Dietary Requirements

Unit

4

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Dietary Requirements

A healthy diet may help to prevent certain long-term (chronic) diseases such as heart disease, stroke and diabetes. It may also help to reduce your risk of developing some cancers and help you to keep a healthy weight. Your body needs energy to work normally and keep you alive. You obtain this energy from
nutrients in the food that you eat - mostly, carbohydrates, fats and proteins. Minerals and vitamins are other nutrients that are also important in your diet to help your body stay healthy.
It is important to find the right balance between these different nutrients to achieve maximum health benefits.

Three main types of dietary recommendations may be produced by public health agencies: dietary allowances (DRVs), dietary goals, and dietary guidelines.

Dietary allowances are quantitative guidelines for different population subgroups for the essential macro- and micro-nutrients to prevent nutritional deficiencies.
Dietary goals are quantitative national targets for selected macronutrients and micronutrients aimed at preventing long-term chronic disease e.g. coronary heart disease, stroke and cancer. They are usually aimed at the national population level rather than the individual level.
Dietary guidelines are broad targets aimed at the individual to promote nutritional well-being. They were
initially introduced for macronutrients but are now being used for micronutrients. Dietary guidelines can be expressed as quantitative targets (e.g. five servings of fruit and vegetables/day) or as qualitative guidelines
(e.g. eat more fruit and vegetables).

Cardiovascular Disease

CVD is caused by a build-up of fatty streaks and cholesterol in the blood vessels. Natural wear and tear to blood vessels makes it easier for fatty cholesterol to leak in and get stuck to the artery walls. This build-up causes the arteries to narrow, reducing the heart's ability to pump blood through them to the body. If they become completely blocked, it will cause a heart attack or a stroke if the blockage occurs in the brain's blood vessels.

Importantly, not all cholesterol is bad. There are two types of cholesterol in the bloodstream: LDLs and HDLs. LDLs create the build-up in arteries, while high HDL levels are a good sign that the person is not at risk of CVD. The umbrella term for diseases that affect the heart or the blood vessels is cardiovascular disease.

The Arteries

The arteries are the large blood vessels that carry blood away from the heart to tissues. They do the high pressure work in the body and therefore need to be elastic, flexible and strong. Artery walls are made of smooth muscle and connective tissue and it is this that gives them strength and flexibility. A lot of activity takes place in the lining of arteries: it can constrict or

dilate and release chemicals. It has been said that you are as old as the health of your arteries. If the condition of the arteries is poor, disorders such as atherosclerosis and hypertension (or high blood pressure) can develop.

Heart Health

Atherosclerosis

Atherosclerosis is the form of hardening of the arteries where cholesterol, fats and calcium are deposited in the artery walls. If they are not stopped or removed, these deposits can become hard paques that may block the arteries and lead to heart attack or stroke.

Cholesterol

Cholesterol is the starting material for all of our steroid hormones. These include oestrogen, progesterone, testosterone and the stress hormone cortisol, which is made by the adrenal glands. If someone has an infection and he needs the anti-inflammatory properties of cortisol, his blood cholesterol levels rise. Though cholesterol has its uses in the body, oxidised and damaged cholesterol is found in processed foods that have been heated to high temperatures, such as powered eggs and milk. This kind of cholesterol blocks the arteries is typically oxidised and damaged cholesterol.

Lipoproteins

The other substance in the blood test that is often labelled _bad‘ is low-density lipopotein (LDL). It is often referred to as the _bad cholesterol‘. Its counterpart (HDL) or high density lipoprotein is called the good cholesterol. Doctors sometimes tell patients that they want to see their levels of bad cholesterol lowered, and higher levels of their good cholesterol. LDL and HDL are not only cholesterol. They are lipoproteins (substances that are proteins bound with fats). They act as carriers in the blood. Blood is watery and it is the transport medium throughout the body. Fat and water don‘t mix so if fatty substances need to be transported via the blood, they need to be escorted by other substances that are more soluble.

Risk factors

Some risk factors are strongly associated with CVD but are potentially reversible or can be modified:

- being overweight
- increased levels of LDL cholesterol low HDL cholesterol
- smoking
- high triglycerides (caused by the build up of fats derived from foods eaten or made in the body from other energy sources)
- large waist circumference (being 'apple-shaped')
- high blood pressure inactivity
- diabetes

Dietary changes

Making small changes in the diet is one of the simplest and most effective ways to reduce the risk of CVD. This can be done by:

- reducing fat in the diet, especially **saturated and trans-fats**
- eating more **fruit and vegetables**, **wholegrain food and soluble fibre**
- drinking **alcohol** in moderation
- reducing **salt** to maintain a lower blood pressure

Fat

Reducing the proportion of fat in the diet, especially saturated fat, can help to reduce blood cholesterol levels. There's a strong link between high blood cholesterol levels and the risk of heart disease. For those who don't have CVD or aren't considered to be at highrisk of CVD, normal blood cholesterol levels are below 5mmol/litre. People with average energy needs should aim to consume no more than 70g/day of fat and less than 20g/day of saturated fat.

Trans-fatty acids are a particular kind of fat that are naturally occurring in meat and dairy products but may also be produced when plant-based oils are hydrogenated to produce solid spreads, such as margarines. They're often found in confectionery and processed food like pastry, biscuits and cakes. They've been found to have the same effect on cholesterol levels as saturated fat and should be avoided as much as possible. Thankfully, many manufacturers have now modified processing techniques to keep these fats to a minimum. When reducing total fat, it's important not to cut out the heart healthy fats from the diet including mono and poly-unsaturated fats and omega-3, mostly found in plant and fish oils.

Fat intake can be reduced or modified by:

- using butter and other spreads sparingly choosing lean cuts of meat or trim fat off
- grilling, baking or steaming food rather than frying
- swapping saturated fats such as butter for unsaturated oils such as sunflower, rapeseed or olive oil
- limiting the intake of trans-fats from processed food
- eating two to three portions of oily fish each week (e.g. sardines, mackerel, fresh tuna, salmon)

Essential fatty acids

Essential fatty acids such as omega-3s, which are found in oily fish, have been shown to reduce the risk of CVD by lowering blood triglycerides, reducing blood clotting and regulating heart rhythm. For general heart health eating two portions of fish per week, (one of which should be oily) are recommended.

Stanols and Sterols

Certain plant-derived compounds, called stanol or sterol esters have been shown to reduce cholesterol levels. Spreads, yoghurts, drinks and soya 'dairy alternatives' are now available containing these products. These sterol enriched foods may be particularly useful for those with raised blood cholesterol which has remained elevated even after making other dietary changes. Clinical trials show that when used regularly, they can reduce high cholesterol levels.

Fruit and vegetables

Fruit and vegetables are rich in many essential nutrients including vitamins C and E and carotenoids (which are all antioxidants). They may help to protect the heart by limiting the damaging effects of cholesterol on body tissues. One should aim for at least five servings of fruit and vegetables a day.

Wholegrain and fibre

Studies of large groups of people in the US have shown that diets rich in wholegrain food can reduce the risk of CVD by up to 30 per cent. This can be done by including wholegrain food in every meal by choosing wholemeal bread and wholegrain varieties of pasta and rice.

Soluble dietary fibre, found in oats, beans and pulses, can help to lower LDL cholesterol. These foods should be included as part of an overall healthy balanced diet, at least two to three times each week.

Soya protein

A diet that includes at least 25g of soya per day has been associated with reductions in LDL cholesterol and CVD. Soya in particular has been shown to reduce CVD risk as they inhibit the growth of cells that form artery-clogging plaque. Soya protein is also an excellent substitute for meat and is available in a convenient and tasty form in many ready-made meals. Another good source of soya protein is soya milk and yoghurt.

Cancer

What is cancer?

The growth and function of all the cells in our body are carefully controlled by many processes. The term cancer is used when these control systems go wrong and our cells start to grow out of control. The process usually involves damage to the DNA in cells, which can be caused by chemicals found in cigarette smoke, radiation and even some viruses. The food we eat also affects DNA function, but the exact mechanisms are unclear. In most cases, cancer is caused by many different factors, with several processes being involved in DNA damage in cells.

Risk Factors

The most important risk factor for lung cancer is, of course, smoking, which is thought to be responsible for about 30% of cancer deaths. Exposure to sunlight is the most important risk factor for skin cancer. Diet is also thought to have a risk of about one-third of cancers, but identifying components of diet which could increase or decrease the risk is remarkably difficult. High fat diets are associated with an increased risk of cancers at various sites including the colon, breast and prostrate. Population consuming large amounts of saturated fat appear to be at increased risk of cancer. High intake of polyunsaturated fats may increase the risk of cancer by causing damage to cell membranes through the production of free radicals. However, an adequate intake of anti-oxidant nutrients (e.g. beta-carotene, selenium and vitamins C and E) helps to prevent damage to cell membranes caused by free radical.

Food and the prevention of cancer

The link between diet and cancer is complicated, and scientists have not yet unravelled the exact mechanisms involved. This is because diets are made up of different foods containing many nutrients that interact in different ways in individuals.

Nutrition scientists need to study very large groups of people over many years to give us more specific answers to how and what foods increase the risk of cancer. These studies are ongoing, but the **World Cancer Research Fund** has examined all the existing evidence. It has produced recommendations on food, nutrition and physical activity to help reduce the risk of cancer, based on current scientific evidence.

Achieving and maintaining a healthy weight

One should aim to stay in the healthy **body mass index** range of 18.5kg/m2 to 25kg/m2. Excess body fat is a particular risk factor for cancer of the oesophagus, pancreas, colon, rectum, endometrium and kidney, as well as postmenopausal breast cancer.

Cutting calories by reducing dietary fat and eating plenty of fruit and vegetables, and foods rich in fibre can help. Sugary drinks should be avoided and portion sizes must be checked.

Developing regular physical activity habits

One should aim for at least 30 minutes of moderate activity a day, then build up to either 60 minutes of moderate activity or 30 minutes of intense activity every day. Activity not only helps protect against weight gain but also decreases the risk of colon cancer and possibly endometrium and postmenopausal breast cancer. Moderate activity should raise the heart rate and breathing, but not make a person completely breathless and unable to talk. Examples of moderate activity include brisk walking, gardening and dancing. Examples of intense activity include jogging and swimming.

Moderate alcohol intake

Men should not exceed two drinks a day and women no more than one. Over the past few years, research has shown alcohol increases the risk of cancer, especially of the breast and colon.

Limiting intake of red meat and avoiding processed meat

One should try to eat no more than 500g (18oz) each week and have very little, if any, processed meat such as bacon and salami. Red meat is an important source of nutrients, especially **iron**, but we only need to eat red meat in modest amounts, probably no more than two to three times a week.

Eating foods that mostly come from plants

This means eating more fruit, vegetables and unrefined cereal foods and pulses, as they are mostly rich in fibre, low in calories and packed with the nutrients that lower the risk of cancer.

Limiting consumption of salty foods

Salt and salt-preserved foods are linked to an increased risk of stomach cancer.

Using supplements wisely

Following the principles of **healthy eating** should provide most individuals with the nutrients they need to minimise the risk of cancer. There's no good evidence to show supplements will protect the general population from cancer. Some studies have shown beneficial effects of supplements in groups of people who have a high risk of developing certain cancers, but these findings can't be applied to the general population.

Cancer patients and diet

The person who has been diagnosed with cancer should continue to eat well during treatment, as it will help to:

- cope with the treatment withstand infections
- reduce the risk of nutritional deficiencies generally improve the quality of life

Maintaining a good dietary intake can be challenging because tumour growth can increase energy needs. Also, physical symptoms such as difficulty swallowing, sore mouth, taste changes, nausea, vomiting or diarrhoea make it difficult to eat well and maintain a good weight. In this situation some of these practical solutions may also be helpful. The cancer patients should:

- try to regain any weight lost during acute treatment periods keep ready-meals in the freezer for when too tired to cook eat regularly - keep nutritious snacks to hand
- add an extra dash of olive oil in cooking or on salads

Eating Difficulties

Some patients may find that they can not eat normally because of the side effects of radiotherapy or chemotherapy. Multivitamin and mineral supplements may be required either because the patient is not eating normally or because there is a risk of nutrient deficiency due to the drug treatment. Nausea and vomiting are common side effects of chemotherapy, and patients may find the following advice useful:

- eating small, frequent meals rather than three large meals
- eating bland foods such as bread, toast, crackers, scrambled eggs and potatoes which are less likely to induce nausea than spicy or fatty foods
- avoiding the smell of cooking food
- drinking fluid in between meals rather than with meals to prevent feeling too full

Alternative diets for cancer prevention and treatment

There are many so-called anti-cancer diets that claim to prevent or even cure cancer. They often recommend excluding whole groups of foods or eating only a few specific foods. These diets are not supported by robust scientific evidence and tend to be based on anecdotal reports of success, the patients should avoid those which:

- suggest excessive food restrictions are based on eating raw foods only recommend single large doses of supplements

Diabetes

Diabetes is a condition where blood glucose (sugar) levels are poorly controlled. Diabetes cannot be cured but it can be successfully treated. People with diabetes have a high level of glucose in their blood. This can be caused by:

- Too little insulin being produced by the pancreas
- The body not accepting or using the insulin it produces
- A combination of both.

People with diabetes need to keep their blood sugar levels within a healthy range. Blood sugar levels are controlled through diet, physical activity and, for some people, medication or insulin injections.

Understanding insulin

When we eat foods that are primarily carbohydrates, they metabolise to a sugar called glucose. When we think of carbohydrates as our major source of energy, the energy source is really glucose. This is the only form of sugar that our body can utilise. After the carbohydrates are metabolised into glucose, the sugar enters into the blood stream. But glucose can not be used for energy while it is in our blood. It is only on a journey and needs to reach its intended destination. It must be taken out of the

bloodstream and put into the cells where it can be burned as energy. The only way it can do this is to have the hormone insulin present. Insulin acts as a carrier and escorts glucose into the cells. It is almost as if the inside of the cell is an exclusive club and the club will only allow glucose to enter if insulin escorts it in. without insulin, the receptor site acts like a bouncer at the cell membrane entrance and tells glucose: no, you can't come in. you should have insulin with you! This is the problem that diabetics have.

Latest figures show that over 2 million people in the UK have diabetes and an estimated 1 million people are undiagnosed and don't realise they have diabetes. There are two different types of

diabetes:

Type 1

Type 1 diabetes, which used to be called insulin-dependent diabetes, occurs when the body fails to produce insulin, the hormone required for controlling blood sugar levels. People with type 1 diabetes require regular insulin injections to correct this. All type 1 diabetes patients should have access to a qualified dietician, as diet is an important part of their clinical care. Type 1 diabetes usually affects young people, often in childhood, and is the least common of the two forms of diabetes accounting for between five to 15 per cent of all people with this disease.

Type 2

Type 2 diabetes develops slowly. It's much more common than type 1 diabetes, accounting for at least 75 per cent of cases. Type 2 diabetes often develops later in life although cases in obese children and young adults are becoming more common. It's strongly related to being overweight.

Although the body continues to secrete insulin, often in large amounts, people who are on the path of type 2 diabetes don't respond efficiently. This is known as insulin resistance. Later, insulin production declines and this signals the onset of type 2 diabetes. In the early stages, diet and lifestyle measures can often be sufficient to control and even reverse insulin resistance. In the later stages of the disease, some people will need tablets and later insulin injections to manage their diabetes.

One can reduce the risk of developing type 2 diabetes by achieving and maintaining a healthy weight. Studies show that for overweight people at risk of diabetes, losing just five per cent of the body weight can reduce more than 50% chance of progressing to diabetes. It's worth noting that despite diabetes being a condition of sugar regulation, specific restriction of sugars isn't necessary, except as part of ensuring a balanced diet overall.

The person who is living with diabetes needs to reduce the risk of developing associated diseases such as coronary heart disease, kidney and eye disease. This means losing **weight**, keeping the blood pressure and blood glucose as near normal as possible and having the **cholesterol** and tri-glycerides checked regularly.

WHAT IS THE GLYCEMIC INDEX?

The glycaemic index (GI) is a way of ranking carbohydrate foods based on how quickly they increase blood sugar levels. Low GI foods are especially helpful for people with diabetes, who need to have more control over their blood sugar levels than the general population.
Ideally foods with a low GI, such as those rich in soluble fibre like oats and legumes, should be eaten more frequently than those with a high GI. But the texture, type of cooking or processing used, and

the amount and type of sugars present can all affect the GI. Since foods are often consumed as part of a meal or snack, it can be difficult to calculate the GI. Focusing on unrefined, high-fibre, whole grain cereals and minimising rapidly absorbed, refined cereals and sugary foods will all help to lower the GI of the diet.

Why is the Glycemic Index Important?

Our body performs best when our blood sugar is kept relatively constant. If our blood sugar drops too low, we become lethargic and/or experience increased hunger. And if it goes too high, the brain signals our pancreas to secrete more insulin. Insulin brings our blood sugar back down, but primarily by converting the excess sugar to stored fat. Also, the greater the rate of increase in our blood sugar, the more chance that the body will release an excess amount of insulin, and drive the blood sugar back down too low.

Therefore, when we eat foods that cause a large and rapid glycemic response, we may feel an initial elevation in energy and mood as our blood sugar rises, but this is followed by a cycle of increased fat storage, lethargy, and more hunger!

Although increased fat storage may sound bad enough, individuals with diabetes (diabetes mellitus, types 1 and 2) have an even worse problem. Their bodies inability to secrete or process insulin causes their blood sugar to rise too high, leading to a host of additional medical problems. The theory behind the Glycemic Index is simply to minimize insulin-related problems by identifying and avoiding foods that have the greatest effect on the blood sugar.

Should All High GI foods be Avoided?

For non-diabetics, there are times when a rapid increase in blood sugar (and the corresponding increase in insulin) may be desirable. For example, after strenuous physical activity, insulin also helps move glucose into muscle cells, where it aids tissue repair. Because of this, some coaches and physical trainers recommend high-GI foods (such as sports drinks) immediately after exercise to speed recovery.

Also, it's not Glycemic Index alone that leads to the increase in blood sugar. Equally important is the amount of the food that we consume. The concept of Glycemic Index combined with total intake is referred to as "Glycemic Load".

How Glycemic Load Improves the Glycemic Index

Although most candy has a relatively high Glycemic Index, eating a single piece of candy will result in a relatively small glycemic response. Why? Well, simply because our body's glycemic response is dependent on both the type and the amount of carbohydrate consumed. Glycemic Load is calculated this way:

GL = GI/100 x Net Carbs

(Net Carbs are equal to the Total Carbohydrates minus Dietary Fibre)

Therefore, we can control your glycemic response by consuming low-GI foods and/or by restricting our intake of carbohydrates

Glycemic Indexes and Glycemic Loads for Common Foods

GI and GL for Common Foods

Food	GI	Serving Size	Net Carbs	GL
Peanuts	14	4 oz (113g)	15	2
Bean sprouts	25	1 cup (104g)	4	1
Grapefruit	25	1/2 large (166g)	11	3
Pizza	30	2 slices (260g)	42	13
Low fat yogurt	33	1 cup (245g)	47	16
Apples	38	1 medium (138g)	16	6
Spaghetti	42	1 cup (140g)	38	16
Carrots	47	1 large (72g)	5	2
Oranges	48	1 medium (131g)	12	6
Bananas	52	1 large (136g)	27	14
Potato chips	54	4 oz (114g)	55	30
Snickers Bar	55	1 bar (113g)	64	35
Brown rice	55	1 cup (195g)	42	23
Honey	55	1 tbsp (21g)	17	9
Oatmeal	58	1 cup (234g)	21	12
Ice cream	61	1 cup (72g)	16	10
Macaroni and cheese	64	1 serving (166g)	47	30
Raisins	64	1 small box (43g)	32	20
White rice	64	1 cup (186g)	52	33
Sugar (sucrose)	68	1 tbsp (12g)	12	8
White bread	7	1 slice (30g)	1	1

Watermelon	72	1 cup (154g)	11	8
Popcorn	72	2 cups (16g)	10	7
Baked potato	85	1 medium (173g)	33	28
Glucose	10	(50g)	50	50

The table above shows values of the Glycemic Index (GI) and Glycemic Load (GL) for a few common foods. GI's of 55 or below are considered low and 70 or above are considered high. GL's of 10 or below are considered low and 20 or above are considered high.

Dietary Management

Diet plays a cricial role in the management of both types of diabetes. Recommendations of the British Diabetic Association are:

- Reduce and maintain body weight in the ideal range
- Complex carbohydrates should make up 50-55% of the dietary energy intake
- Sugar is allowed up to 25 g a day provided that it is a part of the diet low in fat and high in NSP and that it is consumed as part of a meal
- NSP intake should be 18g a day(equivalent to 30g of dietary fibre), concentrating on soluble NSP
- Fat intake should not exceed 30% of the energy intake and saturated fat should not exceed 10% of energy intake
- Cholestrol intake should not exceed 300mg a day
- Protein intake should comprise about 10-15% of energy intake

Salt intake should be limited to 6g a day

- The main aims in the dietary management of diabetes are:
- To reduce weight in the overweight patient
- To maintain blood glucose levels as near to normal as possible
- To mainatin blood lipid levels as near normal as possible

The main factors to consider the diabetic diet are body weight, the amount and types of carbohydrate and fat in the diet and the level of alcohol consumption.

Eating a balanced diet

By choosing to eat a **healthy balanced diet** one can initiate to manage diabetes, by helping to control the blood glucose levels, blood fats and blood pressure. It will also help to regulate the body weight. If

the person is overweight it's especially important to try and achieve and maintain a lower weight. Even small weight losses lead to surprisingly big reductions in the risk of diabetes and will also reduce the risk of heart disease, high blood pressure and stroke.

Finding the balance between the amount of carbohydrates and fat is important. Cutting down on the amount of fat a person eats can also help - particularly saturated (animal) fats, as this type of fat is linked to heart disease. One should choose monounsaturated fats, e.g. olive oil and rapeseed oil and should aim to eat a portion of oily fish at least twice a week.

Carbohydrates

Starchy foods are important for patients with diabetes because complex carbohydrates can slow down the absorption of glucose from gastrointestinal tract. If glucose is absorbed slowly, less insulin is released. The consumption of NSP also influences the post-prandial rise in blood glucose. The type of NSP is also important. Foods that are rich in soluble NSP (e.g. pulses and oats) produce a smaller (e.g. Butter) glycaemic response than those containing insoluble NSP (eg wheat products) soluble NSP also has a beneficial effect on blood lipid levels, lowering both total and LDL cholesterol. Although insoluble NSP has less of an effect on blood glucose and lipid levels, it is still an important part of the diabetic diet. Patients with diabetes should therefore be encouraged to eat wholemeal bread and cereals, oats and oat products, pulses such as lentils, chickpeas and red kidney beans, and plenty of fruit and vegetables.

Sugar

The British Diabetic Association recommends that sugar intake should be limited to 25g a day and that it should be consumed as part of a whole meal or snack. Sugar consumed as part of the meal has less of an effect on blood glucose level than sugar consumed on its own. Sugar in drinks should be avoided. If sweetness is desired, an energy free sweetener should be used. Sweeteners providing energy such as fructose, sorbitol, and maltodextrin should be restricted.

Whether diabetic or not, an adult needs daily:

- two servings of protein foods e.g. lean meat, fish, eggs or pulses (e.g. lentils)
- at least five servings of starchy carbohydrate foods at least five servings of fruit and vegetables
- three servings of low-fat dairy foods

Alcohol

As alcohol contains calories it should be kept to a minimum to help lose weight. A unit is a small glass of wine or half a pint of beer, or a pub measure of spirits. If the patient is taking tablets to help control his blood sugars, he must remember that alcohol can make hypoglycaemia (low blood sugars) so he should never drink on an empty stomach.

Exercise

Being **fit and active** reduces the risk of diabetes. Patients with diabetes should be encouraged to take regular exercise just the same as everyone else. Physical activity, when combined with a healthy balanced diet, will help to manage the diabetes and prevent long-term complications.

Smoking

People with diabetes are at an increased risk of **cardiovascular disease**. Stopping smoking will help to decrease the risk of cardiovascular disease and minimise the chance of developing other complications of diabetes.

Medication

People with diabetes may often need additional treatments to work alongside their healthy lifestyle such as medication to control their diabetes. This may be in the form of tablets or insulin.

Coeliac Disease

People with coeliac disease cannot eat foods containing gluten, a protein found in wheat, rye, barley and some other grains. In people with coeliac disease, the body's immune system responds to gluten by damaging the lining of the small intestine. Most of the nutrients in food are absorbed through the small intestine. Damage to the small intestine means nutrients cannot be fully used by the body. This can lead to nutrient deficiencies.

Diagnosis

The condition is genetic. If an immediate family member has coeliac disease, the chance increases to 1 in 22. Because so many cases of coeliac disease go undiagnosed, family history alone is not always an accurate gauge.
Some symptoms of celiac disease include:

- Gas Diarrhoea Stomach pain Fatigue
- Joint pain
- Weight loss
- An itchy skin rash called dermatitis herpetiformis

There are dozens of symptoms associated with coeliac disease and vary from person to person. Symptoms may occur in the digestive system or in other parts of the body. Properly diagnosing coeliac disease includes a medical review of the symptoms. It also involves a blood test to look for high levels of certain auto-antibodies and a biopsy of tissue from the small intestine. Though coeliac disease cannot be cured, the condition can be managed. People with coeliac disease can lead long, healthful lives.

Diet and Nutrition

The only treatment for coeliac disease is to eat a gluten-free diet. There are plenty of foods that are naturally gluten-free, including fruits, vegetables, beef, poultry, fish, nuts, eggs and more. A growing number of foods are being developed by manufacturers to answer consumers' increasing interest in gluten-free products.
However, managing coeliac disease is not just about eliminating gluten from the diet. It also involves making sure that one gets all the vitamins and nutrients he need — particularly iron, calcium, fibre and the B-vitamins thiamine, riboflavin, niacin and folate—and watching weight gain. Weight gain can be a side effect for people with celiac disease once they start following a gluten-free diet. This is because the body is absorbing more nutrients and calories from food.

Obesity

What is obesity?

Obesity is a condition in which excess fat leads to impairments in health. It's usually defined as a Body Mass Index (BMI) greater than 30 kg/m² where excess weight is gained due to energy intake exceeding energy expenditure.

Risks

Both being obese and being overweight increase the risk of a range of diseases that can have a significant health impact on individuals.

The risks are higher as BMI increases for

- diabetes - the risk of developing type 2 diabetes is about 20 times greater for people who are very obese compared with healthy weight individuals.
- cancer - 10 per cent of all cancer deaths among non-smokers are related to obesity. coronary heart disease - leading to heart attack and stroke
- hypertension - 85 per cent of hypertension is associated with a BMI greater than 25.
- liver disease - up to 90 per cent of people who are obese have fatty liver which may lead to cirrhosis.

Causes of Obesity

There are many reasons for obesity. While its cause is certainly tied to an imbalance of calories taken in versus calories burned through physical activity, it also can be affected by:

- Family history and genes
- Medications. Some antidepressants, anti-seizure medications, diabetes medications, steroids and beta blockers may cause weight gain.
- Social networks and economics Research suggests people may be at greater risk for being overweight or obese if their friends are; other data shows people at lower economic levels have a greater chance of being obese.
- Lifestyle habits, eating behaviours and stress
- Too little sleep. This can affect hormones that increase appetite.
- Medical problems, such as hypothyroidism, Prader-Willi and polycystic ovary syndrome.

Approach to Weight Loss

Weight loss therapy should be based on three components:

1. Diet,
2. Physical activity and
3. Behaviour therapy like recognizing triggers for eating or learning to pinpoint obstacles that hold you back from making lifestyle changes.

This combination has been found to be more successful than using any one intervention alone.

Healthy Eating Plan

A dietician creates a plan based on the medical history, lifestyle and food preferences and also explores how the person‘s habits, emotions and environmental issues affect his diet.
A weight loss plan should also include a discussion on:

- **Calories.**

  No weight loss effort can work long-term without a close and constant look at the calories one eats each day. The goal should be to establish a new balance between calories in and calories out (burned through physical activity).

- **Protein.**

  The protein we eat supports our muscles. It is important to get enough protein and exercise to keep—and even grow—muscle strength and mass. Foods rich in protein such as meats, fish, low-fat and fat-free dairy foods, nuts and beans are also satisfying. When part of a well-planned diet, protein can delay hunger and keep one feeling full longer.

- **Fibre.**

  Foods rich in fibre such as whole fruits, vegetables, beans and whole grains tend to offer plenty of vitamins and minerals without plenty of calories. High-fibre foods satisfy hunger and keep the person feeling full longer than processed foods. They are tasty, nutritious "filler foods."

- **Eating a Variety of Foods.**

  A healthful weight loss plan includes a variety of foods from all the food groups: fruits, vegetables, grains, dairy and meat and beans, plus a moderate amount of healthy fats.

Osteoporosis

Osteoporosis means 'porous bones'. The texture inside our bones is like honeycomb, and over the years the holes in the honeycomb become larger as they lose bone mineral. This is called osteoporosis, and it weakens bones and makes them more vulnerable to breaking. Often osteoporosis is called 'the silent disease' as it can remain undetected until someone has a broken bone as a result of a fall or accident.

Osteoporosis can strike at any age, but occurs mostly in people over 50. One in two women and one in four men older than age 50 will experience an osteoporosis-related bone fracture during their lifetime. Taking steps to build bone health while one is young can save people from this disease. However, at every age, a bone-building diet and regular physical activity are important. They help ensure bone tissue continues to be built.

What causes Osteoporosis?

We often think of bones as being 'static', but we're constantly making new bone and breaking down old bone. There are two kinds of cells that help in this process. During childhood and up to our 20s,
the 'building' cells dominate over the 'destruction' cells. After the age of about 30, the 'building' cells slow down and by the age of around 40 the 'destruction' cells dominate. This means we lose bone mineral faster than we replace it, and the end result is osteoporosis.

It's important to build up as much bone mineral as we can while we're growing because our 'building' cells are at their peak.

Who's particularly at risk?

Our genes play a role in bone health, so a family history of osteoporosis means a greater risk. Other risk factors include:

- Early menopause or hysterectomy
- Taking corticosteroids (steroids) for conditions such as asthma, arthritis or inflammatory bowel disease
- Illness and inability to move very much
- Conditions that affect absorption of foods, such as coeliac disease
- Excessive drinking
- Smoking
- Being very underweight

How to minimise the risk of osteoporosis

There are many ways to help our bodies build strong and healthy bones, especially during childhood and adolescence. After about the age of 30, it's difficult to increase bone mass, but protecting the bones can begin at any age.

Bone Health and Diet

Bones may seem dry and dull, but they are far from it. They are constantly under construction; certain cells break down bone tissue and other cells use the calcium and nutrients in the foods we eat to build new bone. If we are not physically active and getting the nutrition we need, our bones will suffer. Over time they will become less dense, weaker and more likely to fracture.

Bone Building Nutrients

Calcium, the major nutrient needed to form new bone cells, is vital for bone health. Our bones store more than 99 percent of the calcium in the body. Good sources include dairy products, almonds, dark green leafy vegetables and calcium-fortified foods such as cereals and fruit juice

Broken wrists, hips and spinal bones are the most common fractures as a result of osteoporosis. Here are a number of ways to build and maintain healthy bones:

- **Getting active** - regular weight-bearing activity can help maintain bone strength and reduce the rate of loss of bone mineral. Activities such as brisk walking, climbing stairs or jogging are good examples of weight-bearing exercise. Short bouts of high-impact activity, such as jumping up and down, are helpful for building bones when one is young.
- **Boosting calcium intake** - calcium is important for healthy bones, and a mature adult skeleton contains about 1,200g. Many foods contain calcium, but the richest and most easily absorbed source is found in dairy products. One should aim for about three servings of these a day to meet our calcium needs, such as a glass of milk, a small matchbox-sized piece of cheese and a 150g pot of yogurt. Fish eaten with bones, pulses, cereals, nuts, seeds, dried fruit and green vegetables also contain calcium.

Age (years)	Calcium requirement (mg/day)
0 to 12 months	525
1 to 3 years	350
4 to 6 years	450
7 to 10 years	550
11 to 14 years 15 to 18 years 19+ years	Male Female 1000 800 1000 800 700 700

Calcium cannot build bones alone. It works with other nutrients to increase bone strength. These include:

- Vitamin D Vitamin K Potassium Fluoride Magnesium
- **Soaking up vitamin D** - vitamin D helps our bodies to absorb calcium from the digestive system. Most of the vitamin D we need comes from exposing our skin to sunlight. It's also found in oily fish and fortified margarines. Some groups - such as older people, those who aren't able to go outside or those who cover up completely when outside - might need a daily supplement (10 micrograms) of vitamin D.
- **Choosing plenty of fruit and vegetables** - fruit and vegetables (particularly green leafy vegetables) contain vitamin K, which is thought to have a role in building healthy bones. Fruit and vegetables also make the body less acidic, which helps to keep calcium in bones.
- **Watching the intake of certain foods** - animal protein foods, salt, fizzy drinks, alcohol and caffeine can all work to leech minerals out of bones
- **Keeping a healthy body weight** - a very low body weight can affect bone health and increase the risk of osteoporosis. Heavier people tend to have a higher bone mass, but being too **overweight** has other effects on health.
- **Smoking** - smoking prevents the bone-building cells from working as efficiently as they should.

Nutrition Requirement for Different People

Pregnancy and lacation

Everyone should be advised to eat a healthy diet but this is particularly important during pregnancy and lacation because of the influence of nutrition on the infants health. Although dietary guidelines for pregnancy and lacation do not differ from those for other healthy adults, women tend to be particularly receptive to nutritional advice at this time. Dietary advice before conception is particularly important because one of the most significant influences on the infants birth weight is the mother's nutritional state at the start of pregnancy. Ideal weight should be attained before the pregnancy starts.

Being a healthy body weight is important before pregnancy. If the woman is very underweight, it can be more difficult for her to conceive. Being obese may also cause problems with conceiving especially if the woman suffers from **polycystic ovary syndrome**. Women who are obese while pregnant also increase the risk of complications during pregnancy, delivery and in the few days after birth.

The ideal weight range is usually calculated using the **body mass index (BMI)**. A BMI between 18.5 to 25 is a healthy weight for most people and associated with relatively low risks. For people with a BMI over 30, even a small weight loss can greatly increase the ability to conceive and have a healthy pregnancy.

Folic acid

The department of health recommends that all women who are planning a pregnancy, or who may become pregnant, should take a folic acid supplement. Supplementation should continue until the 12th week of pregnancy. Different doses are recommended depending on the level of risk. In addition women should be advised to increase their intake of folate-rich foods.

Doses of folic acid before conception and after pregnancy

High risk 5mg daily Low risk 0.4 mg daily

Dietary sources of folate

Food	folate content (micro gram)
Milk 1 pint	35
2 slices white bread	16
2 slices wholemeal bread	30
1 serving spinach	80

1 serving green beans	50
1 serving potatoes	45
1 serving cauliflower	45
1 serving baked beans	50
1 orange	50
1 glass orange juice	40

Vitamin A

An adequate intake of vitamin A is required before conception, but excessive amounts can substantially increase the risk of birth defects.The department of health has warned women who could become pregnant to avoid eating liver and liver products. This is because liver is a particularly concentrated source of vitamin A. women planning a pregnancy should also be advised to avoid dietary supplements containing vitamin A. This recommendation has caused some confusion. It does not mean that vitamin A should be avoided altogether- in any case it would be difficult to eat a diet devoid of vitamin A – but most women consume more vitamin A than they require in the diet. Thus, to avoid excessive intake, dietary supplements containing vitamin A should be avoided.

Nutritional advice for women planning a pregnancy

A woman who is planning a pregnancy should:

- Eat a diet based on healthy eating guide lines
- Increase intake of folate-rich foods
- Take a supplement of folic acid until 12th week of pregnancy
- Avoid liver or products containing it
- Avoid dietary supplement containing vitamin A
- Stop taking oral contraceptive three months before planned conception.

Pregnancy

Pregnancy and the needs of the growing foetus impose increased nutritional demands on the mother, but large increases in nutrient intake are not required. This is because absorption of many nutrients increases, excretion decreases and metabolism is generally more efficient.

A balanced diet

With a few exceptions, one can continue to eat a normal, healthy diet before and during pregnancy. This includes regular meals and snacks, and a sensible healthy eating regime containing:

- plenty of starchy carbohydrates - bread, rice, pasta, breakfast cereals, chapattis, couscous and potatoes
- plenty of fruit and vegetables - at least five portions a day
- low or reduced fat dairy products such as milk, yoghurt, fromage frais and pasteurised cheeses lean sources of protein, such as meat, poultry, fish, eggs (well-cooked), beans and pulses
- not too many fat-rich and sugary foods
- at least eight medium glasses of fluid each day
- very little or no alcohol

Generally, pregnancy can progress well with the need for only very small increases in protein, carbohydrate, fat, vitamins and minerals. The digestive system in pregnant women changes and becomes more efficient at absorbing certain nutrients. In fact, with only a few exceptions, most of the additional nutrient needs of pregnancy can be met by eating a well-balanced and varied diet. So the old saying 'eating for two' doesn't mean that one should eat twice as much food.

Weight gain

Optimum weight gain in pregnancy depends on the pre-pregnant weight. The baby and amniotic fluid are only a small part of the weight gain; the rest is an increase in the mother's fat stores to provide an energy reserve for later breastfeeding. There are no specific recommendations for pregnancy weight gain in the UK. However in the USA, thinner women are encouraged to gain a little more weight, anywhere between 12.8kg and 18kg (28lb to 40lb), while women of an average weight should aim for between 11.5kg and 16kg (25lb to 35lb). Overweight and obese women should aim to gain less weight.

Energy

An adequate energy intake is essential during pregnancy, both for the growth and development of the foetus and also for the development of the mother's stores adipose tissue for lacation. However it is neither necessary nor desireable to eat for the two; the department of health has recommended an average increase in energy intake of .08 MJ (200kcal) and that only in the last trimester. Excessive energy intake will obviously result in undesireable weight gain, and this may result in the production of too heavy an infant as well as hypertension in the mother.

Probably the best guideline for energy intake is the achievement of desireable weight gain in the mother. This varies depending on her initial weight as follows:

- 9kg for women who are in the ideal weight range (i.e. between 80 and 120% of ideal body weight) at start of pregnancy
- 13.5 kg for women who are under weight (i.e. less than 80% of ideal weight) at the start of the pregnancy.
- 7.5 kg for women who are over weight (i.e. more than 120% of ideal weight) at the start of pregnancy.

Women normally gain about 4kg by the end of 20th week and then about 0.5 kg/ week until term.

Iron

Iron supplements are required by those women who have low iron stores at the start of pregnancy. Women likely to have poor iron status who have heavy periods and those who have had several pregnancies in close succession.

Folic acid

The DOH recommends that folic acid supplements should be taken by all pregnant women, starting from the time when they begin planning a pregnancy until at least the 12th week of pregnancy.

Dietary advice for common problems

Nausea and vomiting

Nausea and vomiting are common, particularly in early pregnancy but usually subside by the 16th week. There is no harm in snacks replacing full meals provided that the snacks are nutritious. Suitable snacks include:

- Plain biscuits or crackers
- Breakfast cereals
- Hot or cold milk drinks
- Yoghurt
- Fresh fruit or raw vegetables
- Jacket potatoes Sandwiches Soups
- Bread or toast

Heartburn and indigestion

The following advice may be helpful:

- Avoiding any foods which cause the symptoms
- Eating smaller meals more frequently
- Eating slowly
- Avoiding heavy meals near bedtime.

Constipation

Women should be advised to increase their intake of non-starch polysaccharides (NSP) by eating whole meal bread, brown pasta and rice, whole grain cereals, pulses, and fruit and vegetables. Fluid intake should be increased at the same time.

Infants

Good nutrition is essential not only to promote growth and development but also because it may contribute to disease prevention in adult life. The risk of developing obesity, hypertension, coronary heart disease and cancer may be alterered by diet in the first few weeks and months of life.

Birth to six months

Breastfeeding

The Department of Health recommends that, wherever possible, infants are breastfed exclusively until six months of age.Breastmilk is the best source of nutrition for newborn babies, as it provides easily digestible nutrients in the right quantities. It is also packed with antibodies and helps to establish the baby's immune system. Babies breastfed exclusively are reported to be at less risk of stomach upsets and ear, respiratory and urinary tract infections than those who are bottle-fed formula milk. They're also less likely to become obese or experience constipation and vomiting. If there's a family history of allergies or diabetes, breastfed babies are less likely to develop these.

Breast milk contains substances that help the development of a baby's brain, retinas, gut lining and protective sheath for the central nervous system. Breast milk also contains hormonal factors that help the baby's growth and development. It carries digestive enzymes, too, which help to digest the nutrients in milk, helping the baby's immature digestive tract.

When not to breastfeed

Breastfeeding isn't recommended for all women. For example, women who are HIV-positive risk transmitting the disease to their baby through their milk. Therefore they should not breast feed their babies.

Types of breast milk

During the first few days after birth, the mother's breasts produce a substance called colostrum. This yellowish fluid is packed with antibodies and is rich in protein, making it ideal for newborn babies.

The colostrum soon changes and becomes thin and white (transitional milk). Then, after three or four days, the mature breast milk starts to come through.

At each feed the breasts produce two types of milk: foremilk, produced at the beginning of feed; and hind milk, which has more fat, energy and essential nutrients. As babies grow, it is important they receive the hind milk in order to meet their nutritional needs.

Establishing and maintaining breast feeding

The infant should be put to the breast immediately after delivery in order to develop the suckling reflex. Thereafter the baby should be fed every 2-3 hours as frequent suckling stimulates the milk supply. Once lacation is well established feeds can be spaced apart. Support for the mother from family, friends and health professionals is essential during the early weeks after delivery.

Complementary feeding

This is the term used when infant formula milks are given in addition to breast feeding.This may be done for reasons of convenience or if the mother’s milk supply is in adequate. However, complementary feeding diminishes the mother’s milk supply even further, and a return to full breast feeding will be difficult.

Dietary supplements

In general the mother does not need to take dietary supplements, but if there is any doubt about the mother’s diet, vitamin drops may be prescribed for the baby.

Bottle feeding

Despite encouragement to breast feed, some mothers choose to bottle feed and their decision should be respected.

Types of infant feeds

Infant feeds are available in the form of powders for reconstitution, concentrates and ready to feed liquids. There are several different feeds, they are:

- Whey-based milks
- Casein-based milks
- Follow-on milk
- Pre-digested milks
- Lactose-free, casein- based feeds
- Pre-term milks

Whey- based milk

Whey-based milk most closely mimic breast milk, and mothers wishing to bottle feed should generally be advised to use them. They contain a whey: casein ratio of about 60:40 which is similar to that of breast milk. In this milk the whey: casein ratio is 20:80 and is similar to cow's milk. Like whey based milks casein- based milks may be sued from birth.

Follow-on milk

Follow –on milks differ from whey and casein based milks in that they contain a higher concentration of protein and electrolyse. They also contain more iron and vitamin D than either whey and casein-based milks or cow's milk. They are designed for use in infants over six months old and should not be used for younger babies.

Soya based formulas

Soya based formulas do not mimic breast milk as closely as either whey- or casein based formulas. Soya based formulas are prescribed for lactose intolerance, proven whole cow's milk sensitivity, galactokinase deficiency and galactosaemia.

Weaning (six months to one year)

When to start weaning

At six months, a baby's digestive system has matured enough to cope with solid food, and other developmental changes (such as the ability to bite and chew) mean the baby is ready to experience new tastes and textures. The Department of Health recommends that weaning shouldn't be introduced until the age of six months, but the baby may show signs of wanting to try solids earlier than this. The aim of weaning is gradually to introduce a variety of tastes and textures so that, by the age of one, the baby is enjoying a varied and healthy diet. Every baby is different. Some enjoy trying new tastes and textures, moving through weaning quickly and easily, while others need a little more time to get used to new foods.

How to start

Given below are some general tips for successful weaning:

- First of all a good time of day should be chosen for the baby to start on solids. This should be when they're not too tired or hungry (in the early stages, offering a breastfeed or a little formula beforehand will mean that the baby is not too hungry and so is less frustrated with learning to take solids from a spoon).
- Plenty of time should be allowed to the baby for eating.

- The food should not be forced on the baby. If they don't want to try a food, it should ne taken away and can be offered later or in a few days' time.
- Plenty of bibs and cloths should be made available to clear up the mess.
- Only a small amount of food should be heated up so the food that the baby does not eat is not wasted.
- Previously uneaten food should not be reheated for use.
- The temperature of food should always br tested before it is given to the baby.
- Self feeding should be encouraged. As the baby develops and shows signs of wanting to feed independently, finger foods should be given.

Stages of weaning

Stage 1

When starting to give baby solid foods, a teaspoon of one of the followings can be mixed with the baby's usual milk (breast or formula):

- smooth vegetable purée such as carrot, parsnip, potato or yam, or
- fruit purée such as banana, cooked apple, pear or mango, or
- cereal (not wheat-based) such as baby rice, sago, maize, cornmeal or millet.

This should be offered to the baby before or after one of the usual milk feeds, or in the middle of a feed, if that works better.Most babies take time to learn how to take food from a spoon. So one should be patient and be prepared for some mess. Food should not be forced on the baby. If the food really doesn't seem to be wanted, it should be stopped and one should wait until the next time. The main aim at this stage is to get baby used to the idea of taking food from a spoon. He or she will still be getting most of their nourishment from breast or formula milk (around 500-600ml a day).

Stage 2

Feeds will still be mainly breast or formula milk (around 500-600ml a day). But gradually the amount of solid food can be increased, either before, during, or after the milk feed. At the same time,one can move gradually from solid food at one feed in the day to solid food at two, and then three feeds. At this stage the baby can be given full-fat cows' milk products, such as yoghurt or cheese sauce as a solid food.

Cereals can also be given to the baby but just once a day. Different foods and different tastes can also be added. Foods already cooked for the family just as mash, sieve, or purée can also be tried but in a small amount and without adding salt, honey or sugar.
Preparing larger quantities than required and then freezing small portions for later use, for example in an ice cube tray, can save time and effort.

More first foods to try

Add to the vegetable, fruit and cereal purées other foods such as:

- Purées of meat and poultry
- Purées of pulses such as lentils (dahl), hummus
- Full-fat milk products such as yoghurt or fromage frais - unless advised otherwise by health visitor or GP
- Full-fat milk can also be used for cooking, for example in cheese sauce, but it should be avoided giving it to the baby as a drink until after he or she is a year old

Stage 3

As solid food becomes a large part of a baby's diet, it's important to offer a range of different foods. This is to provide the baby with all the vitamins and minerals he or she needs. The baby should still be having a minimum of 500-600ml of breast or formula milk a day.

The baby should be given two to three servings a day of starchy foods such as potatoes, yams, rice or bread. Fruit and vegetables make good finger foods and should be included at two or more meals each day. The baby should have one serving of soft cooked meat, fish, egg, tofu or pulses such as beans or lentils (dahl) a day. Red meat such as beef and lamb is an excellent source of iron. Eggs (well cooked) are a quick, nutritious and cheap source of protein.

As babies continue to develop, foods with a thicker consistency and a lumpier texture can be introduced to encourage them to learn to chew and manage small pieces of food, even if they don't have teeth yet.Finger foods such as toast, bread, breadsticks, pitta bread or chapatti, peeled apple, banana, carrot sticks, or cubes of cheese can be given to the baby. Sweet biscuits and rusks, should be avoided so that the baby doesn't get into the habit of expecting sweet snacks.

Once the baby is over six months, he /she can be given vitamin drops containing vitamins A, C and D. However, if the baby is on infant formula, there is no need to start giving them vitamins until they are having less than 500ml of formula a day. This is because infant formula already contains added vitamins and minerals.

Stage 4

As the baby becomes increasingly used to eating solid foods, he or she should be learning to fit in with the family by eating three minced or chopped meals a day, plus breast or formula milk as the main drink (around 500 - 600ml a day). The baby should be given fruit or other healthy snacks between meals. Babies have small stomachs and they need energy to grow, so they should be given full-fat dairy products. Cutting back on fat is sensible for adults, but not for babies or young children.

Three to four servings a day of starchy foods and of fruit and vegetables should be given to the baby. Biscuits and cakes should be avoided because these foods will fill the baby up without providing right nutrients.

Babies On Vegetarian Diet

For those who have decided not to give their baby meat or fish, must make sure that they give their babies two servings a day of pulses (such as red lentils, beans or chickpeas), or tofu to make sure that the baby gets all the energy and nutrients he/she needs. The vitamin C in fruit and vegetables might help bodies absorb iron, so they should be given fruit and vegetables at mealtimes. It is especially important to give vitamin drops to babies who are on a vegetarian diet.

Vegan diets, which contain no foods from animals, can't easily give babies all the energy and nutrients they need. For this reason, vegan diets aren't recommended for young babies.

What foods to avoid

Salt

S alt should be added to the foods given to the baby because a young baby’s kidneys can’t cope with it. Some foods, such as cheese, sausages and bacon, are high in salt, so these should be given in small amounts only.

Most of the salt we eat comes from the food products we buy, Food labels often give figures for sodium rather than salt. Lower salt (or lower sodium) versions should be chosen for the baby. Babies under a year should have less than 1g salt per day, which is less than 0.4g sodium.

Sugar

Sugary foods and drinks can encourage a sweet tooth and lead to tooth decay when the baby's teeth start to come through. Sugar can only be added to foods if it's really necessary. Sweet puddings, biscuits, sweets and ice creams are not recommended for babies under a year.

Honey

Honey should not be given to the babies, even for easing coughs, until they are a year old. Very occasionally honey contains a type of bacteria that can produce toxins in babies' intestines. This can cause a very serious illness called infant botulism. Honey is also a sugar, which means, like sugar, it can encourage a sweet tooth and lead to tooth decay.

Low-fat, low-calorie and high-fibre

It isn't advisable to give 'low-fat', 'low-calorie' or 'high-fibre' foods to babies. Babies have small tummies, but are growing fast. They need foods that provide lots of calories and nutrients in a small amount of food, rather than bulky high-fibre foods.

Fat gives them energy and provides some vitamins that are only found in fat. So full-fat dairy foods should be chosen. Babies should not be given high-fibre versions of foods, especially those with added bran. It stops babies from absorbing important minerals such as calcium and iron. It's better not to give the baby brown rice, wholemeal pasta or bran-enriched breakfast cereals until they are older, although they can be given some brown bread.

Fish

Any shark, swordfish or marlin should not be given to the baby. This is because the levels of mercury in these fish can affect a baby's growing nervous system.One should also avoid giving raw shellfish to babies to reduce their risk of getting food poisoning.

Eggs

Raw or lightly cooked eggs should not be given to babies. Eggs can be given to babies over six months, but they should be thoroughly cooked until both the white and yolk are solid.

Starting solids before six months

When deciding to start baby on solid foods before six months,it should be remembered that there are many foods that should be avoided at this age including:

- soft and unpasteurised cheeses
- liver
- peanuts
- nuts
- seeds
- cows' milk
- eggs
- foods that contain wheat or gluten
- fish and shellfish

Food allergies

If it is feared that the baby might develop a food allergy, it's a good idea to introduce the foods that are most likely to cause food allergies one at a time and to start with just a small amount (but don't introduce them before six months). These foods are: peanuts, nuts, seeds, egg, milk, soya, wheat (and other cereals that contain gluten such as rye, barley and oats), fish and shellfish.

Peanut allergy

If the baby has already been diagnosed with an allergy, such as a food allergy or eczema, or if there is a history of allergy in their immediate family (if their parents, brothers or sisters have an allergy such as a food allergy, asthma, eczema, hayfever, or other types of allergy) then the baby has a higher risk of developing peanut allergy. If the baby hasn't been diagnosed with any allergies and there isn't a history of allergy in their immediate family, one can choose to give them peanuts or foods containing peanuts after they are six months old.

Cows' milk allergy

If the baby has an allergy to cows' milk, the GP might prescribe hydrolysed protein infant formulas. Babies who are allergic to cows' milk may also be allergic to soya. So only use soya-based infant formulas should be used.Milks based on goats' milk protein have not been approved for use by the European Food Safety Authority for babies under a year old, so these should not be given to the babies.Most babies with cows' milk allergy are also likely to react to goats' milk and sheep's milk. This is because some of the proteins in these types of milk are similar to those found in cows' milk. The levels of lactose are also similar in these milks, so milks based on goats' milk protein are also unsuitable for babies that are lactose-intolerant.

Water

This is the best alternative drink to milk, but fully breastfed babies don't need any water until they start eating solid food. For babies under six months old, tap water should be used after boiling. water should be allowed to cool before giving it to the baby.
Bottled water isn't a healthier choice than tap water and usually isn't sterile. In fact, some natural mineral waters aren't suitable for babies because of the amount of minerals they contain. When giving bottled water to babies under six months,it should be boiled and cooled down just like tap water

Fruit juice

Fruit juices, such as orange juice, are a good source of vitamin C. But giving the baby juices and other drinks will reduce his or her appetite for milk. Fruit juice also contains sugars, which are present naturally, and these can cause tooth decay. Fruit juice is also acidic. For these reasons, it's important not to give baby fruit juice before he or she is six months old.

Other drinks

The following drinks aren't suitable for babies and they could fill them up so they aren't hungry for more nutritious foods:

- juice drinks, fizzy drinks, sugary drinks and squashes
- diet drinks, 'low-calorie' and 'no added sugar' drinks
- flavoured milks and flavoured waters
- baby drinks and herbal drinks
- tea and coffee

Pre school children (one to four) Nutrition for children

It is important to establish good dietary habits in childhood to lay the foundation for life-long healthy eating. This is not always easy, but every effort should be made. Young children are completely dependent on parents and carers for their meals, and will often want to imitate what is being eaten by the rest of the house hold. The presence of a young child can therefore be a time for the whole family to review their eating habits. Healthy eating habits will benefit the parents and help to set a good example to the young child.

Food and nutrients help to form strong teeth and bones, muscles and a healthy body. A good diet can also help to protect the child against illness now and in the future.

This is a critical time to complete the weaning process, reducing the amount of milk and establishing the foundations of the child's diet. A young child's diet needs special care and planning - the need for energy and nutrients is high, but appetites are small and eating habits can be fussy. Their diet must be made up of small, regular, nutrient-dense meals.

Key nutrients and dietary sources
Suitable foods

The food given to the child should be based on the following food groups to help ensure they're getting all the important nutrients. Pre-school children should be allowed to eat according to appetite, as there are no specified recommendations on portion sizes for this age group. At this age, children are often good at regulating their appetite. There's no need to rely on pre-prepared toddler foods. If the family diet is healthy, children can just have family food.

1. At least one kind of starchy carbohydrate, such as bread, rice, pasta, noodles, cereals or potatoes, should be served with all meals.

Young children have small appetites, so fibre-rich carbohydrates can be bulky and inhibit the absorption of some minerals. High fibre carbohydrate foods, such as whole-wheat pasta and brown rice, should be introduced gradually so that by the time children are five, they're eating the same fibre-rich foods as the rest of the family.

2. Fruit and vegetables are important. Children should be given at least five servings of fruits and vegetables a day, where a serving is about a handful in size. Given below are some guidelines for giving fruits and vegetables to the children;
   - fruit should be used in puddings and as snacks
   - Frozen and canned fruit and vegetables can be just as nutritious as fresh varieties
   - Vegetables can be eaten raw or cooked (serve crunchy rather than very soft to preserve the vitamins and minerals)
   - If vegetables aren't a favourite, try hiding them by pureeing in to soups, sauces, casseroles and pizza toppings

3. Milk and dairy foods are an important source of calcium. A child should be having about one pint (500 to 600ml) of milk a day.

   - full-fat varieties; semi-skimmed may be given from the age of two if the overall diet contains enough energy and nutrients
   - milk can be used on cereals or in drinks, puddings and sauces cheese, fromage frays or yoghurt can be given instead of some milk
   - grated cheese, cheese spread or cheese portions can be used on sandwiches or toast
   - yoghurts can be used as a pudding or snack between meals, served alone or with fruit

4. Meat, fish and alternatives should be eaten by the child once or twice a day.

- Minced beef, turkey, chicken and pork should be cooked slowly to ensure it's soft and tender The Food Standards Agency recommends at least two servings of fish a week, one of which should be oily. But a child should not be given more than two servings of oily fish a week. Shark, swordfish or marlin should also be avoided, as these contain high levels of mercury, which might affect a child's developing nervous system
- Egg can be given as either boiled, in sandwiches, as omelettes or scrambled

Different beans and pulses, such as lentils, baked beans, peas and chickpeas can be given.

Children 5 to 12 years

Nutrition and children

Although their growth is slower than in infancy, school-aged children still have high nutritional needs but fairly small appetites. So it's crucial all meals and snacks continue to be rich in nutrients and energy. The food choices children make during the crucial years of development can influence their future health risk and can also influence food habits in later life. A structured eating plan with regular meals and snacks is important to establish good eating habits. Ensure there's also plenty of variety - burgers and chips are fine occasionally, but not for every meal. A limited number of foods make it difficult to obtain the full range of nutrients. Therefore a child should be given a range of foods based on each of the main food groups.

Energy

School children still have a high energy requirement for growth and activity, but increasing numbers are becoming overweight. This is because they’re eating too many calories and not being active enough to use up the extra energy they’ve eaten.

Their meals and snacks should be based on five main groups but fatty and sugary snacks should be avoided where possible. An overweight child still needs a nutrient-packed diet that provides all the essential building blocks for growth and development. Healthy eating ensures that children maintain healthy weight.

Calcium

This mineral is important for healthy bone development. Good sources include dairy products such as milk, cheese, yoghurt and fromage frais, as well as fortified orange juice, green leafy vegetables, cereals, sesame seeds and tofu. A child should be given three servings of calcium-rich food a day - for example, a 150ml glass of milk, a small pot of yoghurt and a small matchbox-sized piece of cheese.

Folate

This vitamin is important for growth, but intake is low in some children, especially those who skip breakfast because fortified cereals are a good source of folate. Other sources include bread, green leafy vegetables and pulses.

Iron

This mineral helps to keep red blood cells healthy. Insufficient iron intake can lead to iron-deficiency anaemia, but this is much less common in primary school–aged children than their younger and older siblings.

Good sources of **iron** include red meat, liver, fortified breakfast cereals, beans and pulses. To help absorb the iron more effectively from non-meat sources, it can be combined with vitamin C-rich foods such as citrus fruits and fruit juice.

Fatty and sugary foods

This group includes spreading fats (such as butter), cooking oils, sugar, biscuits, cakes, crisps, sweets, cream and ice cream, chocolate and sugary drinks. These foods shouldn't be eaten too often and, when they are, should only be consumed in small amounts. They're loaded with calories, fat and sugar, and don't necessarily contain many vitamins and minerals. Also, sugary foods and drinks (including fruit juice) can increase the risk of dental decay. The amount of sugar and sweets should be limited or should be offered at the end of meals, rather than in-between. Some sugar-free or diet drinks can also cause decay because of their acidity. Milk or water is the best drink between meals.

Adolescence

Adolescence is a time of great physiological and psychological change. Physiological changes influence nutritional requirements, and psychological changes tend to affect eating patterns. Physiological changes include a marked acceleration in growth and gain in bone and muscle tissue. During the growth spurt, boys gain on average about 20cm in height and girls about 10cm. Boys gain proportionately more muscle and bone and girls more fat. For most boys and girls the teenage years are a period of increasing independence from the family, and often a time of rebellion.

Teenagers and diet

Teenagers' diets should sustain growth and promote good health. During this time, a number of physiological changes occur that affect nutritional needs, including rapid growth and considerable gains in bone and muscle (especially in boys). This is also a time when teenagers begin to develop real independence from their parents, including making decisions about the food they eat. Teenagers often choose food in response to peer pressure or as an act of defiance against parents. It's not all bad news, as there are many opportunities to encourage healthy dietary habits in teenagers, particularly when relating good food choices to sporting or physical prowess. There should be plenty of healthy options available at home for healthy meals and snacks.

Nutrition

The National Diet and Nutrition Survey of Young People Aged 4-18 Years provides detailed information on the nutritional intake and physical activity levels of young people in the UK. The findings reveal average consumption of saturated fat, sugar and salt is too high, while that of starchy carbohydrates and fibre is low. During the seven-day recording period, more than half the young people surveyed hadn't eaten any citrus fruits, green leafy vegetables (such as cabbage or broccoli), eggs or raw tomatoes. The survey also showed that one in ten teenagers have very low intakes of vitamin A, magnesium, zinc and potassium. Intake of iron and calcium was also below ideal levels among many of the teenagers. Meanwhile the rising levels of obesity suggest many young people are eating too many calories.

Iron deficiency

Iron deficiency is one of the most common nutritional deficiencies in the UK. In the National Diet and Nutrition Survey, up to 13 per cent of teenage boys and 27 per cent of girls were found to have low iron stores. Rapid growth, coupled with a fast lifestyle and poor dietary choices, can result in iron-deficiency anaemia. Teenage girls need to take particular care because their iron stores are depleted each month following menstruation.

The main dietary source of iron is red meat, but there are lots of non-meat sources, too, including fortified breakfast cereals, dried fruit, bread and green leafy vegetables. The body doesn't absorb iron quite as easily from non-meat sources, but iron absorption can be enhanced by combining these foods with a food rich in vitamin C (found in citrus fruits, blackcurrants and green leafy vegetables). In contrast, tannins found in tea reduce the absorption of **iron**, so it's better to have a glass of orange juice with the breakfast cereal than a cup of tea.

Calcium deficiency

The survey also highlighted that 25 per cent of teens had a calcium intake below the recommended level, which has serious implications for their future bone health. Osteoporosis is a disease that causes bones to become brittle and break very easily. Bones continue to grow and strengthen until the age of 30, and the teenage years are very important to this development. Vitamin D, calcium and phosphorous are vital for this process, with calcium requirements for the teenage years ranging from 800mg to 1,000mg per day.

Calcium-rich foods should be consumed every day. The richest source of calcium in most people's diet is milk and dairy products. Teenagers should be encouraged to eat two to three portions of dairy food each day – for example, a glass of milk, a 150g pot of yoghurt and a small matchbox-sized piece of cheese. If a teenager doesn't eat dairy products, he/ she should try fortified soya milk. Dairy foods are often avoided by teenage girls because of concerns about fat content. Low-fat dairy foods are equally rich in calcium, so providing these versions to aid consumption can be helpful.

Foods to choose

Adolescence is a time of rapid growth, and the primary dietary need is for energy - often reflected in a voracious appetite. Ideally, foods in the diet should be rich in energy and nutrients. Providing calories in the form of sugary or fatty snacks can mean nutrient intake is compromised, so teenagers should be encouraged to choose a variety of foods from the other basic food groups:

- Plenty of starchy carbohydrates - bread, rice, pasta, breakfast cereals, chapattis, couscous and potatoes
- Plenty of fruit and vegetables - at least five portions every day
- Two to three portions of dairy products, such as milk, yoghurt, fromage frais and pasteurised cheeses
- Two servings of protein, such as meat, fish, eggs, beans and pulses
- Not too many fatty foods
- Limit sugar-rich food and drinks

Other important dietary habits to follow during adolescence include:

- Drinking at least eight glasses of fluid a day.
- Eating regular meals, including breakfast, as it can provide essential nutrients and improve concentration in the mornings. Choosing a fortified breakfast cereal with semi-skimmed milk and a glass of fruit juice.
- Taking regular exercise, which is important for overall fitness and cardiovascular health, as well as bone development.

Adults

Nutrion Requirement

By eating a nutritious diet and being physically active, one can maintain a healthy body weight and reduce the risk of developing diet-related illnesses, such as type 2 diabetes, heart disease and some types of cancer.

Some of the most important risk factors for premature death in adults are:

- Excessive alcohol intake
- Smoking
- Obesity
- Physical inactivity Raised blood cholesterol Raised blood pressure

With the exception of smoking, applying the principles of healthy eating and being more physically active can make a significant impact on all of these risk factors.

Importance of a Healthy Diet

To understand how one can eat healthily, it's important to know which types of food to consume and why. The body requires a well-balanced diet, with a good supply of carbohydrates, especially high-fibre foods, plenty of fruit and vegetables, some protein, low-fat dairy products and plenty of fluid. The best way to get the right balance is to follow the principles of healthy eating.

A consumer survey carried out by the Food Standards Agency revealed that knowledge of what constitutes a healthy diet is actually quite high. Most of the adults surveyed knew which kinds of food they should be eating more of, such as fruit and vegetables, or less of, such as fat and salt.

But data from the National Diet and Nutrition Survey, published in 2003, shows that UK adults eat too much saturated fat, sugar and salt, not enough dietary fibre and, on average, their fruit and vegetable intake is fewer than three portions a day. The rising number of people becoming overweight also tells us that, for a variety of reasons, this knowledge about diet is not being translated into positive action to achieve a healthier diet.

Everyone should be eating a variety of food to achieve a healthy diet, but some nutrition issues are more specific to men or women.

Nutrition issues

While both sexes need to maintain a healthy body weight, men in particular should be wary of excess weight. In men, extra pounds tend to be stored around the tummy. Sometimes referred to as abdominal fat, this increases the risk of developing heart disease and diabetes to a greater extent than fat stored on the hips and thighs, which is more typical for women. This risk of abdominal obesity is even greater for men of Afro-Caribbean and Asian origin.

The elderly

The number of older adults in the world is growing both in absolute and relative terms. In 1994, 16 per cent of the UK population was aged over 65. By 2031, this will increase to 23 per cent, and 10 per cent of this figure will be made up of people over 75 years old. The greatest challenge over the coming years will be maintaining the health of this increasing number of older adults. Deciding what we mean by 'older people' is a little arbitrary. The World Health Organisation classifies people aged between 45 and 59 as 'middle age', 60 to 74 as 'elderly' and over 75 as 'old'. There may be a little difference in the energy requirements of a 50 and a 70 year old.

Although the requirement of energy may fall but the need for nutrients does not, and Dietary Reference Values for vitamins and minerals in the elderly are no different from those in young and middle aged adults. The only exception is iron in women; the need for iron falls after menstruation ceases. The fact that the energy requirement tends to fall and the nutrient needs remain the same means that the quality of the diet is very important. In other words, dietary advice to elderly people needs to emphasise the importance of nutrient- dense foods.

But the nutritional needs of older adults are difficult to neatly categorise into absolute age groups. Dietary needs depend on current health, and while many older people are fit and active, some others who are younger may be frail and require additional care.

Nutrition for generally fit and healthy older adults

Activity

Research shows that remaining active can help to maintain both mental and physical health. Keeping up the activities one enjoys doing help to maintain physical fitness and preserve muscle tissue. Preserving the strength will help to maintain independence. Where as activity doesn't necessarily mean joining an exercise class. Gardening, walking to the shops and housework can all count as types of activity too.

Energy

Energy requirements can decline with age, particularly if physical activity is limited, but the need for protein, vitamins and minerals remains the same. It is vital that food choices are nutritionally dense, which means the elderly still need to eat a variety of foods to get all the vitamins and minerals they need, but with fewer calories. If the person is overweight or obese, it is even more important for him to be **calorie conscious**.

Fat

Advice to restrict fat intake, particularly cutting saturated fat to improve heart health, remains true for older people who are fit and well. A dietary survey of older people showed most eat too much saturated fat. Above the age of 75, fat restriction is less likely to be beneficial, and isn't appropriate if the person is frail, has suffered weight loss or has a very small appetite. In fact, in these situations additional fat may be used to increase the calories in meals and snacks to aid weight gain.

Fibre

Older people can suffer from constipation and bowel problems mainly due to a reduced gut motility and inactivity. To relieve they can try eating high-fibre cereal foods, fruit and vegetables. Raw bran and excessive amounts of very high-fibre foods are not the answer, though; they're too bulky and may interfere with the absorption of certain nutrients. To help the gut work properly, it's also important to drink plenty of fluid, approximately eight medium glasses a day.

Fluid

Dehydration can make people feel drowsy or confused, it's important to drink, even if this means extra trips to the toilet. The risk of dehydration can be higher in older people because their kidneys don't function as efficiently as those of younger people. Older people are also not as sensitive to the feeling of thirst. Fluid intake doesn't just mean water - it can also include such drinks as tea, coffee, fruit juice and squash.

Sugar

Generally fit and healthy older people should limit foods and drinks that are rich in sugar, as it can impair dental health and contribute to weight gain when energy intake is too high. But for people who have a poor appetite, or who have lost weight, sugar-rich foods can be a useful source of calories.

Iron

Anaemia is common in older adults. Poor absorption of iron, due to changes in the gastrointestinal tract, blood loss and the use of certain drugs - together with a poor dietary intake - may be causal factors. Iron intake should be sufficient which can be taken from red meat and foods from non-meat sources (such as fortified cereals, dried fruit, pulses and green leafy vegetables) every day. Absorption of iron from a meal containing non-meat sources is maximised by consuming foods rich in vitamin C at the same time (such as a glass of fruit juice, fresh fruit or vegetables).

Factors that affect nutrition

There are many factors that influence nutritional status in older adults, and they can be broadly grouped into four main areas:

- Those that naturally occur during the ageing process, such as a reduced ability to absorb nutrients efficiently, or a sore mouth due to dentures
- Disease-specific conditions such as cancer, which place greater nutritional demands on people
- Some drugs that interact with nutrients and prevent absorption, for example aspirin, which can interfere with the absorption of vitamin C
- Social influences, such as not being able to get to shops, or social isolation

Continuing to enjoy food and to eat a diet that maintains nutritional status is key to coping with illness. Poor nutrition has been shown to increase the risk of infections, bed sores, chest infections and poor wound healing. Good nutritional status will help ensure a quicker recovery.
Other common problems:

Loss of taste

The ability to taste flavours declines as we age. Food can often taste bland to older people so they can try:

- Using herbs and spices, tomatoes and other flavouring such as lemon juice to flavour food, but must avoid using too much salt
- Choosing foods with a strong taste - go for strong-flavoured meats, sauces, dressings, mustards and pickles

Loss of interest in food

Older people can lose interest in food for a variety of reasons. Depression due to loss of independence or bereavement, or simply eating alone can reduce appetite. They can be advised to:

- Explore the possibility of lunch clubs in the area
- Eat with company when they can
- Make meal times special by laying the table and presenting food in an attractive way
- Choose a variety of foods where possible to keep the experience interesting.

Poor appetite

If an elderly person is unable to eat much he can try small appetising meals and calorie-rich snacks in between meals to boost nutrient intake. To increase the calorie intake, the following tips can be helpful:

- Fats and sugars provide energy and help food to taste good, so these should be used generously. Extra cheese can be added to sauces or grate on potatoes, or butter or margarine can be added to vegetables.
- Pudding can be enjoyed once or twice a day, such as yoghurt, milky puddings, ice cream,
- trifle, cake, fruit pie, sponge puddings with custard and ready prepared desserts. Cakes, biscuits, chocolate and crisps provide extra energy when eaten with meals, but one should make sure that they don't spoil the appetite for more nourishing foods.

Dietary supplements

There should be no need for the dietary supplements provided the diet is varied and enough food is consumed. However, many elderly people are unable to eat a healthy and varied diet, so recommending a multivitamin and mineral supplement is a wise precaution. Vitamin D supplements are important for those who are housebound.

Problems Associated with Nutrition

Nutrition deficiency

Some elderly are at risk of vitamin deficiency because of a poor diet. Intake of vitamin C is frequently poor, so elderly people should be encouraged to eat plenty of fruit and vegetables. If people become housebound, it becomes increasingly difficult to obtain adequate vitamin D from the action of sunlight on the skin. Elderly people should be encouraged to expose some skin to sunlight regularly during the

summer months. If this is not possible, vitamin D supplementation should be considered, especially during the winter and early spring.

Constipation

Constipation is a common problem in the elderly, often because of lack of food or exercise or both.It is essential to find out whether the problem is of long duration or of sudden onset and to consider the possibility of underlying disease. It is also important to establish what the person considers to be normal bowel habit.

The best advice is to increase the intake of non starch polysaccharides (NSP) by eating more wholemeal bread, wholegrain cereals and fruit and vegetables. Raw bran should be avoided because of its phytate content which may prejudice mineral absorption. Fluid intake should be increased to about 8 cups a day and regular exercise such as walking should be encouraged if possible.

Osteoporosis

Emphasis should be given to calcium intake and exercise. It is particularly important to resume exercise promptly after periods of ill health.

Sports Nutrition

Whether it's playing football, swimming or jogging, athletes need to eat a nutritious, balanced diet to fuel their body. Good nutrition, like any sporting event, has basic ground rules. The main consideration for the athlete is the provision of sufficient energy.

Energy metabolism

Energy is obtained most efficiently and quickly from glucose, which can be obtained either from the stores of glycogen in the liver and muscle or to a lesser extent from amino acids. Stores of energy in the form of glucose are not large compared with needs; even in a trained athlete, they can provide no more than about 3.4 MJ (800 kcal) which could easily be used up in an hour’s intensive activity.

The most important thing is to concentrate on eating a nutritious, balanced diet every day. This provides plenty of energy to grow and exercise. Here are a few tips about eating before, during and after exercise.

Before

- Some high carbohydrate foods like bananas, bagels or fruit juices should be consumed. These foods are broken down quickly and provide glucose to the muscles.
- The timing of this meal depends on athletes' preference for eating before exercise, but researchers have found that eating something from 1 to 4 hours before exercise helps keep plenty of blood glucose available for working muscles.
- It is also critical to drink plenty of cool water before exercise to keep muscles hydrated.

During

- Perspiration and exertion deplete the body of fluids necessary for an optimal performance and lead to dehydration. It is important to drink plenty of cool water, at least a half a cup of water every 20 minutes of exercise. Adding a teaspoon of sugar, a little fruit juice or a small amount of powdered drink mix flavours plain water and may encourage fluid intake.

- Usually there is no need to worry about replacing carbohydrates unless the exercise lasts over 90 minutes and is hard and continuous. When this happens, drinking a sports drink or other beverage with some sugar in it will fuel and water to the muscles being exercised.

- one can make a homemade sports drink by mixing no more than 4 teaspoon of sugar, 1/4 teaspoon of salt and some flavouring (like a teaspoon of lemon juice) in 8 ounces of water.

After

If the exercise was strenuous and lasted a long time, glycogen stores may need refueling. Consuming foods and beverages high in carbohydrates right after exercise will replenish glycogen stores if they are low after exercising.

No matter the intensity of the exercise, it's important to drink plenty of water and eat a nutritious, balanced meal that has lots of carbohydrate rich foods such as grains, pastas, potatoes, vegetables and fruits.

What diet is best for athletes?

All athletes need a diet that provides enough energy in the form of carbohydrates and fats as well as essential protein, vitamins and minerals. This means a diet containing 55-60 percent of calories from carbohydrates (10 to 15 percent from sugars and the rest from starches), no more than 30 percent of calories from fat and the remaining (about 10-15 percent) from protein. That translates into eating a variety of foods every day - grains, vegetables, fruits, beans, lean meats, and low fat dairy products. The base of the diet should come from carbohydrates in the form of starches and sugars. Fluids, especially water, are also important to the winning combination. Dehydration can stop even the finest athlete from playing his or her best game.

Why it is important for athlete to eat right?

Eating right will:

- Help to train longer and at a higher intensity
- Delay the onset of fatigue
- Promote recovery
- Help body adapt to workouts
- Improve body composition and strength
- Enhance concentration
- Help maintain healthy immune function
- Reduce the chance of injury
- Reduce the risk of heat cramps and stomach aches.

Are carbohydrates important for athletes?

When starches or sugars are eaten, the body changes them all to glucose, the only form of carbohydrate used directly by muscles for energy. Whether carbohydrates are in the form of starches (in vegetables and grains), sucrose (table sugar), fructose (found in fruits and juices) or lactose (milk sugar), carbohydrates are digested and ultimately changed to glucose. The body uses this glucose in the blood for energy. Most glucose is stored as glycogen in the liver and muscles. During exercise glycogen is broken down in the muscles and provides energy. Usually there is enough glycogen in muscles to provide fuel for 90-120 minutes of exercise. Most exercise and sport games do not use up glycogen stores so eating carbohydrates during the activity usually isn't needed. But for some athletes, eating or drinking carbohydrates during exercise helps maintain their blood glucose and energy levels. Most athletes need not be concerned with "carbohydrate loading," the special technique of eating a lot of carbohydrates for several days before an endurance event. Instead, focus on getting enough carbohydrates everyday. The best way to ensure plenty of energy for exercise is to eat a nutritious, balanced diet that is high in carbohydrates and low in fat with lots of different foods.

Carbohydrate needs will depend on the type of training someone is doing. Recommended amounts and sources of carbohydrates:

Type of Training	Daily Carbohydrate (per kg body weight)	Daily Carbohydrate (per lb body
Light to moderate training	5 to 7 grams per kilogram	2.3 to 3.2 grams per pound
Heavy training load and high intensity	7 to 10 grams per kilogram	3.2 to 4.5 grams per pound
Extreme training and high intensity races (longer than four to	≥ 10 to 12 grams per kilogram	≥4.5 to 5.5 grams per pound

Fat

Fat is a vital source of energy for lengthy, lower to moderate-intensity exercise and sport training. Healthy sources of fat include fatty fish, nuts, nut oils, vegetable oils, spreads made from a vegetable oil base, avocados and olives. Athletes should limit the intake of saturated fat, which comes from dairy foods such as whole milk, butter and high-fat cheese and animal products, such as lard and highly-marbled cuts of meat. However, since dairy and animal products contribute energy and nutrients to the diet, they can opt for leaner options, such as low-fat or fat-free milk, low-fat cheeses and lean, trimmed meats. This way, they can get calcium and protein with much less saturated fat they should minimise consumption of foods that contain *trans* fats such as hydrogenated oils.

Protein

Intensive training results in deposition of protein in the muscle which leads to an increased requirement for protein. In most cases adequate protein can be obtained from the diet. Eating large quantities of meat, milk, eggs and cheese is expensive, and because it may reduce the appetite for carbohydrate- rich foods it should not be encouraged.

Protein needs depend on the type of training. Recommended amounts and sources of protein:

Type of Training	Daily Protein needs per kilogram	Daily Protein needs per
	(per kg body weight)	(per lb body weight)
Light to moderate training	1.2 to 1.7 grams per kilogram	0.55 to 0.8 grams per pound
Heavy training load and high intensity	1.4 to 2.0 grams per kilogram	0.7 to 0.9 grams per pound

Fluid and electrolytes

Prolonged exercise leads to a loss of water and electrolytes from the body. As much as 2 litres of fluid an hour can be lost during prolonged exercise in a hot environment. Thirst is not always a reliable indicator of the state of hydration, and athletes should always drink plenty of fluid before, during and after an event. Athletes should be advised to drink 200-500 ml of fluid about 20 minutes before the event. Urine production falls as soon as exercise begins, so there should be no necessity for a toilet stop.

Sports supplements can be broadly divided into the following groups: Energy supplements

- Sports drinks
- Vitamins and minerals Amino acid supplements Lactic acid buffers
- Herbs
- Caffeine

Vitamin Needs of Athletes

Vitamins do not provide energy, but they are crucial for turning food into energy. Although some research suggests the high activity levels of athletes may increase their vitamin needs, at present, the Institute of Medicine does not make vitamin recommendations specific to athletes. While vitamins will not enhance the performance, a shortage is sure to get one down.
Here's a view of the role vitamins play, as well as their Dietary Reference Intakes (DRI):

Vitamin B1 (Thiamine)

Thiamine helps breakdown carbohydrates and proteins for energy. Taking more than the DRI does not appear to enhance performance.

- DRI: 1.2 mg (men), 1.1 mg (women)
- Good sources: Whole and enriched grains and fortified cereals

Vitamin B2 (Riboflavin)

Riboflavin is integral to energy production. It also plays a role in red blood cell formation. Athletes need the DRI of this vitamin.

- DRI: 1.3 mg (men), 1.1 mg (women)
- Good sources: Almonds, milk, yogurt, wheat germ, fortified breads and cereals

Niacin

Niacin supports both anaerobic and aerobic performance. Too much or too little niacin can shift the body's use of energy from fat to carbohydrates or vice versa; this might affect performance.

- DRI: 16 mg (men), 14 mg (women)
- Good sources: Meat, fish, poultry, peanuts, peanut butter and enriched grain products

Vitamin B6

Vitamin B6 is involved in over 100 metabolic reactions in your body, including the production of energy and haemoglobin, a protein in red blood cells. Intakes below the DRI can hurt performance.

- DRI: 1.3 mg (31-50 year-old), 1.7 (men 51 and over), 1.5 (women 51 and over) Good sources:
- Meat, fish, poultry, eggs, beans whole grains, seeds and oysters

Vitamin B12

Because of its role in red blood cell formation, B12 is crucial for getting oxygen to tissues. B12 is only found in animal products, putting vegan and vegetarian athletes at risk for anaemia. Such groups should try to get as much B12 from food as possible. Taking a B12 supplement or eating B12-fortified foods also may be needed.

- DRI: 2.4 mcg
- Good sources: Seafood, meats, milk and cheese, eggs and fortified breakfast cereals

Folate

Folate is important for cell production, heart health and protection against birth defects. The DRI appears to be enough to support the energy demands of athletes. Female athletes of childbearing age should include folate in their diet every day.

- DRI: 400 micrograms
- Good sources: Enriched grains, dark leafy greens, whole-grain breads and cereals and citrus fruits

Vitamin C

Perhaps the most famous antioxidant, vitamin C offers a wide-variety of health benefits, including protecting from infection and damage to body cells, helping produce collagen (the connective tissue that holds bones and muscles together), protecting the body from bruising by keeping capillary walls and blood vessels firm; and helping in the absorption of iron and folate.

- DRI: 90mg (men), 75mg (women)
- Good sources: citrus fruits (oranges, grapefruits and tangerines), strawberries, sweet peppers, tomatoes, broccoli and potatoes

Pantothenic Acid

This vitamin is needed for the breakdown of fats, proteins and carbohydrates into usable energy. It is found in almost all plant and animal foods. Athletes should aim to meet the adequate intake for pantothenic acid.

- DRI: 5 mg
- Good sources: Poultry, seafood, nuts, seeds, avocados and whole grains

Biotin

Biotin plays an important role in energy production.

- DRI: 30 mcg
- Good sources: Nuts, eggs, soybeans and fish

Vitamin D

"Vitamin" D is actually a hormone, not a vitamin. Your body can make its own vitamin D with enough sun exposure. Vitamin D is important for bone health; athletes in weight-sensitive sports such as gymnastics, running or cycling should take care to get enough. A physician may suggest Vitamin D and/or calcium supplements for some athletes.

- DRI: 200IU, 400IU (51-70 years old), 600IU (71+ years old)
- Good sources: Fortified milk and cereals, cod-liver oil, seafood and eggs

Vegetarianism

Vegetarian diets are growing more and more common. The Vegetarian Society defies a vegetarian diet as one that includes grains, pulses, nuts, seeds, fruit and vegetables, and excludes all meat, poultry, fish and their derivatives, with or without the use of free range eggs, milk and dairy products. Generally there are four different types of vegetarians:

- Strict vegetarian or vegan: A vegetarian diet that excludes all animal products such as meat, poultry, fish, eggs, milk, cheese and other dairy products
- Lacto vegetarian: A vegetarian diet that excludes meat, poultry, fish and eggs but includes dairy products
- Lacto-ovovegetarian: A vegetarian diet that excludes meat, poultry and fish but includes eggs and dairy products. Most vegetarians in the United States fall into this category.
- Flexitarian: A semi-vegetarian diet with a focus on vegetarian food with occasional meat consumption

Food Sources of Important Nutrients

No matter which category of vegetarian a person falls into, it is important to choose a variety of foods, including whole grains, fruits, vegetables, legumes, nuts and seeds.

Calcium

Vegetarians should consume a variety of calcium sources in order to meet daily requirements. Studies have shown vegetarians absorb and retain more calcium from foods than do non-vegetarians. Dairy products are a rich source of calcium. If dairy products are not included in your diet, adequate amounts of calcium can be obtained from plant foods. Lacto vegetarians can get plenty of calcium from fortified soymilk, non-fat yogurt and low fat cheeses. Here are some other vegetarian-friendly sources of calcium:

- Cow's milk
- Fortified soymilk or rice milk
- Leafy green vegetables
- Broccoli
- Beans
- Calcium-fortified juice
- Calcium-set tofu
- Almonds and almond butter Sesame seeds and sesame butter) Soy nuts
- Blackstrap molasses
- Figs

Iron

Vegetarians should consume a variety of iron sources to meet daily requirements. Consuming a good source of vitamin C (citrus fruits, orange juice, tomatoes) at each meal increases iron absorption. Good sources include dried beans, dark green vegetables like spinach and beet greens, dried fruits, prune juice, blackstrap molasses and fortified breads and cereals. Other good vegetarian-friendly sources of iron include:

- Instant oatmeal
- Nuts and nut butters Potatoes (eaten with skin) Enriched pasta

Protein

Protein is found in most plant foods as well as animal foods. The body will make its own complete protein if a variety of foods and enough calories are eaten during the day. Good sources of protein include:

- Beans
- Whole grains
- Soy products
- Nuts and nut butters
- Dairy products
- Eggs

VitaminB12

B12 is found in all foods of animal origin, including eggs and dairy products. An adequate intake of vitamin B12 is generally not a concern for vegetarians who eat some dairy products or eggs. Strict vegetarians or vegans, however, may need to supplement their diet by choosing a fortified breakfast cereal or by taking a vitamin B12 (cobalamin) supplement of no more than 100 percent of the Daily Value. Good sources of B12 include:

- Vitamin B12-fortified foods (nutritional yeast, soymilk, meat analogs or ready-to-eat cereals) Dairy products
- Eggs

VitaminD

Few foods are naturally high in vitamin D, but dairy products are fortified with vitamin D in the United States. People who choose not to eat dairy products and who do not receive exposure to sunlight on a regular basis may wish to consider taking a vitamin D supplement of no more than 100 percent of the Daily Value. Good sources of vitamin D include:

- Eggs
- Vitamin D-fortified foods (soymilk, cow's milk, orange juice, ready-to-eat cereals) Vitamin D is also made in the skin from sunlight