

The expert group would like to express their gratitude to Dr. Francesco Branca, Regional Adviser for Nutrition at WHO Regional Office for Europe for the consultations and assistance during the preparation of this edition. We also would like to thank to Assoc. Prof. Dr. Nikola Vassilevski and all colleagues from the Ministry of Health and other Ministries and Institutions, Medical Universities in Sofia, Varna, Plovdiv, the University for Food Technologies, Plovdiv, Regional Inspectorates for Control and Public Health Protection, representatives of Associations and Unions of food producers involved in the consultative meetings for the valuable suggestions contributing to the development of the Guidelines.

Our special gratitude is for Prof. Dr. Liubomir Ivanov, DSc, Director of NCPHP for the support and conditions provided for the realization of this project.

Food Based Dietary Guidelines for the Bulgarian population were elaborated by a team of experts from the National Center of Public Health Protection (NCPHP):

Assoc. Prof. Stefka Petrova, MD, PhD

Assoc. Prof. Konstanza Angelova, PhD

Assoc. Prof. Donka Bajkova, MD, PhD

Assoc. Prof. Veselka Duleva, MD, PhD

Assoc. Prof. Blagoy Jordanov, MD, PhD

Assist. Prof. Krassimira Vatrlova, MD, PhD

Assist. Prof. Dora Ovcharova

Edited by Assoc. Prof. Stefka Petrova, MD, PhD,

Assoc. Prof. Konstanza Angelova, PhD

Design and prepress - Boryana Mekushina;

**Artcom**

Cover design - Rumen Kotsev

ISBN 9526

## CONTENTS

Bulgarian population needs positive changes of dietary pattern. . . . .	3
1. Eat a nutritious diet with variety of foods. Do eat regularly, take enough time and enjoy your food in friendly environment. . . . .	6
2. Consume cereals as an important source of energy. Prefer wholegrain bread and other wholegrain products. . . . .	9
3. Eat a variety of vegetables and fruits more than 400 grams every day, preferably raw. . . . .	11
4. Prefer milk and dairy products with low fat and salt content. . . . .	14
5. Choose lean meat, replace meat and meat products often with fish, poultry or pulses. . . . .	17
6. Limit total fat intake, especially animal fat. Replace animal fats with vegetable oils when cooking. . . . .	20
7. Limit the consumption of sugar, sweets and confectionery, avoid sugar-containing soft drinks. . . . .	23
8. Reduce intake of salt and salty foods. . . . .	25
9. If you drink alcoholic beverages, you should consume moderate quantities. . . . .	28
10. Maintain a healthy body weight and be physically active every day. . . . .	30
11. Drink plenty of water every day. . . . .	34
12. Prepare and store the food in a way to ensure its quality and safety. . . . .	36
Pictorial presentation of Food Based Dietary Guidelines for Bulgarian population . . . . .	39
References . . . . .	40

## *Bulgarian population needs positive changes of dietary pattern*



Food is necessary not only for the development, growth and maintenance of body functions but it also plays a key role for life quality. Both undernutrition and overconsumption, as well as unbalanced diet have negative effects on health and work capacity.

Unhealthy nutrition is an important risk factor for cardiovascular disease and a number of cancers that are the major death cause for the Bulgarian population. During the last decades 62-65% of all deaths in our country are due to cardiovascular disease (coronary heart disease, hypertension, stroke) and Bulgaria is one of the leaders in the world by mortality rate of stroke. Cancers are the second major mortality cause (13-15%). The overconsumption of high energy foods and low physical activity contribute substantially to the high prevalence of obesity - risk factor for diabetes type 2, high blood pressure, cardiovascular disease etc. The National Nutrition Survey (2004) revealed that among adult population (19 - 60 years) 41% of men and 34% of women are overweight and 22% of men and 17% of women are obese. Unhealthy nutrition is also related to higher risk for osteoporosis which prevalence in Bulgaria is increasing.

On the other side, undernutrition causes nutritional deficiencies that provoke immunity disorders and elevated risk for infectious diseases.

The studies on nutrition of the Bulgarian population in the last 15 years revealed negative characteristics and trends that can be associated with population health:

- High consumption of total fat, both of animal and vegetable origin;
- High consumption of fat meats and meat products;
- Low consumption of fish;
- Consumption mainly of high-fat milk, significantly decreased intake of yogurt - traditional healthy food for the Bulgarian population;
- Low intake of raw fruits and vegetables in winter and spring;
- Low consumption of wholegrain bread and other wholegrain products;
- Tendency to increased consumption of sugar, sugar and confectionery products, sugar-containing soft drinks;
- High salt intake (2-3 times over the recommended amounts);
- High alcohol intake among some population groups;
- Low intake of a number of vitamins (folate, thiamine, riboflavin, vitamin C) and minerals (iron, zinc, calcium, magnesium).

Food safety is very important for the health as well. Each year many Bulgarians suffer from foodborne diseases associated with microbiological contamination of foods due to not following the hygienic rules for their preparation and storage.

Positive changes in the diet; weight reduction and increasing of the physical activity could improve the health in every stage of life. You could contribute significantly to your health following the next:

## 12 guidelines for healthy nutrition

1. Eat a nutritious diet with variety of foods. Do eat regularly, take enough time and enjoy your food in friendly environment.
2. Consume cereals as an important source of energy. Prefer wholegrain bread and other wholegrain products.
3. Eat a variety of vegetables and fruits more than 400 grams every day, preferably raw.
4. Prefer milk and dairy products with low fat and salt content.
5. Choose lean meat, replace meat and meat products often with fish, poultry or pulses.
6. Limit total fat intake, especially animal fat. Replace animal fats with vegetable oils when cooking.
7. Limit the consumption of sugar, sweets and confectionery, avoid sugar-containing soft drinks.
8. Reduce intake of salt and salty foods.
9. If you drink alcoholic beverages, you should consume moderate quantities.
10. Maintain a healthy body weight and be physically active every day.
11. Drink plenty of water every day.
12. Prepare and store the food in a way to ensure its quality and safety.

**In order  
to establish a healthy  
diet, it is  
important that each  
recommendation be considered,  
not only single one**



*1. Eat a nutritious diet with variety of foods. Do eat regularly, take enough time and enjoy your food in friendly environment.*

To be healthy, your diet should be nutritious and well balanced that means the food should provide all nutrients that you need in adequate amounts. The appropriate way to assure nutritious diet is the variety of foods. It is necessary because no single food or food group can supply all nutrients in amounts meeting the requirements of the body.

The foods are included into **6 major food groups** depending on the nutrients they are the main source of:

- Cereals and potatoes
- Vegetables and fruits
- Milk and dairy products
- Meat, fish, eggs, pulses and nuts
- Added fats (butter, lard, sunflower oil, corn oil, olive oil, margarine etc.)
- Sugar and confectionery, pastry

The first group includes foods rich in starch - **cereals** (bread, bakery, rice, pasta, corn, wheat, oats etc.) and **potatoes**. Starch is the main energy source for the organism. Cereals provide also significant amounts of plant proteins and wholegrain foods contribute substantial amount of vitamins of B group, minerals and dietary fiber as well.

**Fruits and vegetables** are another basic food group, rich in vitamins, minerals and dietary fiber, bioactive substances with beneficial health effect; they practically do not contain fats and have comparatively minor energy contribution.

**Milk and dairy products** (yogurt, white cheese, yellow cheese, curds, etc.) are the food group rich in highly available calcium. They also contain proteins of high biological value, vitamin B2, B6 and other vitamins of B group, vitamin A. The foods from this group are rich in fats with the exception of those with specially reduced fat content; brined cheese contains also high amounts of salt.

The fourth group comprises foods rich in protein - **meat and meat products, poultry, fish, eggs, pulses and nuts**. Animal protein is of good quality. The foods of this group are sources of iron with high bioavailability, other minerals, vitamins of B group. They almost do not contain vitamin C. Fatty meats and meat products are sources of fat with unhealthy effect. Fish and nuts however provide valuable oils with beneficial health effects. In difference with the other foods of the group pulses are low in fat. Eggs are a source of good quality protein but the yolk is high in cholesterol.

**It is recommendable to include in your daily menu representatives of all those four food groups.**

There are two more food groups, part of our diet but their intake should be restricted. The group of **added fat** includes vegetable oils and animal fats that are used at preparation of dishes, bakery and confectionery products, salads etc. Vegetable oils include the sunflower oil that is traditional for Bulgarian cuisine, as well as corn oil, olive oil etc. Milk butter and lard are most frequently used as added animal fats. Margarines are produced usually from vegetable oils hardened at special technological processes.

The sixth group includes **sugar and products containing great amounts of sugar** such as confectionery, sweets, chocolates, cakes, biscuits etc., **soft sugar-containing drinks**. These foods have great energy value without supplying vitamins and minerals necessary for the body. Sweets also contribute large amounts of added fats.

## Recommendations for healthy dietary menu planning

- Plan your menu for at least several days - this gives a better possibility to provide food variety.
- Each daily menu should include cereals or potatoes. Prefer wholegrain foods - wholegrain bread, brown rice, spaghetti of wholegrain flour, oatmeal etc.
- Each meal should include vegetables and/ or fruits - mainly fresh fruits and raw vegetables, as components of vegetable and vegetable-meat dishes, components of bakery refreshments, sandwiches etc.
- Your daily menu should include milk and dairy products with low or reduced fat and low salt content, consume yogurt more frequently.
- Each daily menu should contain representatives of the group of protein foods. Eat lean meats, limit meat dishes, substitute them frequently with pulses, have fish at least once - twice per week.
- Limit the quantity of added fats when preparing dishes, prefer vegetable oils to animal fats, avoid fried foods.
- Avoid and limit the quantity of sugar, candy and confectionery in the menu - replace them with fresh fruits.

**Dietary intake should be regular, 3 to 5 times daily.** Regular meals prevent the overconsumption and contributes to better food digestion. **The breakfast** is an important dietary intake, which should not be skipped as it improves mental and physical work capacity in the morning. Have dinner not later than 2-3 hours before bed time.

**Eating in enjoyable surroundings** without to hurry contributes to better perception of taste and flavor of foods. We can have a quick bite of a sandwich in the 5 minutes stolen from our working hours but eating could give us pleasant social contacts with the family or friends.





*2. Consume cereals as an important source of energy. Prefer wholegrain bread and other wholegrain products.*

**Cereals** (wheat, rice, corn, rye, barley, oats) and grain products are the main plant foods that contribute the greatest portion of food energy. A specific characteristic of cereals is that they are rich in starch (60 - 80%). They also contain protein (7-11%) but they are poor in fats. **Potatoes** are included in this group, because they are also rich in starch. Unlike grain foods they contain negligible amounts of protein but are a source of vitamin C.

The high consumption of **bread** is a national characteristic of Bulgarian diet. Currently white bread is still preferred. Other grain foods consumed in larger amounts are rice, bakery and pasta. Potatoes are also part of our national cuisine.

**Wholegrain foods** (wholegrain wheat and rye bread, wheat, corn, pasta of wholegrain flour, brown rice, oatmeal etc.) are rich in fiber, vitamins of B group and many minerals. Fiber found in the bran stimulates the function of the gastrointestinal tract and reduces the risk for constipation, hemorrhoids and some cancers. The soluble fiber in oatmeal binds food cholesterol and contributes to reducing the cardiovascular risk. Fiber intake promotes the feeling of satiety, suppresses the feeling of hunger thus decreasing the risk of weight gain.

**The popular opinion that bread and potatoes have to be avoided as their consumption causes overweight and obesity is wrong.**

The energy value of cereals and potatoes is relatively low if they do not contain added fats. Carbohydrates, their main component, contribute only 4 kcal/g compared to fats (9 kcal/g). For example 100 g boiled potatoes provide 72 kcal and 100 g French fries account for 280 kcal. The starch in pasta is with modified structure and is assimilated to a lower extent than that in bread and bakery products, thus pasta are adequate for consumption in case of overweight and obesity.

### **Recommendations for healthy choice of cereals and potatoes:**

- Consume daily bread, other cereals and/or potatoes - 300 - 500 g/day (the amount depends on sex and physical activity).
- Substitute at least half of the white bread for wholegrain bread.
- Include in your menu more pasta made of wholegrain flour.
- Brown rice is an appropriate choice for healthy nutrition.
- Prefer boiled or baked potatoes, avoid consuming fried potatoes and chips.
- Inform yourselves for the composition of grain foods shown on the label. Choose wholegrain products and those which label notifies that they are enriched with fiber.
- Limit the consumption of bakery products rich in fats.



*3. Eat of a variety of vegetables and fruits more than 400 grams every day, preferably raw.*

Vegetables and fruits are valuable component of the healthy diet. They provide great number of **vitamins and minerals** and are the main dietary sources of **vitamin C**. Their energy value is low as they have high water content; they are rich in dietary fiber and contain negligible amounts of fat and protein. Fruits and vegetables are sources of highly bioavailable sugars, organic acids and of a great number of bioactive substances - carotenoids, flavonoids, phytosterols etc.

This group includes fresh vegetables and fruits, and fresh juices, processed vegetables and fruits - frozen, dried and canned (sterilized vegetables, pickles, nectars, compotes, marmalades, jams, etc.).

The adequate daily intake of vegetables and fruits **substantially reduces the risk for development of cancer, hypertension, stroke, coronary heart disease, diabetes type 2, constipation.**

The protective effect of high consumption of vegetables and fruits is associated with the effect of the various nutrients and bioactive substances they contain as:

**Antioxidants**, reducing the risk of cancer and cardiovascular diseases - vitamin C, carotenoids, bioflavonoids;

**Potassium and magnesium**, minerals contributing to decrease blood pressure (low sodium content in fruits and vegetables supports their beneficial effect);

**Fiber** (cellulose, hemicellulose, pectin, lignin) reduces the risk of a number of cancers; soluble pectin supports the reduction of blood cholesterol. The high content of fiber in vegetables and fruits and their low energy value contribute to reducing the risk of obesity and diabetes. Fiber also regulates the intestinal motility and reduces constipation.

Leafy vegetables (spinach, nettles, rhubarb, cabbage, lettuce), green beans and green peas that are important folate source contribute to the adequate intake of this essential vitamin which has an important role to **reduce the risk for neural tube defects during pregnancy** and also to lower the risk of cardiovascular diseases.

A number of vegetables are rich in **iron** (spinach, nettles, rhubarb, green peas, green beans, spring onion) but only a small amount of it is absorbed. Combining them with vegetables and fruits rich in vitamin C, though, helps the better absorption of iron from plant foods.

Yellow-orange vegetables and fruits and dark green vegetables contain carotenoids, e.g. beta-carotene (pro- vitamin A) and other bioactive carotenoids - lutein, zeaxanthin that have favourable effect on vision and reduce the risk for macular degeneration of the retina and senile eye cataract.

**It is recommended to consume more than 400 grams daily variable vegetables and fruits** as the different representatives of this food group contain various amounts of nutrients and bioactive substances. For example yellow-orange and dark green vegetables and fruits (carrots, pumpkins, red pepper, tomato paste, tomatoes, apricots, melons, spinach, nettles etc.) are rich in carotenoids while black currants, citrus fruits (oranges, lemons etc.), strawberries, kiwi, and peppers are high in vitamin C.

Vitamin C and folate in vegetables and fruits are destroyed to a significant extent at high temperature and by the oxygen in the air, thus it is recommended to consume mainly fresh fruits and vegetables raw and in salads.

## **Recommendations for healthy choice of sufficient and various vegetables and fruits with maximally preserved composition beneficial for health:**

- Consume vegetables and fruits at each meal.
- Choose vegetables of different groups - yellow-orange (tomatoes, peppers, carrots, pumpkin etc.), green leafy vegetables (spinach, lettuce, spring onions, parsley), green beans, green peas etc.
- Consume fresh vegetables (salads) and vegetable dishes; include vegetables in sandwiches, as vegetable fillings in bakeries etc.
- Replace pickles with frozen or unsalted canned vegetables.
- Consume variety of fruits - apples and pears, citrus fruits (oranges, grapefruits, lemons etc.), berries (strawberries, raspberries, blackberries, blueberries, black currants etc.), melons, watermelons, apricots, peaches, plums etc.
- Choose fresh fruits for dessert and snacks, include them in milk and other desserts;
- Limit the consumption of fruits preserved with sugar; if you prepare homemade fruit preserves, use less sugar.
- Choose fresh seasonal fruits and vegetables.
- Apply shorter, saving culinary technologies that preserve the useful substances (stewing, boiling, baking) adding minimal amounts of fats and oils, salt and sugar.



#### *4. Prefer milk and dairy products with low fat and salt content.*

Milk and dairy products are valuable foods for all age groups. They are the best **source** of highly bioavailable calcium. Milk and dairy products contain proteins of good quality and other essential nutrients such as vitamin A, vitamin D, all B-group vitamins, especially vitamin B2. Milk and dairy products are also sources of fats, and milk provides milk sugar (lactose).

**This food group includes** milk and yogurt, different types of white and yellow cheese, curds, cream and milk-based products such as ice cream.

Milk and dairy products have different composition. While milk and yogurt contain 3-5% protein, cheeses are rich in proteins (17-26%) and also in fats (20-47%). The lactose content in milk is about 5% while in yogurt it is significantly reduced (2%) due to lactic acid fermentation and cheeses practically do not contain lactose.

Milk and dairy products are the main sources of calcium in human diet. One glass of milk or yogurt (200 g) contains 240 mg calcium. The same amount of calcium is contributed by about 50 g of cheese. One glass of milk and 50 g of cheese provide for almost 50% of the daily calcium requirements (1000 mg) for adults.

**Milk and dairy products are an important component of healthy nutrition.** Calcium is vitally important for building up and maintaining the **bone structure and teeth** all life long. The adequate calcium intake reduces risk of **osteoporosis** - a disease most prevalent in menopausal women, characterized by low bone mass and deterioration of bone tissue leading to increased risk of fracture at insignificant traumas. It is con-

sidered that the adequate calcium intake provided by milk and dairy products helps to reduce the **risk for hypertension**.

**Yogurt** is a valuable traditional Bulgarian food but its consumption in the past years has significantly decreased. Yogurt and the other fermented milk products have special health effect. Lactic acid bacteria improve digestion, stimulate the motility of the intestines and reduce constipation. They suppress the reproduction of harmful bacteria in the intestines, thus decreasing the cases of intestinal disorders, their duration and severity. Lactic acid bacteria improve the immunity, decrease the number of cases with lactose intolerance, reduce the atherosclerosis risk by decreasing blood cholesterol. They have the potential to decrease the risk of colon and rectum cancer. Bioactive peptides reducing the blood pressure and stimulating the immunity are formed from milk proteins during the fermentation processes provided by lactic acid bacteria.

Cream, high-fat milk and cheeses can be a **significant source of total fats and saturated fatty acids**. The high intake of saturated fatty acids increases the levels of total cholesterol and of the so-called "bad cholesterol" (cholesterol in lipoproteins with low density), increases the risk for atherosclerosis and some cancers. This is the basis to recommend consumption of semi-skimmed (1.5%) and skimmed milk (0.1-0.5% fats), cheeses and curds with reduced or low content of fat and limited consumption of cream.

Some individuals have deficiency of the enzyme lactase, which degrades milk sugar. This is associated with different complaints - stomach cramps and pains, gases, diarrhea. In case of lactase deficiency it is not recommendable to consume milk. Yogurt intake usually does not create problems as the significant part of the lactose is broken down during the lactic acid fermentation.

Individuals that cannot or do not like to consume milk and dairy products have to supply the necessary calcium from canned fish with bones (sprat, sardine, mackerel etc.). Some vegetables (dark green leafy vegetables - spinach, nettles, rhubarb etc., cereals and pulses) also supply small amounts of calcium.

Unlike milk, the different types of white and yellow cheese, particularly white brined cheese are salty and are a substantial source of sodium in the diet of the Bulgarian population. Sodium is a risk factor for hypertension.

## Practical recommendations

- Consume daily a glass of yogurt or milk (200 ml) and 50 g cheese. This amount equals in terms of calcium content to 2 glasses of yogurt/milk or about 100 g cheese.
- Choose milk and yogurt with low fat content (1.5%) or skimmed milk (0.1-0.5%).
- Prefer fresh cheese, low fat cheese and curds to cheeses with high fat content.
- Prefer cheese and curds with reduced or low salt content.
- Soak salty brined cheese in water for some time to reduce the salt content.





*5. Choose lean meat,  
replace meat  
and meat products  
often with fish,  
poultry or pulses.*

Meat, fish, eggs, pulses and nuts belong to the group of foods rich in protein.

Meat, fish and eggs are sources of proteins with high biological value - important for the synthesis of tissue proteins and maintaining the immune function. These animal protein foods are also rich in vitamins of B group and minerals. Meat and fish are a source of highly available iron and reduce the risk of anemia.

The composition of red meats (pork, beef, lamb) includes solid fats rich in saturated fatty acids and cholesterol. The excessive intake of red meats elevates the levels of total cholesterol and so called "bad" cholesterol thus increasing the risk of cardiovascular diseases and cancer.

It is recommended to consume lean meats (without visible fat) prepared by a sparing culinary method at moderate temperature (**boiling, stewing, baking**). **Fresh meats** are to be preferred to meat products (semi-cooked products, salami, sausages, smoked and salted canned meat products). Meat products have a high content of solid fats and salt, they contain nitrates, polyphosphates and other additives, thus their consumption should be avoided. Of the meat products choose those without visible fat - lean ham, filet, etc.

**Poultry meat** is a good alternative to red lean meats as they contain less fat and has a fine texture. It is recommended to be consumed without the skin as the skin contains the greater portion of fat.

**Fish** consumption is particularly recommendable. Fish is a source of good quality protein, easily digested due to the low amount of connective tissue. Fish fats are the richest in valuable n-3 (omega-3) long-chain polyunsaturated fatty acids decreasing the cardiovascular risk. Fish is particularly rich in various essential vitamins - A, D, group B, highly available iron. Thus a more frequent consumption of fish is recommended.

**Eggs** are valuable and accessible food. Egg yolk and white have a balanced amino acid composition and high biological value, very well digested. The yolk is rich in vitamins and minerals. The egg yolk is very rich in cholesterol but also in lecithin that has a particular role in cholesterol metabolism. That is why eggs should not be excluded from adults.

The plant alternatives of animal protein foods are **pulses** - beans, lentils, green peas, soy, chickpeas, ticks. The protein composition of pulses is deficient of the amino acid methionine and those of the cereals - of lysine. That is why the combination of pulses with cereals (e.g. beans with bread) increases the total biological value of the consumed protein. Pulses are rich in fiber (cellulose, lignin etc.) and contain some substances forming gases in the intestines so it is recommendable to avoid them in case of gastrointestinal problems. Soy protein and phytoestrogens (isoflavones) contribute to reducing blood cholesterol and hence, the risk for cardiovascular diseases. Soy phytoestrogens reduce bone loss and reduce osteoporosis risk for menopausal women, and the risk for breast cancer.

To this group belong also the **nuts** - walnuts, almonds, hazelnuts, peanuts etc. Besides protein, nuts are rich in biologically valuable fats containing essential unsaturated fatty acids (including n-3). They are rich in fiber, minerals, especially potassium and magnesium, vitamin E, bioactive compounds as phytosterols etc., reducing blood cholesterol and risk for cardiovascular diseases. It is recommended to consume nuts unsalted and not fried. Their high energy value (400-700 kcal/100 g product) has to be considered by obese individuals and they have to be consumed in reasonable amounts.

### Practical recommendations:

- Consume poultry meat without the skin (chicken, turkey etc.) and lean red meats (veal, beef, pork, lamb) up to 3 times per week (100 g/serving).
- Remove the visible fat from the meat before cooking.
- Consume fish at least once-twice a week (150 - 200 g/serving).
- Consume pulses (beans, lentils, chick peas etc.) at least twice a week (200 - 300 g/serving); consume 30 - 50 g nuts daily.
- Individuals without elevated blood cholesterol can have 1 egg per day, and those with elevated cholesterol have to restrict the intake to half a yolk per day.



*6. Limit total fat intake, especially animal fats. Replace animal fats with vegetable oils when cooking.*

Fats supply over two times more energy than proteins and one gram of them provide 9 kcal. They supply essential fatty acids that are not synthesized in the body, facilitate the absorption of fat-soluble vitamins (A, D, E and K) and of carotenoids. They improve the taste and flavoring of foods.

This food group also includes cholesterol and phospholipids involved in cellular membranes, in myelin of nerves; they have a role in the regulation of a number of biological functions - synthesis of bile acids and hormones etc.

Because of their high energy value **the overconsumption of fats** increases the risk from obesity which itself is a risk factor for cardiovascular diseases and diabetes type 2.

**Fats contain three groups of fatty acids** in different ratio depending on the product - saturated fatty acids, monounsaturated fatty acids and polyunsaturated fatty acids. Fats of animal origin are usually solid, rich in **saturated fatty acids** and vegetable oils are usually liquid containing mainly monounsaturated and polyunsaturated fatty acids. The high intake of saturated fatty acids increases total cholesterol and the so called "bad" cholesterol - a risk factor for cardiovascular disease. **Monounsaturated fatty acids** are contained mainly in olive oil, peanut oil, rapeseed oil etc. They reduce "bad cholesterol" without reducing "good cholesterol" in blood and reduce the risk from cardiovascular dis-

ease. **Polyunsaturated fatty acids** including essential fatty acids are supplied by vegetable and fish oils. The intake of **vegetable oils** (sunflower, corn, soy, rapeseed) reduces blood cholesterol. The intake of high amounts of polyunsaturated fatty acids, though, increases the risk for their oxidation resulting in cell-injuring products. **Fish oils** contain specific polyunsaturated fatty acids reducing the risk from arrhythmia, have anti-thrombotic and anti-inflammatory effect, reduce blood triglycerides and risk from cardiovascular disease.

**Trans-fatty acids** are formed during the production of margarines in the process of hardening of liquid plant oils. They increase "bad" cholesterol, reduce the levels of "good" cholesterol in blood and elevate the risk for cardiovascular disease. The main source of trans-fatty acids in current diet are chips and hard margarines used in production of biscuits, pastry, wafers etc. containing 15-30% trans-fatty acids. Soft margarines for spreading contain substantially smaller amounts of trans-fatty acids. Soft margarines containing less than 1% trans-fatty acids, due to the introduction of new production technologies, have already been launched on our market. Trans-fatty acids are a natural component in the fats of ruminants (cows, sheep, goats etc.) and in milk fats (3-6%).

Foods of animal origin are sources of **cholesterol** with the highest content in offal (brain, kidneys, liver etc.), meat and meat products, milk butter, cream, cheese, egg yolk etc. One egg yolk contains about 200 mg cholesterol but there is lecithin, which is a main factor in cholesterol metabolism. The recommended daily cholesterol intake is up to 300 mg, as its high intake increases the level of "bad" blood cholesterol and the cardiovascular risk.

### Practical advice to healthy choice and for reducing fat intake:

- Prefer lean meat and restrict salami consumption.
- Prefer low fat milk and dairy products.
- Restrict the consumption of bakery and confectionery (cakes, pastry, pies, ice cream etc.) that contain much fat.
- Restrict the intake of products containing hard margarines - biscuits, wafers, pastry etc. Choose soft low-fat margarines (40-25%).
- Use cooking methods and recipes that do not add fat such as boiling, stewing, baking. Drain off any fat that appears during and after cooking.
- Avoid frying, use a frying pan that does not need adding fat.
- Prefer vegetable oils (sunflower, corn, olive) to animal fats (lard, butter) but consume them also in moderate amounts.
- Inform yourselves from the label of the food about the amount of fats in them and choose low-fat ones.



**7. Limit the consumption of sugar, sweets and confectionery, avoid sugar-containing soft drinks.**

**Sugar** gives a pleasant sensation of sweetness and thus sugar-containing products are often preferred foods. Refined sugar is saccharose which consists of glucose and fructose that are naturally found in fruits. Saccharose and glucose are found in small amounts in some vegetables as well - beet, carrots, green peas.

Refined sugar, though, is a **source of "empty" calories** only, it, unlike fruits, does not provide other valuable nutrients such as vitamins, minerals and fiber.

In addition to white refined sugar, the foods can be sweetened with other simple sugars such as glucose (dextrose), fructose, fructose-glucose syrup, inverted sugar, etc. **Honey** consists of glucose and fructose, however, unlike other sugars it contains bioactive substances with antioxidant and antimicrobial effect and thus it is a preferred alternative to sugar. Brown sugar (demerara) contains some minerals and is also to be preferred to refined sugar.

The greater proportion of sugar intake is contributed by consumption of sweets, chocolate, cakes, wafers, "baklava" and other syrup sweets, sugar-containing soft beverages. Sugar is contributed also by compotes, jams and marmalades.

Sugars are the fastest in providing energy for the organism both at physical and mental efforts, they help to recover quickly at physical and mental fatigue.

The high and frequent intake of sugar, confectionery and soft drinks containing sugar is associated with health risk. The high intake of sugar and sugar-containing foods and beverages leads to overweight and obe-

sity, which themselves increase the risk for hypertension, cardiovascular diseases, diabetes type 2. The energy value of pastry is high, containing, besides sugar, substantial amounts of fats (1 g carbohydrates supplies 4 kcal and 1 g fats - 9 kcal).

The frequent consumption of sugar products and beverages are the main cause for dental caries.

For sweetening the food for patients with diabetes and overweight synthetic sweeteners can be used such as saccharine, aspartame etc. They do not introduce energy and do not create risk for dental caries.

### **Recommendations for restriction of the intake of sugar and sugar containing foods and beverages:**

- Try to drink tea or coffee without sugar. Prefer honey or brown sugar for sweetening.
- Do not sweeten milk or yogurt with sugar.
- Cut at least by half the amount of sugar that usually you use in the cooking recipes for desserts.
- Avoid frequent consumption of soft drinks containing sugar, substitute them with drinking tap or mineral water.
- Prefer natural fruit juices without added sugar to juices and nectars with added sugar.
- Avoid the consumption of sugar products and confectionery, choose for dessert fresh fruits rather than cakes and pastry.
- Reduce the consumption of jams and marmalades.
- Avoid frequent consumption of foods and beverages containing sugar between meals.
- Inform yourselves on the amount of sugar in foodstuffs as displayed on the label and choose sugar-free or low sugar ones.





## *8. Reduce intake of salt and salty foods.*

Salt is sodium chloride. Sodium and chloride are essential elements for many important functions of the body, but the high level of consumption above the physiological requirements, is a health risk factor.

Salt in the diet comes mostly from processed foods and canned foods, from cooked foods but also by adding salt at the table during eating and consumption of foods. A small amount of sodium ions is supplied by foods naturally containing salt. Small amounts of sodium are ingested with technological food additives as flavour-enhancer mono-sodium glutamate, preservative sodium sulphite, baking powder sodium bicarbonate etc.

Foods high in sodium are processed foods as sausages, preserved meats and fish, cheeses, most canned vegetables, pickles, dried soups, salad dressings, soy sauce, canned tomato juice, ketchup, salty snacks, chips etc.

Foods of animal origin as meat and fish contain naturally sodium chloride, while foods of plant origin - fruits, vegetables and cereals contain low amounts of sodium, but high concentration of potassium (See Table for sodium content in foods).

The recommendation for sodium intake is below 2000 mg - equivalent to about 5 g (1 teaspoonful) of salt daily. At intensive physical efforts, the need for sodium chloride increases due to salt loss at sweating.

The average salt intake in Bulgaria is high, more than 10 g per day. The greatest portion of the consumed salt is contributed by bread and bakery, added salt to cooked meals, cheeses, meat products, especially sausages, fried potatoes and chips.

The relationship between excessive levels of salt intake and high blood pressure is proven and decreasing salt intake is an approach of reducing the prevalence of hypertension. High blood pressure is one of the main risk factors for stroke and coronary heart disease. Associations are suggested between excess sodium intake and gastric cancer, deterioration of kidney function, high urinary excretion of calcium and risk for osteoporosis in elderly individuals.

The gradual reduction of salt intake promotes taste adaptation to lower salt levels, increases the intensity of salty taste and reduces preferences of highly salted foods.

### **Practical ways to decrease salt intake are:**

- Choose foods with low salt content - reduce consumption of preserved foods, sausages, salty fish, pickles.
- Prepare foods with little salt.
- Choose cooked meat instead of preserved meat and sausages.
- Choose fresh or frozen fish instead of canned ones.
- Consume more fresh foods.
- Avoid adding salt to foods at the table.
- Substitute salt taste and flavour your food with acidic ingredients like lemon and vinegar, spices and herbs.
- Consume more fruits and vegetables which are naturally rich in potassium - element with favorable effect on blood pressure.

## Sodium content in foods

Food groups	Quantity of intake (grams)	Sodium* (mg)
<u>Cereals</u>		
Rice, pasta /cooked without salt/	100	traces
Bread	100	360 – 600
Cheese pie	100	650
Pizza with yellow cheese	120	450 -1200
<u>Vegetables</u>		
Cooked vegetables without salt	100	Up to 10
Canned vegetables	100	140 - 460
Potato chips	30	120 - 180
Tomato juice	200	660
Pickles	100	950
<u>Fruits</u>		
Fruits fresh	100	traces
Nuts salted	50	200
<u>Milk and dairy products</u>		
Milk	200	120
Brined cheeses	100	1200
<u>Meat, Poultry, Fish</u>		
Fresh meat, poultry, fish	100	Up to 90
Tuna canned	100	300
Sausages	100	1000 - 2500
<u>Other foods</u>		
Ketchup	15	130 –230
Soy sauce	15	1030

*\*The equivalent salt amount is calculated by multiplying sodium content by 2,5*



*9. If you drink alcoholic beverages, you should consume moderate quantities.*

Alcoholic beverages contain ethyl alcohol or ethanol, supply energy - 7 kcal or 29 kJ per gram ethanol, but do not provide essential nutrients and thus contribute "empty calories" to the diet.

The content of absolute alcohol in alcoholic beverages is expressed in volume percents or milliliters of alcohol per 100 ml drink. The concentration of ethanol in beer is 4-5 vol.%, in wine is 10-13 vol.% and in distilled spirits (brandy, vodka, whisky) - 40 vol.%. In different liqueurs the ethanol content is between 15 and 30 % by volume. **One ml of pure alcohol (ethanol) equals 0.78 grams** (See Table).

Beers and wines contain some nutrients - sugars, potassium, a few vitamins (folate in beer) and bioactive plant substances - flavonoids with antioxidant properties, especially in red wine.

The definition of moderate intake of alcohol is consumption of no more than 20 ml or 16 grams pure ethanol per day that means one glass of wine or one beer or 50 ml spirits per day. Due to differences in male and female alcohol metabolism, women should consume approximately half that moderate quantity of alcoholic beverages per day.

**Moderate drinking promotes relaxing and reduces cardiovascular risk. The cardiovascular benefits are associated with light to moderate drinking.**

Consuming more than moderate dose of alcohol increases the risk for traumatic injuries and motor vehicle accidents, loss of self-control. High dose of alcohol severely impairs mental function and causes intoxication. Heavy drinking can lead to dependence and addiction. Excessive

alcohol consumption increases the risk of chronic diseases - high blood pressure and stroke, liver damage, some cancers.

Heavy drinking is associated also with vitamin and mineral deficiencies.

Alcoholic beverages should not be consumed by pregnant and lactating women, children and adolescents, individuals taking medications, as well as by persons engaged in activities imposing attention and coordination.

### Practical recommendations:

- The advice is not to drink, but if you consume alcohol - the daily intake should be no more than moderate quantity.
- Prefer low-alcohol drinks.
- Consume alcohol with foods and slowly.

### Alcohol and energy content of some alcoholic beverages

Alcoholic beverages Content	Beer	Wine	Spirits (rakia, whiskey, vodka)
Alcohol content in vol%	4 - 5,5	10 - 13	40
Serving size - moderate (ml)	500 - 330	150	50
Pure alcohol* (ethanol) in serving size - moderate (grams)	15	15	16
Energy in serving size (kcal) moderate quantity	140	105	110

\* 1 ml pure alcohol (ethanol) = 0,78 grams



*10. Maintain healthy body weight and be physically active every day.*

Maintaining a healthy body weight life long helps to keep in good health and decreases the risk of chronic diseases.

Obesity is a serious health problem that significantly increases the risk of hypertension, stroke, coronary heart disease, diabetes type 2, disturbances in lipid metabolism, gall bladder stones, hormonal disturbances, joints diseases (osteoarthritis, gout), some cancers etc. Obesity also creates psychosocial problems.

Underweight is also associated with elevated health risk due to nutrient deficiencies and disturbed immune function.

Healthy body weight is the body weight associated with low health risk, good work capacity and longevity.

The individual weight depends on a number of factors: gender, height, age, and heredity.

For evaluation of weight the indicator "Body Mass Index" (BMI) is used. It is a ratio of the body mass (kg) vs. the square height (m):

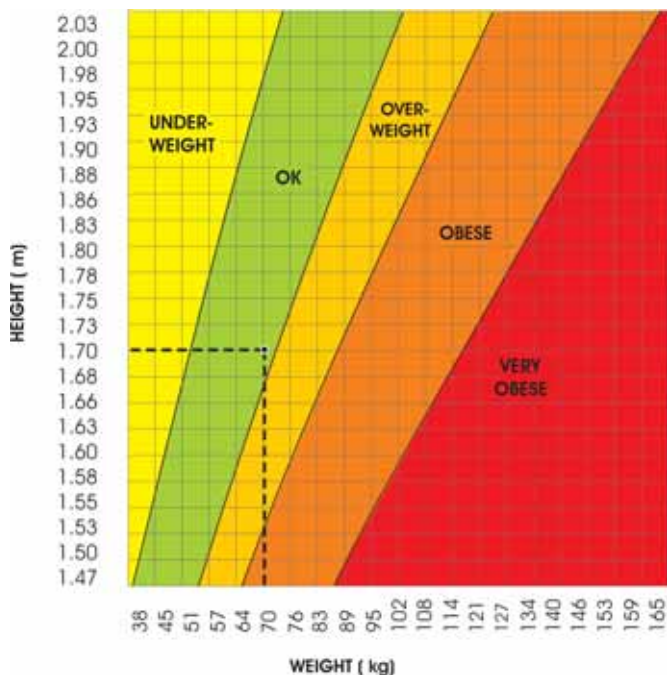
$$\text{BMI} = \frac{\text{body weight in kg}}{\text{height (m)}^2} = \text{kg/m}^2$$

**Example:** An individual with body weight of 70 kg and height 170 cm has a BMI =  $70 : 1.70^2 = 70 : 2.89 = 24.22 \text{ kg/m}^2$

The WHO classifies weight based on BMI and related health risk as follows:

	BMI (kg/m <sup>2</sup> )	Disease risk
Underweight	< 18,5	Increased
Normal weight	18,5 – 24,9	Low
Overweight	25,0 – 29,9	Increased
● Obesity I grade	30,0 – 34,9	Moderately increased
● Obesity II grade	35,0 - 39,9	High
● Obesity III grade	≥ 40	Very high

You could easily find in which range is your weight if you use the following Body Mass Index chart:



Another criterion for assessment of cardiovascular risk associated with overweight is the **accumulation of abdominal fat**. The **waist circumference value** (cm) is used for its assessment. The waist circumference value associated with low health risk for men is below 94 cm, and for women - below 80 cm. Any exceeding of these values increases the health risk and exceeding 102 cm for men and 88 cm for women is associated with significantly increased health risk.

Overweight and obesity are associated with long-term dietary energy intake exceeding the individual needs and/or low physical activity. Maintenance the body weight in normal range is the main criterion for assessment of the balance between dietary energy intake and energy expenditure. The high intake of foods rich in energy and particularly with high fat and sugar content as well as large portions of consumed food increase the risk for overweight and obesity.

The increased rate of underweight is associated on one side with socioeconomic reasons but in girls and young women it is often due to low calorie diets to lose weight. Underweight in women in fertile age sets additional risk in pregnancy both for fetal development and mother's health.

If you are overweight modify your dietary patterns and increase the physical activity. Weight loss is particularly important at obesity. Weight loss helps to decrease elevated blood pressure and improve blood lipid indicators. Nevertheless you should set realistic goals, do not strive to lose more than 0.5 kg per week - very-low-calorie diets and starvation are hazardous for health and do not provide permanent results.

To maintain healthy weight you should keep to the principles of healthy nutrition, control regularly your body weight and be physically active every day.



## Recommendations for maintaining healthy body weight:

- Control your body weight.
- If your body weight increases, try to reduce your food intake.
- Reduce the intake of high-energy foods, especially those rich in fats, sugar and confectionery, sugar containing soft drinks.
- Consume more vegetables and fruits.
- Substitute bakery and confectionery products with wholegrain bread, wholegrain pasta, brown rice, corn.
- Have meals several times per day - rare food intake causes overeating.
- Drink sufficient amounts of water.
- Restrict alcohol consumption.
- Practice physical activity daily for at least 60 minutes (fast walking for example).

Obese or underweight individuals are advised to consult professionals to create an adequate diet and program for physical activity.

## Regular physical activity, 60 minutes daily:

- Improves health.
- Improves the working capacity, coordination and attention.
- Helps to regulate the appetite.
- Improves the spirits, reduces stress.
- Provides better sleep.
- Helps to prevent increasing body weight in adult age.
- Helps to maintain healthy weight.

Physical activity includes fast walking, work in the garden, hiking, sports etc. Avoid using a lift and, if possible, transport means. Walking is the easiest and most accessible way to keep healthy body weight.



## *11. Drink plenty of water every day.*

Water is vitally important - one can live for weeks without food but only a few days without water.

For maintaining the water balance in the organism we need daily water intake depending on the losses. Water losses include excreted water through urine, faeces, skin and lungs. In moderate climate and sedentary lifestyle the water losses of a healthy adult are about 2.6 liters daily. Water loss through skin and lungs is increased at high temperature, dry air and physical activity. Some 250 - 300 ml of water are derived in metabolic processes, 700 - 1100 ml are contributed by normal intake of solid foods depending on kind of food. It is accepted that an adult with low to moderate physical activity in moderate climate has to drink 1.5 - 2 l (6 - 8 glasses) of water, including beverages. Men's needs of water are greater than those of women, associated with the differences in body mass and composition. Water needs increase substantially at intensive physical efforts, especially at high ambient temperatures and can reach 5 - 10 liters daily. At intensive physical efforts significant amounts of salts are lost, the losses could be recovered by intake of special beverages containing sugars and salt.

**Dehydration** caused by insufficient water intake and liquids vs. the needs causes deterioration of mental and physical capacity, disturbance in concentration and attention, fatigue, affects unfavourably the regulation of body temperature. The good water supply reduces the risk for renal calculus, constipation etc.

The first sign of dehydration is **thirst** but it appears after some mild dehydration has occurred. That is why one should not wait to get thirsty but drink liquids regularly.

**Water sources** for the organism are drinking water, mineral water, soft beverages, tea, coffee, milk, yogurt, soups, fruits and vegetables, fruit and vegetable juices and preserves, sauces, and certain amounts of solid foods.

The best drink to satisfy the thirst is drinking water and mineral water. Beverages, such as tea, yogurt and natural fruit juices without sugar contain useful nutrients and bioactive substances unlike sugar containing soft drinks which are not recommended as they contribute only "empty calories".

### Practical recommendations:

- Drink about 6 - 8 glasses of water every day (1.5 - 2 l) - this amount includes other drinks as tea etc.
- Drink regularly small amounts of water during the whole day.
- Drink more water at high ambient temperatures, during and after intensive physical activities.
- Prefer tap or mineral water to soft drinks and juices containing sugar and other sweeteners.
- Drink water with moderate temperature; try to avoid very hot and very cold drinks and water.



## *12. Prepare and store the food in a way to ensure its quality and safety.*

The adequate preparation and storing of food ensures minimal losses of nutrients, preserving the biological value, high quality and safety of foods.

**An important principle of healthy nutrition is the preservation of food quality.**

**Choose heat treatment of foods** that maximally preserves their valuable components - **steaming, boiling, stewing, baking**. Steaming preserves best the nutrients. Vegetables should be put in slightly salted boiling water. The water should cover the vegetables and the pot should also be covered to preserve the vitamins. As most vitamins migrate into the water it is recommendable to cook vegetables in small amounts of water for a short time. It is recommendable to use the liquid part of preserved vegetables and fruits as it contains a great part of their water soluble vitamins and minerals.

Boiling, stewing and baking should be made at moderate temperature. The grilling, barbecuing and long frying at high temperatures, smoking of meat and fish could generate substances hazardous for health.

It is recommended to **defrost** meat and fish in refrigerator in order to preserve their quality and to prevent microbial multiplication. When cook frozen vegetables, put them in boiling water without preliminary defrosting.

**Safe food handling is another important principle of healthy nutrition.**

Food can be contaminated with microbes at each stage of its preparation, storing and culinary processing. Following the hygienic rules will help prevent foodborne diseases that can seriously injure health.

### **Practical recommendations to maintain food safety**

#### *1. Use safe raw foods and water*

- Do not consume food with expired shelf life as displayed on the label.
- Do not buy fish that is not stored in ice.
- Do not buy meat and meat products, milk and dairy products, eggs that are not stored in refrigerator.
- When preparing the food remove all injured, decayed or dirty parts of the products.
- In case of doubted contamination of the water it must be boiled prior to use.

#### *2. Keep hygiene at food preparation*

- Wash your hands before and after preparing the food, after handling of raw foods before touching ready to serve food.
- Keep clean all surfaces and utensils in the kitchen; change often the dish washing sponges and kitchen towels.

#### *3. Avoid contacts between raw and ready-to-eat foods when processing and storing*

- Handle raw foods and ready to serve foods separately, use different cutting boards.
- Wash the cutting boards and knives after handling raw meat and fish in hot water.
- Store raw meat and fish in refrigerator well packed or in closed boxes to avoid contamination by juices dripping onto ready-to-eat foods.

4. *The heat treatment* of animal products (meat, poultry, fish, eggs) must be sufficiently long at temperature over 70° C, in order to kill the microorganisms inside the products.
5. *Keep cooked food* at temperature over 60°C until serving; food intended for later serving is to be cooled quickly and stored in a refrigerator.
6. *Store foods* in the refrigerator well wrapped, in closed boxes or covered.
7. *Never defrost meat and fish at room temperature.* Defrost them in a refrigerator, cold water or microwave oven.
8. *Reheat* cooked food before consumption at minimum 70°C in order to kill the developed microorganisms during storage.



## PICTORIAL PRESENTATION OF FOOD BASED DIETARY GUIDELINES

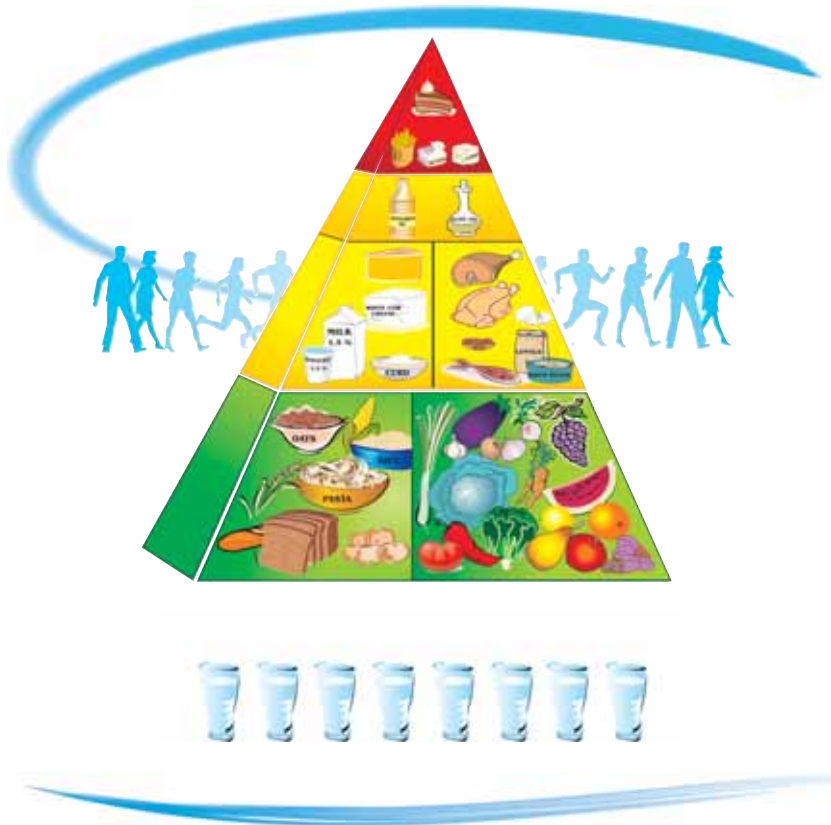
The healthy diet pyramid is a pictorial presentation of the main dietary recommendations.

The pyramid is divided into **sectors covering the food groups**. It reflects the main principle of healthy diet - variety of food intake that is achieved through daily consumption of representatives of all food groups. The size of the sectors corresponds to the proportion of recommended amounts for consumption of foods from particular groups.

The food groups are distributed in three bands in the colors of the traffic light. The **green band** in the base of the pyramid contains plant foods - vegetables, fruits, cereals and potatoes that represent the main portion of the total amount of daily intake. The **yellow band** contains foods of animal origin that are important for healthy nutrition but should be consumed in smaller amounts. It also includes plant foods as pulses and nuts that are rich in protein and are the plant alternative to animal protein foods. Vegetable oils recommended as main added fats are also

placed here but their consumption should be considered as they are rich in energy. The **red band**, on top of the pyramid includes energy-dense foods with low vitamin and mineral content that should be avoided and to be consumed in limited amounts - animal fats, sugar and confectionery products.

Under the pyramid you can see eight glasses of water - recommended daily water intake. The figures of walking and running people prompt the significance of physical activity to maintain healthy body weight.



## References

1. Angelova K., D. Petrova, L. Ivanova et al (2000) National survey of dietary intake and nutrition status of the Bulgarian population, 1998. Energy intake. *Higiena&Zdraveopazvane*, XLIII, 3-4: 7-10. (in Bulgarian)
2. Bajkova D., S. Petrova, K. Angelova et al. (2000) National survey of dietary intake and nutrition status of the Bulgarian population, 1998. Protein intake. *Higiena&Zdraveopazvane*, XLIII, 3-4: 10-14. (in Bulgarian)
3. Bajkova D., Bl. Jordanov, S. Petrova, K. Angelova, V. Duleva, D. Ovcharova, Kr. Vatrlova, Pl. Dimitrov et al. National survey of dietary intake and nutrition status of the Bulgarian population, 2004 (in print) (in Bulgarian)
4. National Statistical Institute. Bulgarian households budget (2004) (in Bulgarian)
5. Vasilevski N. (2002) Alcohol consumption in CINDI Programme areas. *Social medicine*, 3: 24-28. (in Bulgarian)
6. Vasilevski N. (2001) Dyslipidemia - health risk factor in CINDI Programme zones in Bulgaria. *Intervention strategies. Higiena&Zdraveopazvane*, XLV, 2-3: 21-29. (in Bulgarian)
7. Vatrlova K., S. Petrova, K. Angelova et al (2000) National survey of dietary intake and nutrition status of the Bulgarian population, 1998. Anthropometrical nutritional status. *Higiena&Zdraveopazvane*, XLIII, 3-4: 51-54. (in Bulgarian)
8. Duleva V., S. Petrova, K. Angelova et al (2000) National survey of dietary intake and nutrition status of the Bulgarian population, 1998. Intake of fats, fatty acids and cholesterol. *Higiena&Zdraveopaxvane*, XLIII (3-4): 14-21. (in Bulgarian)
9. National Center of Health Informatics (2004). *Health Care*. (in Bulgarian)
10. Ivanov L., N. Vasilevski, P. Tsonov (2004) Adaptive strategies of public health care for healthy nutrition. *In: Nutritional Science in Human Health Protection*. Ed. B. Popov: 190-197. (in Bulgarian)
11. Ivanova L., S. Petrova, K. Angelova et al (2000) National survey of dietary intake and nutrition status of the Bulgarian population. Intake of macroelements. *Higiena&Zdraveopazvane*, XLIII (3-4): 41-45. (in Bulgarian)
12. Ivanova L., S. Petrova, K. Angelova et al. (2000) National survey of dietary intake and nutrition status of the Bulgarian population, 1998. Intake of oligoelements - iron and zinc. *Higiena&Zdraveopazvane*, XLIII (3-4): 46-50. (in Bulgarian)
13. Ivanova L., K. Angelova, N. Vasilevski (2004) Nutrition and chronic non-communicable diseases. General principles for good preventive practice on nutrition problems in CINDI Programme areas - Bulgaria. (in Bulgarian)
14. Jordanov Bl., V. Duleva, K. Angelova et al (2000) National survey of dietary intake and nutrition status of the Bulgarian population, 1998. Intake of carbohydrates and dietary fibers. *Higiena&Zdraveopazvane*, XLIII, 3-4: 22-26. (in Bulgarian)
15. Petrova S. (2004) Current problems of Bulgarian population nutrition. *In: Nutritional Science in Human Health Protection*, Ed. B. Popov, Sofia: 88-95. (in Bulgarian)
16. Petrova S., K. Angelova, L. Ivanova et al (2000) National survey of dietary intake and nutrition status of the Bulgarian population, 1998. Intake of Vitamins A, E and C. *Higiena&Zdraveopazvane*, XLIII (3-4): 26-30. (in Bulgarian)
17. Petrova S., K. Angelova, L. Ivanova et al (2000). National survey of dietary intake and nutrition status of the Bulgarian population, 1998. Intake of vitamins of B group. *Higiena&Zdraveopazvane*, XLIII (3-4): 31-40. (in Bulgarian)
18. Petrova S., D. Bajkova, K. Angelova et al (2000). National survey of dietary intake and nutrition status of the Bulgarian population, 1998. Food consumption of Bulgarian population. *Higiena&Zdraveopazvane*, XLIII (3-4): 55-62. (in Bulgarian)
19. Dietary Reference Intakes for Bulgarians (2005). Regulation №23, SG № 63 (in Bulgarian)
20. Food, Nutrition and the Prevention of Cancer: a Global Perspective (1997) Washington DC, World Cancer Research Fund/ American Institute of Cancer Research.
21. Petrova S. (1997) Nutritional Surveillance Program of Bulgaria, *In: Implementing Dietary Guidelines for Healthy Eating*, Ed. W. Wheelock, Blackie Acad. & Professional, London: 47-58.
22. Petrova S. (1997). Nutrition Policy: Bulgaria, *In: Implementing Dietary Guidelines for Healthy Eating*, Ed. W. Wheelock, Blackie Acad. & Professional, London: 61-85.
23. WHO (2003) Diet, Nutrition and the Prevention of Chronic Diseases. Report of a Joint WHO/FAO Expert Consultation. TRS 916, WHO, Geneva.
24. WHO (2000) Obesity: preventing and managing the global epidemic. Report of a WHO Consultation on Obesity. WHO TRS 894, WHO, Geneva.
25. WHO (1998) Report of a Joint FAO/WHO Consultation. Preparation and use of Food-based Dietary Guidelines. TRS 880, WHO, Geneva.
26. WHO Regional Office for Europe (2004) Global Strategy on Diet, Physical Activity and Health. 57th World Health Assembly 2004. WHA 57.17.
27. WHO Regional Office for Europe (2000) CINDI Dietary Guide (EUR/OO/5018028).