, and the length (up to 2 years) or height (2–5 years) on the horizontal axis.

Points below –2 Z–scores indicate the condition of wasting, which is related to weight loss due to recent episodes of starvation or disease, or to a chronic condition of dietary deficit.

Points below –3 Z–scores indicate situations of severe wasting, which urgently need medical attention.

Children more than two standard deviations (+2 Z–scores) above the median are considered overweight, and those more than 3 Z–scores are considered obese and need medical assistance.





Weight–for–height charts, birth to 2 years, girls and boys

Reproduced with the permission of WHO

(http://www.who.int/childgrowth/standards/en/)

Any time the child is measured it is necessary to pay attention and carefully observe any clinical sign of severe undernutrition. It is important to recognize signs of marasmus and kwashiorkor since they require urgent specialized care that may include special feeding regimens, careful monitoring, antibiotics, etc.

Marasmus: the child is severely wasted. The appearance is of "skin and bones" since he lacks fat and muscle tissues. Hair is generally thinning, face and facial expressions look like those of an old man. Folds of skin on the buttock are often visible.

Kwashiorkor: although the child is severely wasted, bones are not visible because of a generalised oedema (swelling from excess fluid in the tissues). Hair is thin and often discoloured; sores and peeling skin are observable.

Children with these symptoms, regardless of their weight, should be referred for urgent care.

To check for oedema, it is necessary to grasp the foot of the child so that it rests in the hand with the measurer's thumb on top of it. After pressing the thumb gently for a few seconds,

the child with oedema will present a pit (dent) in the foot when the thumb is removed.

Special attention and further investigations have to be considered if a child presents oedema, especially if on both feet.

The correct method to check for oedema

Severe acute malnutrition

A Joint Statement by the WHO and the UNICEF (2009) for the identification of severe acute malnutrition in children aged 6–60 months recommended the adoption of the following diagnostic criteria and cut–offs:

- weight–for–height of below –3 standard deviations of the WHO standards;
- mid–upper arm circumference less than 115 mm;

- bilateral oedema.

These children have an increased risk of dying and require the implementation of intensive nutritional and medical support.

2. Children should be weighed and measured regularly.

Periodic measurements of a baby, especially from birth to age 2, are essential for assessing his proper growth.

All the measurements done during the visits should be recorded, so to plot the growth trend and to identify any major shifts in the pattern.

Each child should have a personal booklet or card where all measurements are recorded. A model of child's growth booklet is given in the Appendix.

The booklet should include a section with "Personal data". The date of the child's birth is particularly important because a correct and complete evaluation of the nutritional status can be done only when the exact age is known.

Another section of the booklet should include the growth charts for the most common growth indices (length/height–

for–age, weight–for–age, weight–for–length/height), for the different child's age's classes (0–2, 2–5, or 5–19 years).

3. Mothers or caregivers should be always involved and made aware of their child's growth.

All mothers or caregivers should carefully preserve the official booklet.

If a child is growing well, the mother should be complimented for her work and attention. Depending on the child's age, it is very important to check, together with the family, the nutritional plan to be adopted for the next period, so that the child's growth may continue properly.

If there are problems, it is extremely important to firmly involve the family, explaining, in a simple but exhaustive way, the situation and the possible consequences.

When the values of growth indices underline a slight malnutrition (either under– or over–) particular attention should be paid to the communications with the family. In these cases, in fact, the reasons for the incipient malnutrition should be investigated and operative solutions (both qualitative and quantitative) regarding food intake habits should be proposed.

A regular check, both for the mother and baby, by skilled health professional in the 24 hours after birth is necessary in order to reduce any sudden problems.

Babies born early or with low birthweight, or babies with other special needs require special care, love and attention to ensure their survival and optimal growth and development. They may need extra care at a special care unit of a hospital until they are sufficiently developed or well enough to go home with the parents. A skilled birth professional can play a critical role in instructing the mother and father on how to take care for their baby.

THE "RIGHT" START TO A HEALTHY LIFE

"...too many people, especially the poor, are never counted; they are born, and live and die uncounted and ignored. It is a fundamental principle of human rights that every life counts, that every individual matters." (AbouZahr et al., Lancet, 2007)

KEY MESSAGES

1. Every child has the right to have a name and nationality.

2. Birth registrations should be free and accessible to everyone.

3. Birth registrations should be supported by the national governments and social services.

4. It is possible to accurately assess the nutritional status of a child only when their exact date of birth is known.

1. Every child has the right to have a name and nationality.

Name and nationality are every child's rights enshrined by the UN Convention of the Child's rights. Birth registration provides an official record of a child's existence and nationality and allows his recognition before the law.

However, it has been estimated that more than 230 million of children under 5 years of age don't have their births registered.

The unregistered children have more difficult access to health services, school, social assistance and, later in time, to a formal job, a passport, etc..

Children under 5 years of age with a birth certificate are more likely to be immunized and receive health care, assuring them a healthy start in life.

Registering a child's birth is a vital step towards their protection.

2. Birth registrations should be free and accessible to everyone.

In some countries parents have to pay a fee if they register their children one month after their births. Because of this, most families are discouraged to do it.

For this reason, birth registration should be free of charge whether for regular or late registrations.

3. Birth registrations should be supported by the national governments and social services.

In those countries where vital registration systems don't completely reach their aims, an improvement of organization, from both a qualitative and quantitative point of view, might represent a worthy strategy.

The birth registration process may be supported by social services, such as health care and education. In fact, some health centers and hospitals can have civil registrars on site that can provide a child's birth certificate at birth or during a health–care visit.

Registration can take place in early childhood education programs.

The use of technology, mobile phones with internet connections for data collection, or computerized systems to store and use data, seem to have lead to a good improvement in several countries.

All these strategies represent important actions for improving data collections especially in remote areas.

What is really important is that any activity should be focused on the main purpose to ensure that the birth registration system, as well as the vital statistic system in general, may be permanent, continuous and available: this is the only way for making people aware of its importance so that they can start to consider the registration of any child's birth as a simple and normal process.

1. It is possible to accurately assess the nutritional status of a child only when their exact date of birth is known.

In this booklet we have firmly underlined the importance of monitoring the nutritional status of a baby since his birth, so

to evaluate if they growth properly and to take prompt actions if they don't.

We have already reported that the exact knowledge of the child's age, in terms of months, is necessary for an accurate and complete assessment of the nutritional status.

For these reasons, wherever a child's birth is not registered and the parents or caregivers don't know the exact date of the birth, this child will have not the possibility to have his growth monitored and checked.

An interesting and operative effort to facilitate the collection of accurate information on child age has been attempted by FAO (2008), that suggested the use of local calendar events for everybody working with children. Indeed, the local calendars provide dates of significant events for a specific geographic area that can assist operators in estimating child's month and year of birth.

ACKNOWLEDGMENTS

We thank WHO and UNICEF for their constant, basic and tireless work for improving children's health.

In particular, we thank WHO for the permission to reproduce:

–the growth charts developed by the Multicenter Growth reference Study (http://www.who.int/childgrowth/standards/en/, accessed 04 June 2014)

– the figures on global estimates of child malnutrition from the report: Joint Child Malnutrition Estimates. UNICEF– WHO– World Bank (UNICEF, New York; WHO, Geneva; The World Bank, Washington, DC; 2012. Updated on September 2013:http://www.who.int/nutgrowthdb/jme_2012_summary_note_v2.pdf?ua=1).

We thank "Fondazione Banco di Sardegna" for funding this project and Bhalobasa Onlus for giving us the opportunity

to give substance and applicability to our research on child malnutrition.

We thank Valeria Succa and Sandro Piludu for the skillful help in the layout of the booklet, and Dominick Tompkins for the language revision.

MAIN REFERENCES

The majority of information contained in this booklet (chapters on breastfeeding, nutrition during growth, hygienic rules and healthy mothers) was taken and summarized from the publication:

United Nations Children's Fund (UNICEF), World Health Organization (WHO), United Nations Educational, Scientific and Cultural Organization (UNESCO), United Nations Population Fund (UNFPA), United Nations Development Programme (UNDP), Joint United Nations Programme on HIV/AIDS (UNAIDS), World Food Programme (WFP), the World Bank, 2010. Facts for life. New York: UNICEF. Available at: http://www.factsforlifeglobal.org [accessed 13 June 2014].

The discussion on tooth hygiene was derived from:

Werner D, Thuman C, Maxwell J, 2012. Where there is no doctor. Berkeley: Hesperian Health Guides.

Chapters on malnutrition and nutritional assessment were

written considering:

World Health Organization, 1995. Physical Status: The Use and Interpretation of Anthropometry. Report of a WHO Expert Committee. WHO Technical Report Series no. 854. Geneva: WHO. Available at: http://www.who.int/childgrowth/publications/physical_status/en/[accessed 13 June 2014].

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the "WHO counts" series published by Lancet in 2007, in particular:

AbouZahr C, Cleland J, Coullare F, Macfarlane SB, Notzon FC, Setel P, Szreter S; Monitoring of Vital Events (MoVE) writing group, 2007. The way forward. Lancet, 370 (9601):1791–9.

and the FAO publication:

UN Food and Agriculture Organization, 2008. Guidelines for Estimating the Month and Year of Birth of Young Children. Available at: http://www.refworld.org/docid/49b52b802.html [accessed 13 June 2014].

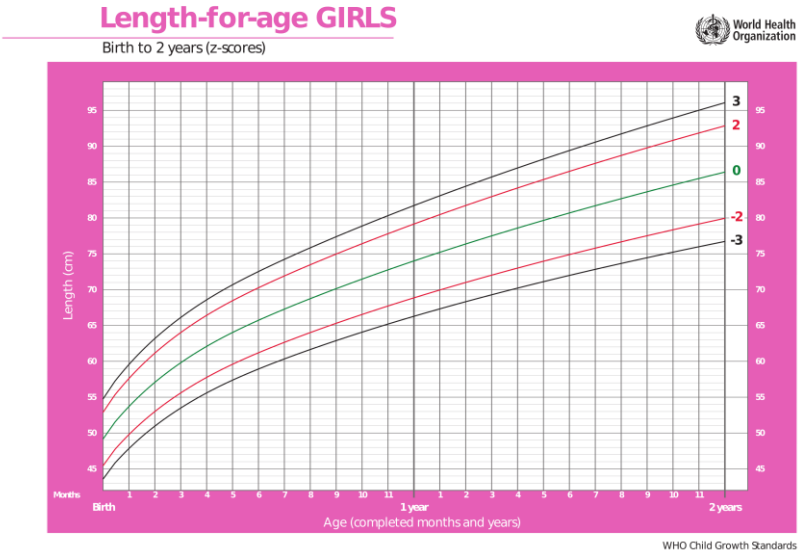
Drawings were created by Riccardo Faa.

APPENDIX

MY GROWTH BOOKLET (0-2 y)♀

NAME: ..... SURNAME: .....

DATE AND PLACE OF BIRTH: .....



VACCINATIONS: .....

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HEALTH PROBLEMS: .....

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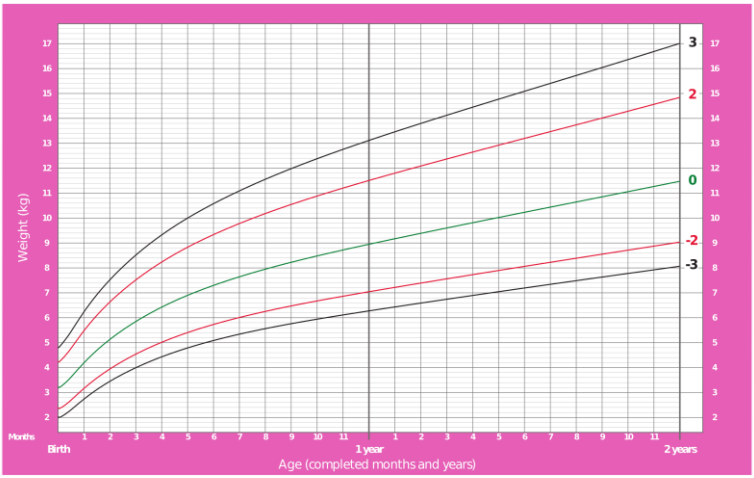
Weight-for-age GIRLS

Birth to 2 years (z-scores)

World Health Organization

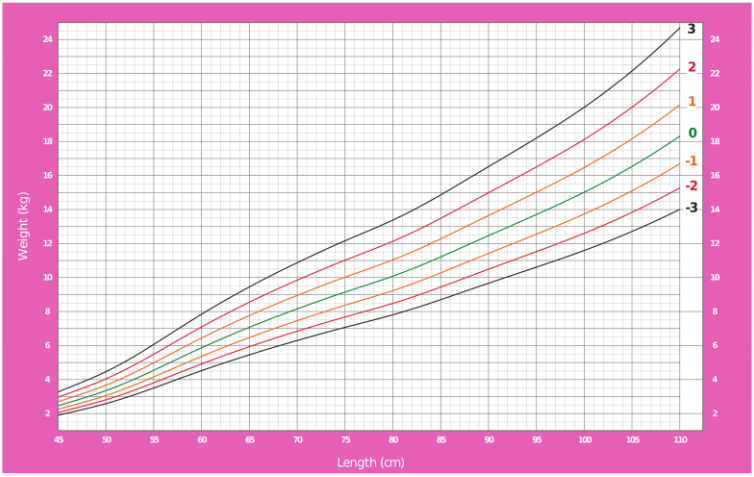


WHO Child Growth Standards

Weight-for-length GIRLS

Birth to 2 years (z-scores)

World Health Organization

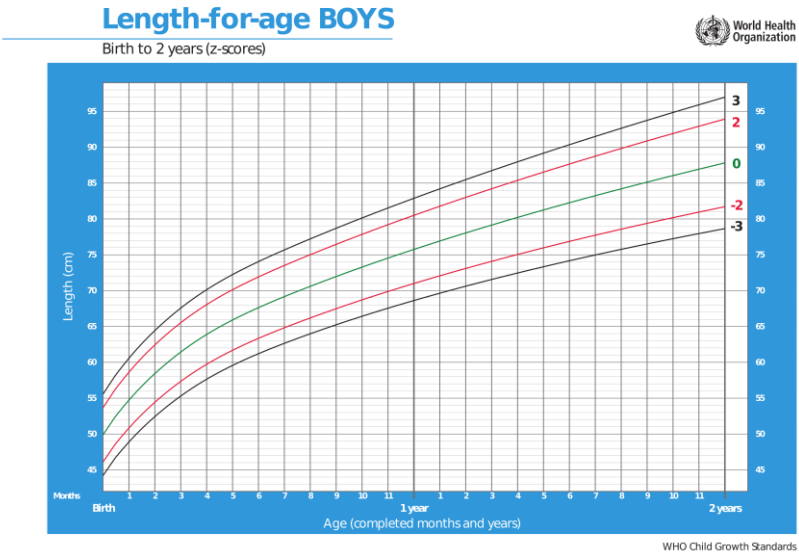


WHO Child Growth Standards

MY GROWTH BOOKLET (0-2 y)♂

NAME: ..... SURNAME: .....

DATE AND PLACE OF BIRTH: .....



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HEALTH PROBLEMS: .....

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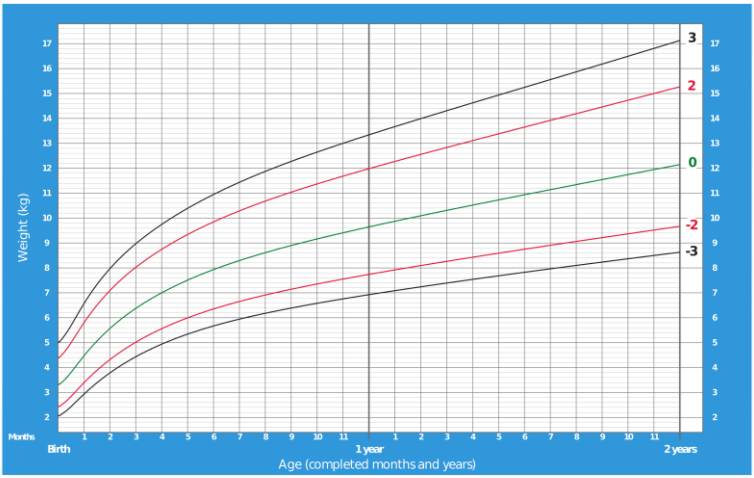
Weight-for-age BOYS

Birth to 2 years (z-scores)

World Health Organization

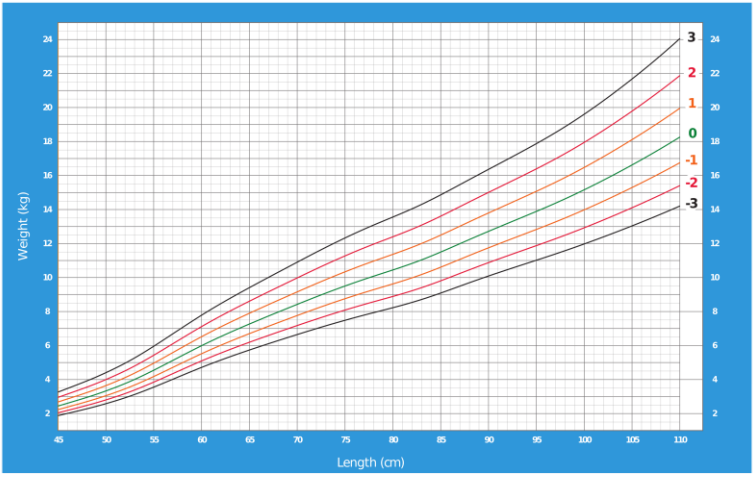


WHO Child Growth Standards

Weight-for-length BOYS

Birth to 2 years (z-scores)

World Health Organization



WHO Child Growth Standards

MY GROWTH BOOKLET (2-5 y)♀

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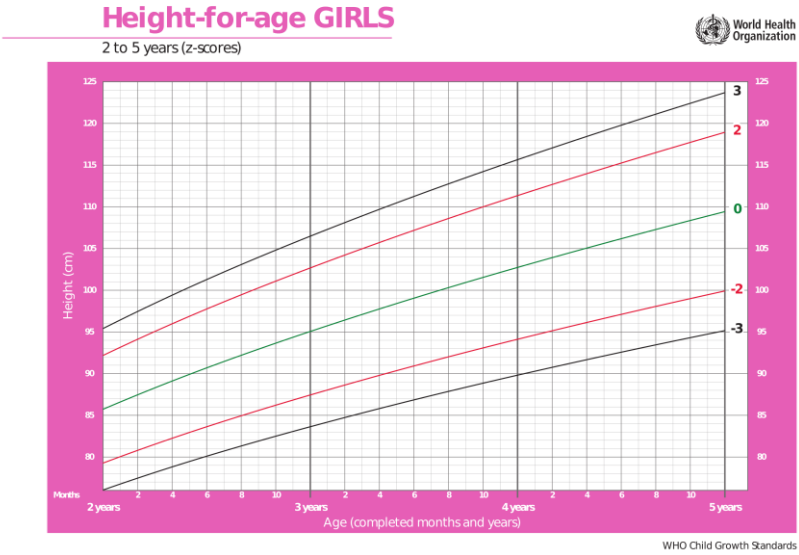
DATE AND PLACE OF BIRTH: .....



VACCINATIONS: .....

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HEALTH PROBLEMS: .....

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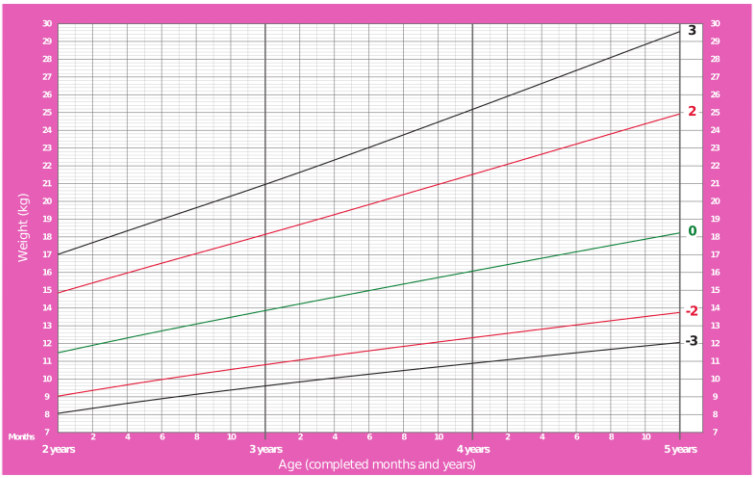
Weight-for-age GIRLS

2 to 5 years (z-scores)

World Health Organization

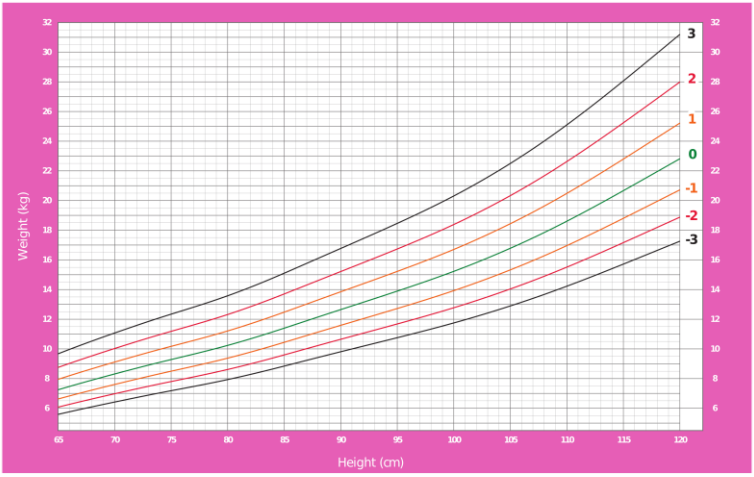


WHO Child Growth Standards

Weight-for-Height GIRLS

2 to 5 years (z-scores)

World Health Organization



WHO Child Growth Standards

MY GROWTH BOOKLET (2-5 y) ♂

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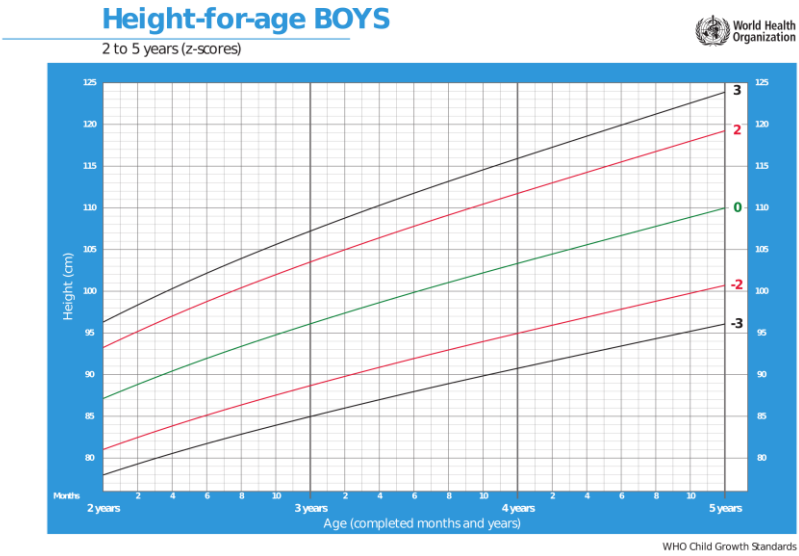
DATE AND PLACE OF BIRTH: .....



VACCINATIONS: .....

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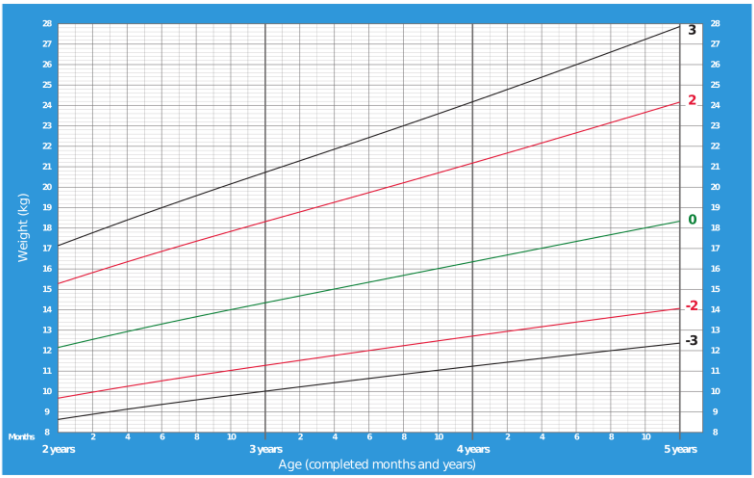
Weight-for-age BOYS

2 to 5 years (z-scores)

World Health Organization

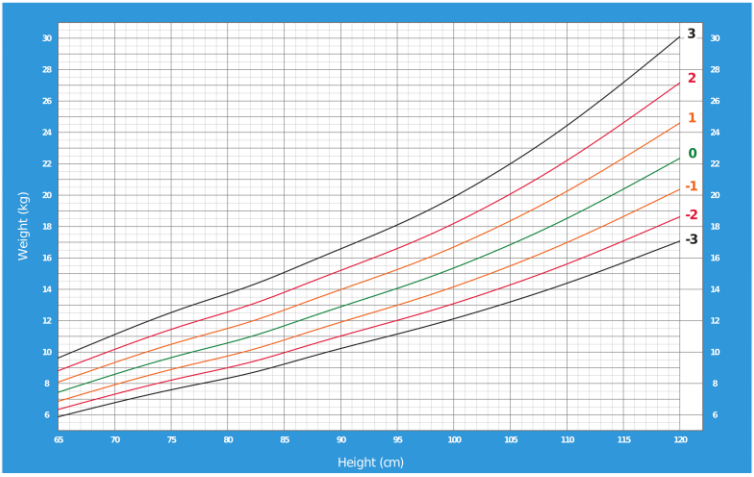


WHO Child Growth Standards

Weight-for-height BOYS

2 to 5 years (z-scores)

World Health Organization

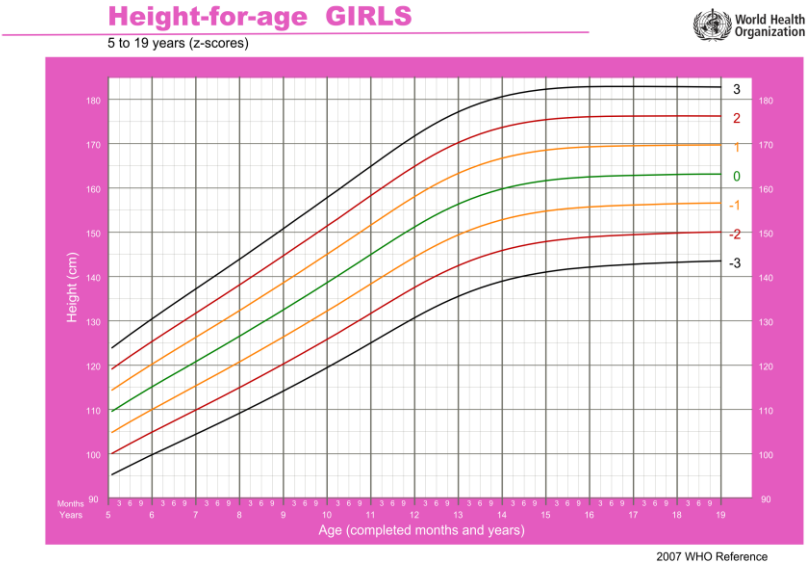


WHO Child Growth Standards

MY GROWTH BOOKLET (5-19 y) ♀

NAME: ..... SURNAME: .....

DATE AND PLACE OF BIRTH: .....



VACCINATIONS: .....

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HEALTH PROBLEMS: .....

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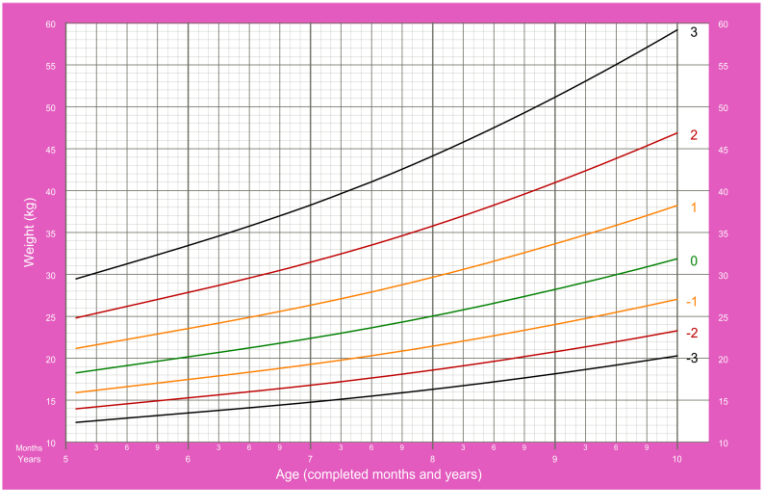
Weight-for-age GIRLS

5 to 10 years (z-scores)

World Health Organization

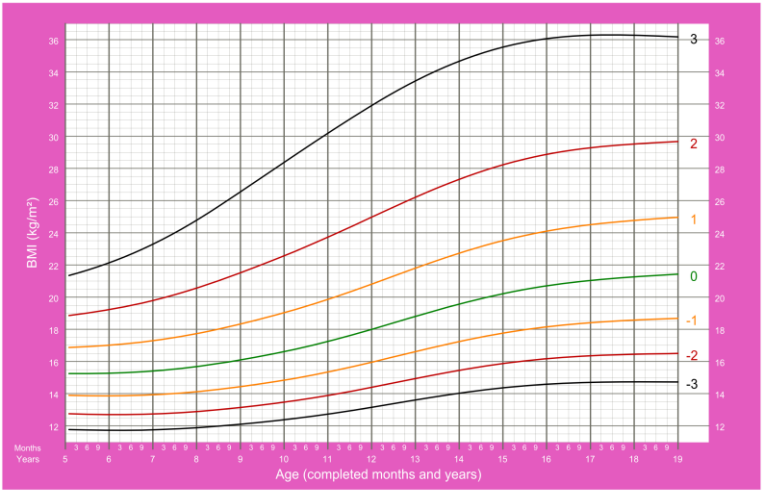


2007 WHO Reference

BMI-for-age GIRLS

5 to 19 years (z-scores)

World Health Organization



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MY GROWTH BOOKLET (5-19 y) ♂

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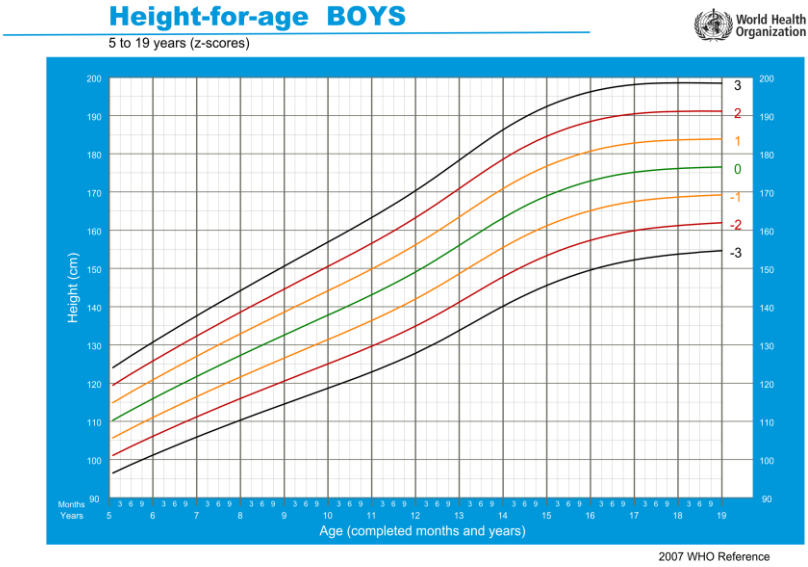
DATE AND PLACE OF BIRTH: .....



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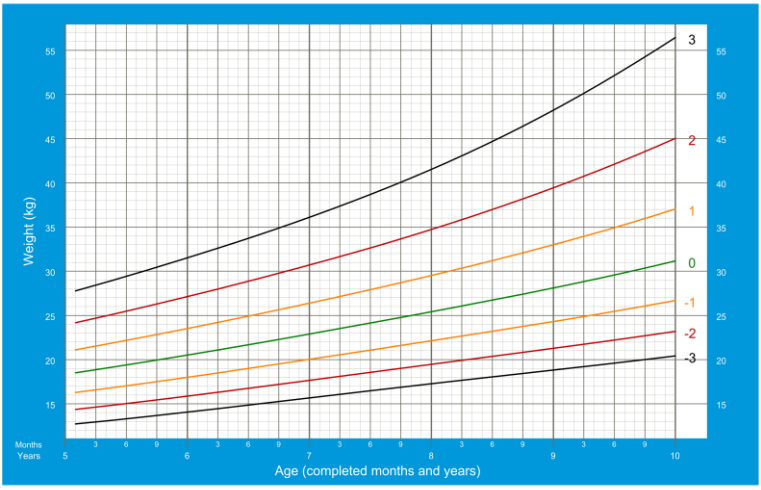
Weight-for-age BOYS

5 to 10 years (z-scores)

World Health Organization



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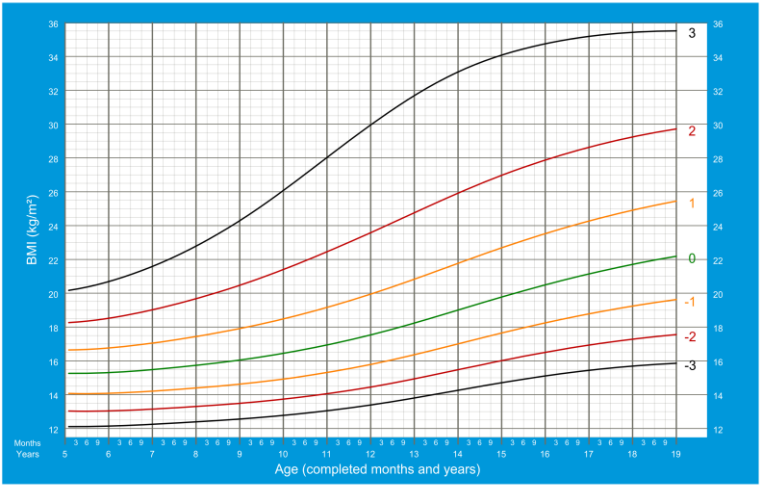

2007 WHO Reference

Notes

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