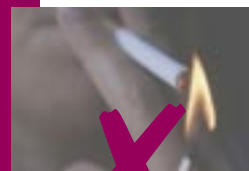


# Avoiding Heart Attacks and Strokes

Don't be a victim  
Protect yourself



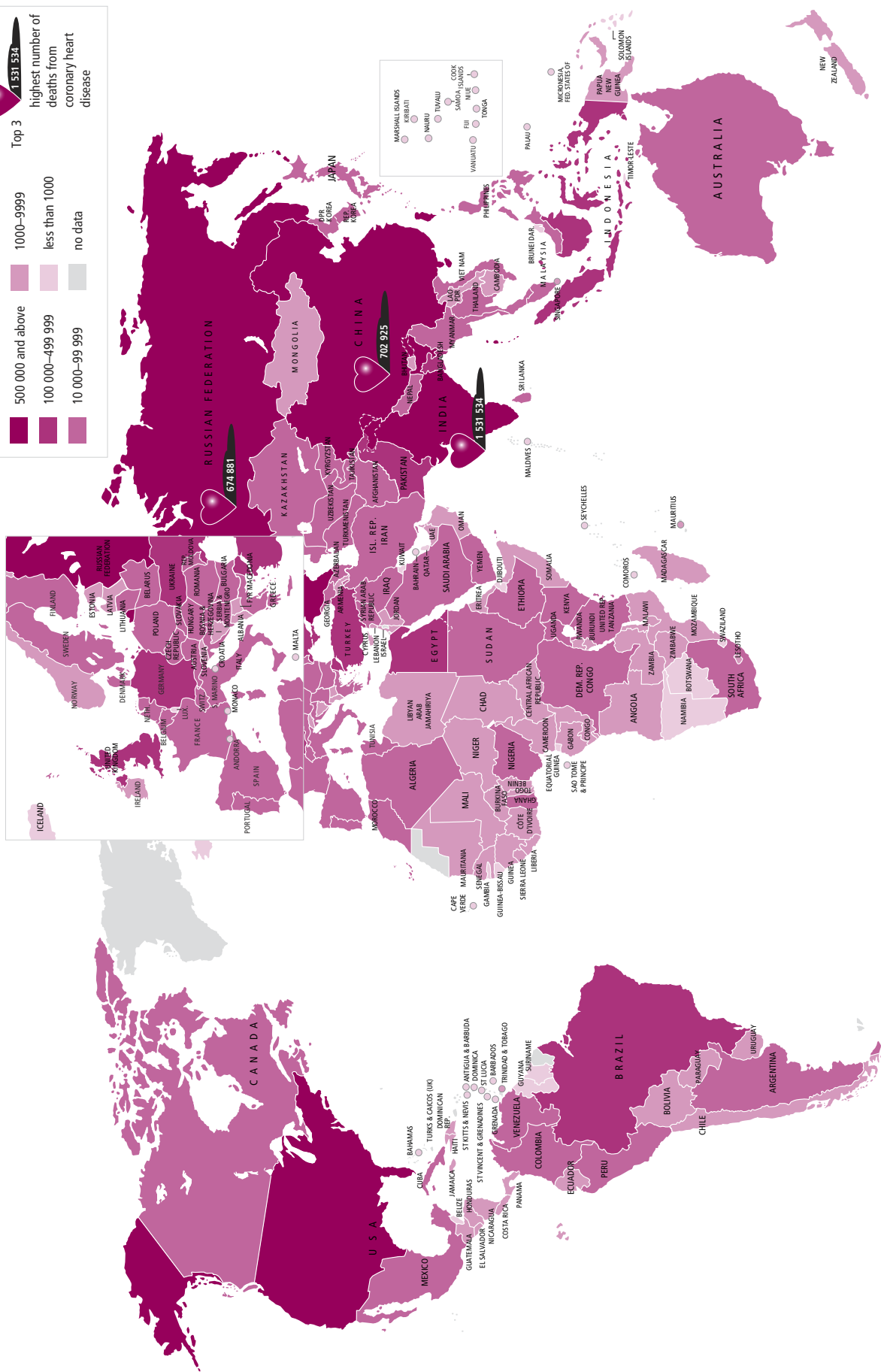
# Deaths from coronary heart disease

Number of deaths from coronary heart disease 2002

- 500 000 and above
- 100 000–499 999
- 10 000–99 999
- no data

**Top 3**  
highest number of deaths from coronary heart disease

1 531 534



# Avoiding Heart Attacks and Strokes

Don't be a victim – Protect yourself



World Health Organization



WORLD HEART  
FEDERATION®



WSMI

WORLD *self*-MEDICATION INDUSTRY



INTERNATIONAL  
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This booklet has been produced by WHO, World Self Medication Industry (WSMI), World Heart Federation (WHF), and International Stroke Society (ISS). It is intended for a global audience, and cannot therefore address the specific cultural, dietary and lifestyle situation of different countries and populations. It is hoped that national professional associations will translate and adapt it for local use. Translations in French, Spanish, Chinese, and Arabic are in preparation.

Printed in France

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## Why you should read this booklet

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You probably know someone – in your family or among your friends – who has had a heart attack or a stroke (a brain attack). These cardiovascular diseases – diseases of the heart and the blood vessels – are killing more and more people around the world, striking rich and poor alike.

Those who survive a heart attack or stroke often need to take long-term medical treatment.

If you have ever had a heart attack or stroke, or had to care for someone who has, you will know that these diseases can seriously affect the life of both the patient and his or her family. The effects can even reach beyond the family to the community.

**Yet so many heart attacks and strokes could be prevented.** That is why you should read this booklet.

This booklet explains why heart attacks and strokes happen and how you can avoid them. It tells you what you should do to avoid becoming a victim. It gives you guidance for your children too. A lot of the damage to the blood vessels starts at a young age. Children often need help to develop healthy habits, like eating a balanced diet and being active.

If you are at high risk, there is advice on the signs to look out for and what you can do to reduce your risk. If you have already had a heart attack or stroke, there is advice on how your condition can be treated and controlled, and how you can improve your quality of life.

Following the advice in this booklet may mean changing your habits and routines, and that is often not easy. It helps to get lots of encouragement and support from your friends and family, and from your health care team. This booklet is not meant to take the place of your doctor, but by reading it, you are taking a positive step towards better health.

## Key messages

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1. Heart attacks and strokes are major killers in all parts of the world. But they can often be prevented.
2. You can protect yourself from heart attacks and strokes by investing a little time and effort.
3. Tobacco use, an unhealthy diet, and physical inactivity increase the risk of heart attacks and strokes.
4. Stopping tobacco use reduces the chance of a heart attack or stroke from the moment you stop.
5. Engaging in physical activity for at least 30 minutes on most days of the week will help to keep away heart attacks and strokes.
6. Eating at least 5 servings of fruit and vegetables a day, and limiting your salt intake to less than one teaspoon a day, can help to prevent heart attacks and strokes.
7. High blood pressure has no symptoms, but can cause a sudden stroke or heart attack. Have your blood pressure checked regularly.
8. Diabetes increases the risk of heart attacks and strokes. If you have diabetes, control your blood pressure and blood sugar to minimize your risk.
9. Being overweight increases the risk of heart attacks and strokes. To maintain an ideal body weight, take regular physical activity and eat a healthy diet.
10. Heart attacks and strokes can strike suddenly and can be fatal if assistance is not sought immediately.



# What you should know

1. Understanding heart attacks and strokes
2. Preventing heart attacks and strokes
3. What are the signs of a heart attack and what should you do?
4. What are the signs of stroke and what should you do?
5. Other heart diseases



# 1. Understanding heart attacks and strokes

Every year, about 12 million people throughout the world die of a heart attack or a stroke. These diseases affect the poor as well as the rich. Most people think that they are diseases of middle-aged men. The truth is that both men and women suffer from heart attacks and strokes. Women are much more at risk after menopause.

The good news is that you can take steps to help prevent heart attacks and strokes.

## What is a heart attack?

### The normal heart

The human heart is only the size of a fist, but it is the strongest muscle in the body. With every heartbeat, the heart pumps blood, carrying oxygen and nutrients, to all parts of the body. The heart beats about 70 times a minute in a person at rest. The heart rate increases when we are active or when we feel strong emotions.

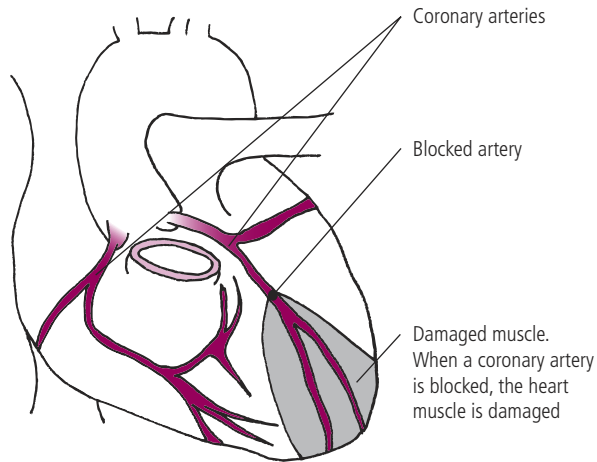
### A heart attack

The heart itself gets oxygen and nutrients through blood vessels called the coronary arteries. When the blood flow to the heart is cut off, the decrease in the supply of oxygen and nutrients can cause lasting damage to this vital organ. When the blockage is sudden, it is called a heart attack.

If the blockage is only partial and the blood flow to the heart is decreased, it can cause chest pain called angina. It may not cause lasting damage to the heart muscle, but it is a warning sign that a person could develop a major heart attack.

Heart attacks and strokes are major killers in all parts of the world. But they can often be prevented.

**Figure 1: A heart attack is caused by a blockage in a coronary artery**



A heart attack may also be called a myocardial infarction or coronary thrombosis. Other terms you may come across include: Coronary heart disease, Ischemic heart disease, Coronary artery disease, or Angina pectoris.

## **What is a stroke?**

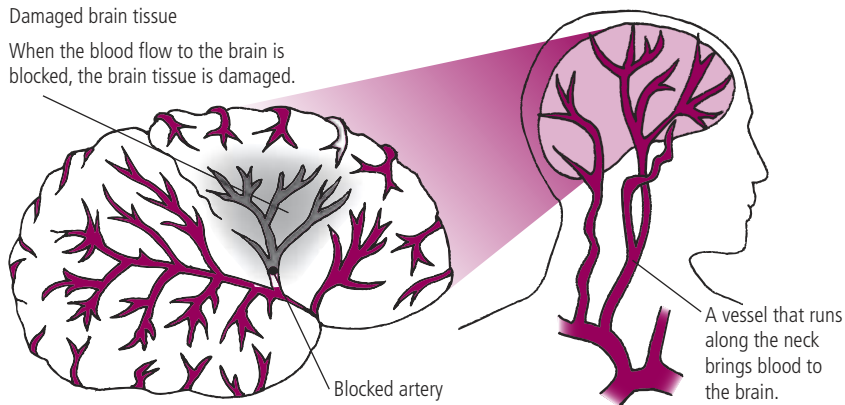
### **The normal brain**

The brain can only function if blood is flowing through it. Two large blood vessels, which run along either side of the neck, bring blood from the heart to the brain. The blood vessels branch off and get smaller and smaller, until tiny blood vessels supply oxygen and nutrients to all parts of the brain.

### **A stroke**

A stroke happens in the same way as a heart attack, but takes place in the brain. If the blood flow to the brain is interrupted, the brain loses its supply of oxygen and nutrients. This causes the damage to the brain tissue that we call a stroke.

**Figure 2: A stroke happens when the blood supply to the brain is interrupted**



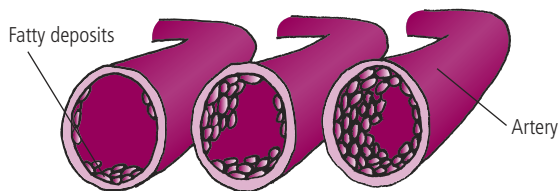
A major stroke may also be called a cerebral haemorrhage or cerebral thrombosis. Other terms you may come across include: Cerebrovascular disease, or Transient ischemic attack.

You can protect yourself from heart attacks and strokes by investing a little time and effort.

## What causes heart attacks and strokes?

Heart attacks and strokes are mainly caused by a blockage that prevents blood from flowing to the heart or the brain. The most common reason for this is a build-up of fatty deposits on the inner walls of the blood vessels that supply the heart or the brain. This makes the blood vessels narrower and less flexible. It is sometimes called hardening of the arteries or atherosclerosis. The blood vessels are then more likely to get blocked by blood clots. When that happens, the blood vessels cannot supply blood to the heart and brain, which become damaged.

**Figure 3: Gradual increase of fatty deposits along the inside of artery walls leads to narrowing of the arteries.**



## Why does fat build up in blood vessels?

There are three main reasons for fatty build-up, and you can control them all:

- smoking and other tobacco use;
- unhealthy diet;
- not staying active.

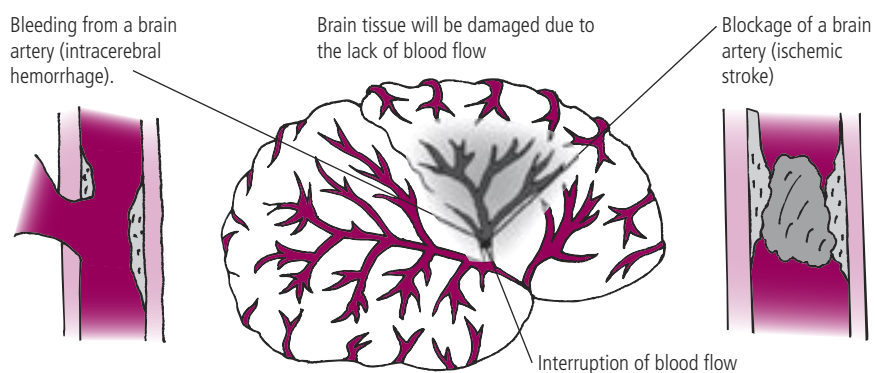
An early form of fatty deposits, known as “fatty streaks”, can even be found in some children younger than 10 years. These deposits get slowly worse as the person gets older. To find out more about how you can prevent this from happening to you and your family, read Section 2, “Preventing heart attacks and strokes”.

## Other causes of stroke

Strokes can also be caused in two other ways:

- A blood vessel in the brain can burst and bleed, damaging brain tissue. This is called intracerebral haemorrhage. High blood pressure is an important risk factor for this. You can read more about high blood pressure in Section 9.
- If a person has a weak or irregular heartbeat, blood clots may form in the heart and travel through the blood vessels to the brain. The clots can become trapped in a narrow brain artery, blocking the blood flow to an area of the brain.

**Figure 4: Different causes of stroke**



## 2. Preventing heart attacks and strokes

Nearly two-thirds of people who have a heart attack die before they can reach medical care. Even when stroke patients have access to modern, advanced treatment, 60% die or become disabled. So it is important to know the warning signs and to act fast (see Sections 3 and 4).

But it is even better to prevent a heart attack or stroke from ever happening. Prevention is always better than treatment, and most heart attacks and strokes can be prevented.

Research shows that a number of things make us more likely to have a heart attack or stroke. These are called risk factors.

Some risk factors are linked to choices we make in the way we live. The three most important lifestyle factors are:

- smoking and other tobacco use;
- unhealthy diet; and
- lack of physical activity.

Poor lifestyle choices can lead to three serious physical problems:

- high blood pressure (hypertension);
- high blood sugar (diabetes);
- high blood fats (hyperlipidaemia).

These are the most important risk factors for heart attacks and strokes.

Throughout large parts of the world, tobacco use is on the rise. People are also becoming overweight in many countries as a result of being less active and eating more food that is high in fat and sugar. More and more young people and children are getting diabetes because they are overweight. We owe it to our children to change these lifestyle choices.

### How poor lifestyle choices increase the risk

#### Tobacco use

Tobacco smoke is full of substances that damage your lungs, blood vessels and heart. They take the place of the oxygen in the blood that your heart and brain need to work properly. Tobacco use greatly increases your chance of having a heart attack or stroke. Tobacco also causes cancer and lung disease, and harms babies during pregnancy. Inhaling the tobacco smoke of other smokers is as harmful as smoking yourself.

*Read about how to stop using tobacco in Section 6.*

**Tobacco use, an unhealthy diet, and physical inactivity increase the risk of heart attacks and strokes.**

## Unhealthy diet

An unhealthy diet is one with:

- too much food (too many calories);
- too much fat, sugar or salt;
- not enough fruit and vegetables.

If you eat a lot of food and you are not active enough to burn it off, you will put on weight. You could slowly become overweight or even obese. Being overweight can lead to diabetes, high blood pressure, and high blood fat levels. All of these physical problems increase the risk of heart attacks and strokes. Obese people are at especially high risk if they have a lot of fat around the waist and stomach area.

An unhealthy diet often contains too much “fast food”, which is high in fat and sugar, and sugar-loaded soft drinks. Fast food is also very high in salt, which increases blood pressure.

*Read Section 7 to find out how to improve your diet.*

## Lack of physical activity

When people do not stay active, their risk of heart attack and stroke increases greatly. Physical activity lowers your risk of heart attacks and strokes by:

- helping your body burn sugars and fats and assisting in keeping a good weight;
- lowering your blood pressure;
- increasing oxygen levels in your body;
- reducing stress;
- strengthening your heart muscle and bones;
- improving blood circulation and muscle tone.

Staying active also reduces the risk of other illnesses, such as cancer. Active people usually feel better and happier. They are likely to sleep better and to have more energy, self-confidence, and concentration.

You do not have to be in training for the Olympics to get these benefits! Walking, gardening, or doing housework for at least 30 minutes on most days can help you prevent heart attacks and strokes.

*Read about how to stay active and control your weight in Section 8.*

## The physical problems that can result from poor lifestyle choices

### High blood pressure (hypertension)

Blood pressure is the force with which the blood pushes against the walls of arteries. If blood pressure is high, the heart is working harder than it should;

over time, this will cause it to weaken. High blood pressure is one of the major risk factors for heart attacks. It is the biggest risk factor for strokes.

To avoid high blood pressure, you need to stay active, maintain a healthy body weight, and eat a healthy diet. A healthy diet includes lots of fruits and vegetables. Limit the amount of salt in your diet, and do not drink too much alcohol. If you make all of these changes to your lifestyle, but you still cannot lower your blood pressure, there are medicines that can help.

*Find out more about how to control your blood pressure in Section 9.*

### **High blood sugar (diabetes)**

The body produces a hormone called insulin, which helps body cells to use sugar from the blood to produce energy. When the body does not produce enough insulin, or cannot use it properly, as in diabetes, sugar builds up in the blood. The high blood sugar levels speed up the development of atherosclerosis – the narrowing and hardening of the arteries. This greatly increases the risk of heart attacks and strokes.

Treating diabetes involves changing your diet and lifestyle. Sometimes, medicines that lower blood sugar are needed.

*Find out more about controlling your blood sugar in Section 10.*

### **High blood fats (hyperlipidaemia)**

Blood fats include substances such as cholesterol and triglycerides. When there are too many of these fats in the blood, they cause fatty deposits to build up in arteries leading to atherosclerosis (the narrowing and hardening of the arteries). This greatly increases the risk of heart attacks and strokes.

If you have high cholesterol or triglyceride levels in your blood, you need to eat less fat, stay active, and control your body weight. If these measures are not enough, you may also need medicine to lower your blood fats.

*Find out more about controlling your blood fats in Section 11.*

### **Combined risk factors**

If a person has two or more of the three risk factors – high blood pressure, high blood sugar, and high blood fats – the risk of heart attacks and strokes is greatly increased. The more risk factors, the higher the risk.

### **Other important risk factors**

#### **Metabolic syndrome**

When a person has central obesity (too much weight around the waist), abnormal blood fat levels (e.g. high triglyceride level or low HDL cholesterol; See section 11), high blood pressure and high blood sugar at the same time, this is known as metabolic syndrome. People with metabolic syndrome are

**High blood pressure, high blood sugar, and high blood fats increase the risk of heart attacks and strokes.**

at high risk of developing diabetes or having a heart attack or stroke, and require careful medical attention.

### **Chronic stress**

Feeling lonely, isolated, or anxious for a long time can combine with other risk factors to make a person more likely to have a heart attack or stroke.

### **Certain medicines**

Some oral contraceptives and hormone treatments can increase the risk of heart attacks. Check with your doctor for details.

### **Irregular heartbeat (atrial fibrillation)**

With irregular heartbeat, or atrial fibrillation, the heart does not contract as strongly as it should. This can cause blood to pool in the heart and form clots. When the blood clots dislodge, they may move to the brain, where they can become trapped in a narrow brain artery, blocking the blood flow and causing a stroke. Up to 20% of strokes may be caused by atrial fibrillation.

Many people are unaware that their heartbeat is irregular. If you are concerned about this, your doctor can easily check by listening to your heartbeat. If necessary your doctor may arrange for an electrocardiogram. If your heartbeat is irregular, medicines (like warfarin or in some cases aspirin) can significantly reduce the risk of strokes. Sometimes, an irregular heartbeat can be returned to normal with medicines or special medical procedures.

## **Tips for reducing your risk**

There is so much that you can do to reduce the risk of heart attack and stroke for you and your family. Start by making some healthy lifestyle choices:

- If you smoke or use tobacco, quit. Avoid inhaling smoke from other people's cigarettes.
- Spend 30 minutes a day doing something active, like walking, gardening, or housework.
- Eat 5 servings of fruit and vegetables each day.
- Limit the salt, fat, and sugar in your diet.
- Once a year, ask your doctor to check your weight, blood pressure, blood fats and blood sugar.
- Encourage your family members and others to change their lifestyles.



## 3. What are the signs of a heart attack and what should you do?

Most heart attacks are sudden and intense. But sometimes a heart attack starts slowly, with mild pain or discomfort. People often aren't sure what is wrong, and wait too long before getting help. A severe heart attack can stop the heart, causing sudden death.

### Major heart attack

A major heart attack is called a myocardial infarction. It usually starts with pain or discomfort in the centre of the chest, which lasts for more than a few minutes or keeps coming back. The discomfort can feel like pressure, squeezing, or fullness. Pain or discomfort may also be felt in the arms, the left shoulder, elbows, jaw, or back. Other symptoms include:

- difficulty breathing or shortness of breath;
- feeling sick or vomiting;
- feeling light-headed or faint;
- breaking into a cold sweat;
- becoming pale.

Women are more likely to have shortness of breath, nausea, vomiting, and back or jaw pain. People who have had diabetes for a long time may not feel the chest pain as much, because diabetes can damage the nerves.

### What to do if you are having a heart attack

Many patients who have a heart attack die before reaching hospital.

**So act fast. Every second counts.**

There are treatments that can dissolve the blood clot and restore blood flow to the heart. The treatment works best if it is given within an hour of the attack. If treatment is started quickly, there will be less damage to the heart muscle.

If there is a hospital nearby, have someone call an ambulance or take you to the emergency room right away. If there is no hospital or health care centre nearby, call a doctor immediately.

### Angina

If the heart blood vessels are blocked only partially and the blood flow to the heart is decreased but not stopped, it can cause chest pain called angina or angina pectoris. The person may have pain or discomfort in the centre of the chest that lasts for a few minutes. Often it is triggered by physical activity and relieved by rest. It may also be brought on by strong emotions, stress, or

Heart attacks can strike suddenly and can be fatal if assistance is not sought immediately.

extreme heat or cold. The pain may spread to the arms, back, jaw, neck and stomach. People who have angina are at high risk of having a major heart attack.

People with angina should monitor their chest pain. The angina may be getting worse if the chest pain:

- occurs more often;
- lasts longer than usual;
- is combined with shortness of breath or a fast or irregular heart beat;
- occurs with smaller amounts of exercise or stress.

## What to do if you are having an angina attack

Stop what you are doing and rest until the pain has passed. Your doctor may have prescribed a tablet for you to keep under your tongue or a spray that helps relieve the discomfort. Follow your doctor's instructions. If these things do not help, call an ambulance to take you to the emergency room of the nearest hospital. If there is no hospital or health care centre nearby, call your doctor immediately.

## Treating a heart attack

The level of medical care you will receive can vary from place to place. The amount of care you will need depends on how severe the attack was.

If you go to the emergency department of your nearest hospital, the doctor there may give you a thrombolytic medicine right away, to dissolve any blood clots in your arteries.

You will probably have a number of tests, such as blood tests, an electrocardiogram, and a coronary arteriogram.

The doctor will probably prescribe medicines to help you manage your heart condition, and give you advice on changing your lifestyle to lower your risk of having another heart attack. If you take this advice, you will get the best possible results. Listen carefully to your doctor's instructions and ask questions if you need to.

There are special procedures that can improve the blood supply to the heart, such as angioplasty or coronary artery bypass surgery. Those procedures will be applied to patients depending on the individual condition.

## After you go home

Many patients will be offered cardiac rehabilitation. This is a medically supervised programme for patients who have suffered heart attacks and angina. It helps you adapt to daily life, and helps prevent repeat attacks. The programme usually includes:

- physical activity prescribed by doctors;
- help with taking medicines and going through medical treatment;
- support for lifestyle changes, like quitting smoking;
- health education and counselling tailored to your needs and risk factors;
- help with regaining strength and independence and improving your quality of life;
- support for going back to work.

## Medicines used to treat heart attack and angina

Medicines often used to treat heart attacks and angina include:

- antiplatelet agents, such as aspirin;
- nitrates and other medicines to relax blood vessels;
- medicines to control blood pressure, such as calcium-channel blockers, and angiotensin converting enzyme inhibitors;
- diuretics to help get rid of excess water;
- medicines to lower blood-fats.

These medicines must be used under a doctor's supervision. You can read more about heart medicines and their side effects in Annex.

## Vitamins and heart attacks

There is no evidence that taking extra vitamin supplements, such as vitamins A, C, and E, prevents heart attacks. The important thing is to eat a healthy, balanced diet.

## Can the heart recover from a heart attack?

Yes, but the degree of recovery depends on how much damage was done to the heart muscle. You should get treatment as soon as you feel the symptoms of a heart attack. The sooner you get treatment, the more muscle doctors may be able to save. That's why they say, "Time is muscle."

## How can I avoid having another heart attack?

Someone who has had a heart attack has a high risk of having another one that could be even more serious and of having complications like acute heart failure. In order to decrease the chance of a future attack, you must:

- follow your doctor's advice and adopt a healthy lifestyle;
- work hard at the rehabilitation programme prescribed by your doctor;
- take your medicines regularly and according to the instructions. Most patients need to continue taking medicines on a long-term basis.

You can avoid a repeat heart attack by adopting a healthy life style and taking medications.

## 4. What are the signs of stroke and what should you do?

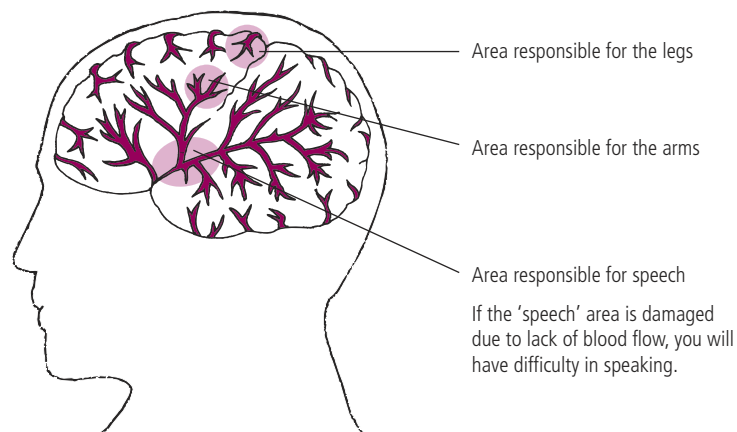
### Major stroke

The most common symptom of a stroke is sudden weakness of the face, arm or leg, most often on one side of the body. Other symptoms include sudden onset of:

- numbness of the face, arm, or leg, especially on one side of the body;
- confusion, difficulty speaking or understanding speech;
- difficulty seeing with one or both eyes;
- difficulty walking, dizziness, loss of balance or coordination;
- severe headache with no known cause;
- fainting or unconsciousness.

The effects of a stroke depend on which part of the brain is injured and how severely it is affected. A stroke may affect just one part of the body, such as the face, an arm or a leg. It can also completely paralyse one side of the body. A very severe stroke can cause sudden death.

Figure 5: Different parts of the brain control different parts of the body.



### Minor stroke

A minor stroke is also called a transient ischaemic attack or TIA. The features of minor strokes may be similar to those of major strokes, but they are milder and last only a short time, usually less than an hour. Often, the person recovers without treatment. These “mini-strokes” are warning signs; most people who have had one or more minor strokes will later have a major stroke.

*Note:* A person can have a major stroke without having had any minor strokes.

## What to do in the case of a stroke

If you see someone showing signs of a stroke, call a doctor or ambulance right away, or take the person to the emergency room of the nearest hospital. Do this even if the symptoms are not very severe, because a stroke can progress. You should also do this in the case of a minor stroke. If there is no hospital or health centre near you, call a doctor immediately.

## Treating stroke

The level of medical care you will receive can vary from place to place. The amount of care you will need depends on how severe the stroke was.

If you arrive at a hospital within 3 hours after the first sign of a stroke, the doctor there may give you a thrombolytic medicine right away, to dissolve any blood clots in your arteries. However the choice of treatment will depend on the exact cause of the stroke.

To diagnose what type of stroke you have had, doctors will take your medical history, examine you, and perform tests such as computerized tomography (CT) and magnetic resonance imaging (MRI). These tests will show whether you have had an ischaemic stroke (caused by a blockage) or an intracerebral haemorrhage (caused by a burst blood vessel in the brain).

The doctor will probably prescribe medicines to help relieve your symptoms and prevent future strokes, and give you advice on changing your lifestyle to lower your risk. If you take this advice, you will get the best possible results. Listen carefully to your doctor's instructions and ask questions if you need to.

For some patients, special surgical procedures to open up the blockage of neck arteries, such as carotid endarterectomy or stenting, can help prevent future strokes.

## Rehabilitation and long-term care

Patients who become paralysed following a stroke need special care in hospital to help them recover and to avoid complications and long-term disability. Most patients who have a stroke are left with some physical disability and may need long-term care at home.

A large part of stroke rehabilitation involves teaching patients how to exercise safely. It also includes:

- helping to improve walking, eating, dressing, bathing, cooking, reading, writing and going to the toilet;
- speech therapy;
- checking to make sure that patients can live safely at home;
- helping to organize medical and rehabilitative care and schedules;
- counselling patients and families, including advice about managing money, legal, and business affairs;

Strokes can strike suddenly and can be fatal if assistance is not sought immediately.

- occupational therapy to help patients stay active and involved;
- physiotherapy to help get back movement.

## Medicines used to treat and manage stroke patients

Medicines often used to treat stroke include:

- antiplatelet agents, such as aspirin;
- anticoagulants or blood thinners, such as warfarin;
- medicines to control blood pressure, such as calcium-channel blockers, and angiotensin converting enzyme inhibitors;
- medicines to lower blood fats.

These medicines must be used under a doctor's supervision. You can read more about stroke medicines and their side effects in Annex.

## Treatment of intracerebral haemorrhage

About 10–15% of all strokes are caused by bleeding into the brain due to rupture of a blood vessel. In many cases this is associated with high blood pressure. When strokes due to intracerebral haemorrhage occur, the diagnosis is usually made on a CT or MRI scan. The management is then usually as described above, including stroke rehabilitation, except that blood-thinning medicines, such as anticoagulants and antiplatelet agents, are not given. Blood pressure control is very important for this type of stroke and management in a stroke unit is also desirable as for other forms of strokes.

Occasionally, surgical procedure may be required depending on the patient's condition.

## Can a person recover from a stroke?

Yes, but the amount of long-term disability depends on how much lasting brain damage the stroke caused. Many stroke survivors are left with mental and physical disabilities. They need support from family members and friends to help them cope.

## How can I avoid having another stroke?

It is important to maintain a healthy lifestyle and to follow carefully your medical treatment, such as taking aspirin and medicine to lower your blood pressure. People who have had one stroke are more likely to have another.

If you have an irregular heart beat (atrial fibrillation), it is also important to recognize it and seek medical care to prevent future strokes. Consult your doctor about this.

You can avoid a repeat stroke by adopting a healthy life style and taking medications.

## 5. Other heart diseases

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### Heart failure

Heart failure occurs when the heart cannot fill up with enough blood or pump the blood through the body with enough force. Because of the decreased blood flow, the body cannot function normally. Water builds up in the body because of the weak pumping function of the heart.

The most common cause of heart failure is damage to the muscles of the heart, as a result of previous heart attacks.

### Who is at risk of heart failure?

The people at greatest risk are those who have had one or more heart attacks. The risk increases in people over the age of 65. People at risk may also have:

- high blood pressure;
- abnormal heart valves;
- rheumatic heart disease;
- congenital heart disease; or
- diabetes.

Less common causes are:

- heart muscle disease or inflammation;
- severe lung disease; and
- thyroid disease.

### What are the signs of heart failure?

In its early stages, the signs of heart failure often appear after physical activity. As the disease gets more severe, the symptoms last longer. They include:

- shortness of breath, or difficulty breathing;
- tiredness and weakness;
- swelling of the ankles, feet, legs, or abdomen;
- weight gain from water build-up;
- coughing, especially at night or when lying down, including bloody, frothy sputum (spit).

### What should I do if I think I am having heart failure?

Contact your doctor as soon as possible. *Do not wait* to see if the symptoms go away. Even if they pass quickly, they could be warning signs of serious illness. Sometimes heart failure starts suddenly, with severe shortness of breath. This is the result of water build-up in the lungs and needs to be treated right away.

## Treating heart failure

The care you receive will depend on how severe your heart failure is. It will probably include:

- *Diagnosis:* This includes taking a history of your past health, a physical examination, and tests to find the cause of the heart failure and the extent of the damage done to the heart.
- *Short-term treatment:* If you are acutely or severely ill, treatment will probably be given in hospital to relieve the symptoms and slow down or stop the cause of the heart failure.
- *Long-term treatment:* Heart failure can happen again and can get worse. To manage it, you will need regular follow-up with doctors, medicines, and changes in your lifestyle.

## What you can do to help your treatment succeed

- Take any medicine prescribed for you as instructed.
- Follow your doctor's advice about lifestyle changes. This includes stopping smoking, eating a healthy diet, and taking exercise that your heart can handle.
- Do not drink alcohol. Alcohol reduces the power of your heart to pump blood. Sometimes, alcohol itself can be a cause of heart failure.
- Avoid crowds and people who have colds or flu. An infection such as influenza or pneumonia would be an added burden to your heart.
- Watch your body weight. If you put on weight, it may mean that water is building up in your body because of weak heart function. Tell your doctor about any sudden increase in your body weight.

## Medicines used to treat heart failure

Medicines used to treat heart failure include:

- diuretics (to get rid of excess water);
- angiotensin converting enzyme inhibitors (to relax blood vessels and reduce the burden on the heart) and cardiac glycosides, such as digoxin (to increase the strength of heart muscles and help the heart pump blood);
- medicines to relax the blood vessels;
- beta-blockers (to slow the heart rate and make the heart beat with less force).

*For more information about medicine for heart failure, see the Annex.*

## Congenital heart disease

In congenital heart disease, a person is born with some abnormal structure or function of the heart (a heart defect). The most common heart defect is a hole in the wall that separates the right and left sides of the heart. The larger and more complex the defect, the more serious the heart disease.

Shortness of breath or swelling of ankles may be features of heart failure.



## Who is at risk of congenital heart disease?

If your family has a history of congenital heart disease, then your risk may be higher. Children whose parents are blood relatives, such as cousins, are more prone to heart defects.

The defect can also develop during the early months of pregnancy, if the mother:

- has an infection, such as German measles (rubella);
- drinks alcohol;
- takes certain medicines;
- has X-rays.

## What are the signs of congenital heart disease?

If the defect is small, it may not cause any symptoms. If the defect is more serious, the doctor will probably detect symptoms right after birth or within a few weeks. These may include:

- blue skin (cyanosis);
- difficulty breathing;
- poor weight gain;
- feeding problems.

If your baby has these symptoms or any features that you think are abnormal, tell your doctor as soon as you can. A baby with congenital heart disease may need surgery, sometimes right after birth.

## How can you lower the risk of heart defects for your baby?

- Avoid cousin (blood relative) marriages.
- Be vaccinated against rubella (German measles).
- If you are pregnant, avoid alcohol, X-rays, and any medicine that your doctor has not prescribed or approved for you.

## Can a baby with congenital heart disease live a normal life?

Yes. Babies born with a mild heart defect can grow up to live a fairly normal life. Some may not be able to exercise as much as others. They will also have a greater chance of getting infections of the inside walls of the heart, called infective endocarditis. These infections can occur as a result of surgery or dental procedures. They must check with their doctor before having any such procedures.

If a baby has severe and complex heart defects, his or her life will become much more limited. Some children will not grow as well as they should.

## Rheumatic heart disease

Rheumatic fever is a disease that causes inflammation of the joints and the heart. If untreated, it can lead to rheumatic heart disease, heart failure, severe disability and even death. Rheumatic fever begins with a sore throat, caused by bacteria called streptococci ("strep sore throat"). This is often seen in school-age children and is easily passed from child to child.

A child with strep sore throat has a sudden sore throat and a high fever (over 38 °C or 100 °F). The back of the child's mouth and tonsils become very red and swollen. Painful and tender nodes or lumps develop under the skin of the neck, which can be felt by touching.

If strep sore throat is not treated, it can develop into rheumatic fever. Rheumatic fever causes swelling and pain (arthritis) in large joints, such as the knees and elbows. It also causes swelling and pain in the heart muscle and heart valves. This can damage the heart valves so that they do not open and close properly. The abnormal heart function or heart failure that this damage causes is called rheumatic heart disease.

### Who is at risk of rheumatic heart disease?

Acute rheumatic fever usually occurs in children aged 5 to 15 years, after one or more attacks of strep sore throat. Rheumatic fever is more frequent in children whose close family members have had rheumatic fever.

Anyone who has had one or more attacks of rheumatic fever is very prone to develop rheumatic heart disease. With each repeat attack, the heart valves become more damaged.

### What should I do to prevent rheumatic fever from developing?

The best defence against rheumatic heart disease is to prevent rheumatic fever.

If you think that you, your child, or another family member has strep sore throat, go to the doctor as soon as you can. Treating strep sore throat with penicillin or other antibiotics can usually prevent acute rheumatic fever from developing. It also stops the infection spreading to others at home or at school.

*Note:* If the patient is allergic to penicillin, be sure to tell the doctor right away so that he or she can prescribe a different antibiotic.

### What are the signs of rheumatic fever and rheumatic heart disease?

There are signs of fever – high temperature, tiredness, weakness, and lack of appetite. There may also be pain and swelling in the joints and shortness of breath – a sign that the heart is not working normally. A doctor may be able to detect an abnormal heart 'murmur' when listening to the heart.

## Treating rheumatic fever and rheumatic heart disease

Diagnosing rheumatic fever or heart disease involves taking a history of the person's past health, a physical examination, and blood and other tests, such as an electrocardiogram, chest X-ray, and echocardiogram. Then, the doctor will give short-term treatment to slow or stop the disease and relieve symptoms.

Children who have had rheumatic fever need long-term treatment and care, including the following:

- *Treatment to prevent repeat fever.* A return of the fever will do more harm to the heart. Penicillin or other drugs can be used to prevent this. The drugs are given once a month as injections or daily, as tablets. Children who have had rheumatic fever need to keep taking penicillin for 5 to 10 years, or even longer, depending on the advice of the doctor.
- *Treatment for rheumatic heart disease.* If rheumatic heart disease has developed, the doctor will prescribe medicine. The doctor may also recommend surgery to repair damaged heart valves. After surgery there is an increased danger of blood clots forming in the heart, so anticoagulant medicines to thin the blood are given to prevent this.
- *Treatment for irregular heartbeat.* Some patients with rheumatic heart disease also have irregular heartbeat, called atrial fibrillation. This can increase the risk of blood clots forming, so the patient must take anticoagulant medicines.
- *Treatment for infection.* Patients with rheumatic heart disease have a greater chance of getting infections of the inside walls of the heart, called infective endocarditis. These infections can occur as a result of surgery or dental procedures. Patients must check with their doctor before having any such procedure.

The best defense against rheumatic heart disease is to prevent rheumatic fever. Go to the doctor if you have a strep sore throat.



# What you can do

6. Stop using tobacco
7. Improve your diet
8. Stay active and control your diet
9. Reduce high blood pressure
10. Reduce high blood sugar
11. Reduce high blood fat levels

## 6. Stop using tobacco

Tobacco can be used in many different ways, such as in cigarette, cigar or pipe smoking, in tobacco chewing or as snuff. No matter how you use it, tobacco is very harmful to your health. If you use tobacco, you should try to quit as soon as you can. This is one of the most important steps you can take to protect your health.

### The benefits of quitting

Stopping tobacco use at any age results in health benefits right away. It will reduce your chances of having a heart attack or a stroke from the day you stop! It will also reduce your chances of having other health problems, such as cancer and lung disease.

There are other benefits to stopping tobacco use:

- After a few weeks, you will feel less tired and wake up feeling more refreshed. You will have more energy. Your blood circulation will improve within a few weeks, making walking easier.
- Your sense of taste and smell will improve, so you will be able to enjoy food more.
- You will not smell of stale smoke, and will have fresher breath.
- You will save money.
- You will no longer be putting your family and friends in danger from your tobacco smoke.

### How to make your plan for quitting

There is more than one way to stop using tobacco. You have to find the way that works best for you.

Before you try to quit, sit down and make a plan.

- Choose a certain day to stop completely, and STOP.
- Set yourself targets.
- Get the support of your family and friends. Ask them to help you quit.
- Think about what you are going to do if you have cravings.

### Dealing with your cravings after you quit

For some people, the hardest part of stopping tobacco use is coping with the withdrawal symptoms. These can include:

- headache;
- feeling irritable, moody, or depressed;
- difficulty concentrating.

**Stopping tobacco use reduces the chance of a heart attack or stroke from the moment you stop.**

Tobacco is an addictive substance. It is normal to have strong cravings for the first week or so after you quit. Even months after you quit, it is very easy to start again. Products such as nicotine chewing gum, patches or tablets can help with cravings and withdrawal symptoms.

*Note:* If you already have heart disease or you are pregnant, you should not use these products without the advice of a doctor.

## **Tips for quitting the tobacco habit**

- Never allow yourself to have “just one”. This is how many people end up using tobacco again. Even after just one, the cravings will be back.
- Keep yourself busy so that you have less time to think about your cravings. If you feel a strong desire for tobacco, say to yourself: “I will wait another five minutes”. Then do something to take your mind off it.
- Avoid places where you used to use tobacco, and avoid others who use it. Ask your family and friends not to use tobacco in front of you during this period.
- Go to bed early, get plenty of rest, and avoid stress. Remind yourself that after a week or so, things will start to get better. Continue the changes you make to your lifestyle for several months after your cravings stop.
- Keep your target in mind and think about what you are going to gain from stopping tobacco use. Think about how good you are going to feel!
- Put away the money that you save and buy yourself a treat to congratulate yourself on your achievement.
- Don’t worry if you put on a bit of weight. This happens to some people when they stop using tobacco, usually because they eat more. You can control this by being careful what you eat and taking exercise. The most important thing is to stop using tobacco!

## **Don’t be discouraged if you have tried to quit and failed.**

Many people who have succeeded in stopping tobacco use have had to try several times before giving it up for good. You may want to try a different approach this time. But keep trying!

## 7. Improve your diet

### “Take 5” – Eat five servings of fruit and vegetables each day

Fruits and vegetables contain substances that help to prevent heart attacks and strokes. They protect blood vessels and heart and brain tissue.

You should eat at least five servings of fresh fruit or vegetables every day (400–500 grams daily).

How much is a serving? Here are some guidelines. One average-size banana, apple, orange, or mango would be a serving of fruit. Two tablespoons of cooked vegetables, or one big tomato would be a serving of vegetables.

### Avoid salt and salty food

Many preserved foods, like pickles and salt fish, contain a lot of salt. In addition, fast food, like French fries, often has a lot of added salt. Prepared foods, such as frozen dinners, can also be very salty.

Try not to add salt to your food. A good guideline is to use less than 1 teaspoon (5 grams) of salt each day.

### Eat more fibre

Fibre protects against heart attacks and strokes. Sources of fibre include beans, lentils, peas, oats, fruits, and vegetables.

### Eat at least two servings of oily fish a week

Fish oils contain “good” fats called omega-3 fatty acids, such as EPA (eicosapentanoic acid) and DHA (docosahexaenoic acid). They protect people from heart attacks and strokes by preventing blood clots. One serving of fish is about the size of a pack of playing cards. Fish oil supplements are also good.

### Limit alcohol

You do not need to avoid alcohol completely. A man should not drink more than two alcoholic drinks a day. Women should not drink more than one. One drink, or unit, of alcohol, contains about 10 grams of alcohol. That is about one 250-ml bottle of beer, one 100-ml glass of wine, or one 25-ml glass of whisky.

Eating at least 5 servings of fruit and vegetables a day, and limiting your salt intake to less than one teaspoon a day, can help to prevent heart attacks and strokes.

## Limit fatty foods

All fats are high in energy and will make you gain weight unless you burn them off by staying active. Some fats are more likely to increase your risk of heart attack and stroke:

- Saturated fats and trans-fats lead to “bad” cholesterol in your blood, and increase your risk of heart disease. Try to restrict your use of these fats.
- Unsaturated fats are less risky, but they still make you gain weight. You should eat them in moderation.

Sources of saturated fat, trans-fat, and cholesterol Restrict your use of:	Sources of unsaturated fat Use these fats in moderation:
Butter and ghee	Safflower oil
High fat dairy products, such as cream and creamy cheeses	Canola oil
Palm oil and coconut oil	Nuts, such as peanuts, cashews, walnuts, and almonds
Food fried in saturated fat	Sunflower oil
Processed meats, such as burgers and sausages	Sesame, pumpkin, or sunflower seeds
Liver and other organ meats	Cottonseed oil
Fatty pork	Corn oil
Lard and shortening	Soybean oil
Poultry skin	Fish oil
Egg yolks	Soft margarine (not hard margarines )
Chocolate	

## Cooking tips for reducing fat

- Use only a very little cooking oil.
- Instead of frying foods, bake, broil, boil, grill, steam, roast, poach, or microwave them.
- Trim the fat and skin off meat before cooking.
- Eat chicken instead of red meat like beef, pork, and mutton.



## 8. Stay active and control your weight

### Obesity and overweight

If you eat a lot and are not active enough to burn off the calories you take in, you will put on weight. You could even become obese. People who are overweight or obese are at higher risk of heart attacks and strokes.

### How to know if you are obese

The body mass index (BMI) is a measure of weight in relation to height. It is calculated as follows:

$$\text{BMI} = \frac{\text{body weight in kilograms}}{\text{height (in metres) squared}}$$

A person with a BMI over 25 kg/m<sup>2</sup> is considered to be overweight. A person with a BMI over 30 kg/m<sup>2</sup> is considered obese. The risk of heart attacks, strokes and diabetes increases as BMI increases. Ideally, the BMI should be maintained between 18.5 and 24.9 kg/m<sup>2</sup>.

### Central obesity increases the risk of heart attacks and strokes

People who are overweight or obese are at higher risk of heart attacks and strokes, especially when they have a lot of excess fat in the waist area and abdomen (stomach area). This is called central obesity. Regular waist measurements are a simple measure of the total fat in your body and of central obesity. Central obesity is said to be present if the waist measurement is 102 cm or more in men, and 88 cm or more in women.

The best weight for you depends on your height, age and sex. Your doctor can help you determine your ideal weight.

### What staying active does for your health

Physical activity lowers the risk of heart attacks and strokes by:

- lowering your blood sugar, blood pressure and blood fats;
- increasing oxygen levels in your body;
- helping you lose weight;
- reducing stress;
- strengthening your heart, muscles and bones;
- improving blood circulation;
- toning your muscles.

Being overweight increases the risk of heart attacks and strokes. To maintain an ideal body weight, take regular physical activity and eat a healthy diet.

Staying active also reduces the risk of some cancers, such as colon cancer and breast cancer. It makes you feel healthier, helps you sleep, and improves your state of mind.

## Do I have to join a health club to stay active?

No! Physical activity is any form of exercise or movement. It does not only mean sports and athletics. Daily chores such as walking, gardening, housework, and playing games with your children are all forms of physical activity. Whatever your age, physical activity plays a big role in your health and well-being.

There are many ways to increase your activity level. Think about small changes you could make to your routine, such as taking the stairs instead of the lift, or walking to work instead of driving. Above all, avoid sitting in front of the television for too long.

## How much physical activity do I need?

Try to get at least 30 minutes of physical activity on most days of the week. This does not have to be all at once. It can be spread over the course of the day.

Start slowly. If you have any medical problems, talk to your doctor about the amount and type of physical activity that is good for you. Listen to your body, and if you feel unwell when you are active, see your doctor about it right away.

If you feel comfortable with the amount of physical activity you are doing, build it up gradually. For most people, the right kind of physical activity produces a light sweat and makes you slightly breathless. If you are active on most days of the week, your fitness will gradually increase.

Once you start getting regular exercise, don't stop. You will lose the fitness you gained and all the benefits it brings. The best thing is to stay active for your whole life.

Engaging in physical activity for at least 30 minutes on most days of the week will help to keep away heart attacks and strokes.

## 9. Reduce high blood pressure

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### What is high blood pressure?

Blood pressure is measured in millimeters of mercury (mmHg), and it has two numbers. The first is the *systolic* blood pressure, and is the pressure when the heart is contracting. The second is the *diastolic* blood pressure, and is the pressure when the heart is resting. A person has high blood pressure, or hypertension, when the first pressure is above 140 mmHg or the second is above 90 mmHg.

### What causes high blood pressure?

Some people have high blood pressure because it runs in the family. Blood pressure also tends to increase with age. But lifestyle factors can also cause high blood pressure or make it worse. These factors include:

- being overweight or obese;
- eating too much salt in the diet;
- drinking too much alcohol.

High blood pressure can also be linked to some illnesses, such as kidney disease. Some medicines, such as birth control pills, can increase blood pressure.

### Why is high blood pressure dangerous?

High blood pressure makes the heart work harder than it should, causing it to get weaker over time. The higher your blood pressure, the greater your risk of heart attack and stroke.

### How do I know if I have high blood pressure?

You cannot tell if you have high blood pressure unless you have it measured. You should have it measured once a year. The measurement is quick and painless.

## What should I do if I have high blood pressure?

- Maintain a healthy body weight.
- Stay active.
- Eat a healthy diet that is low in salt and fat and high in fruit and vegetables.
- Do not smoke.
- Do not drink too much alcohol.
- Have your blood pressure taken regularly.

If you are doing these things and your blood pressure is still high, your doctor can prescribe medicines. These do not cure high blood pressure, but they control it. You must take them as directed, probably for the rest of your life. You should have your blood pressure checked regularly.

*To find out more about medicines for high blood pressure, read the Annex.*

High blood pressure has no symptoms, but can cause a sudden stroke or heart attack. Have your blood pressure checked regularly.

## 10. Reduce high blood sugar

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People with high blood sugar levels, or diabetes, have a higher risk of heart attacks and strokes. At least half of the people who have diabetes do not know they have it.

Diabetes speeds up the development of atherosclerosis – the narrowing and hardening of the arteries that causes heart attacks and strokes. Untreated diabetes can also lead to blindness, kidney failure, nerve damage, leg ulcers and coma. Pregnancy is much more difficult for diabetic women and their babies are more likely to have birth defects.

### What causes diabetes?

Diabetes occurs when the body fails to produce enough insulin, or cannot use it properly. Sugar then builds up in the blood. There are two main types of diabetes:

*Type I Diabetes* develops most often in children and young adults. Patients need to have daily injections of insulin to survive.

*Type II Diabetes* is the most common form -- almost 95 % of people with diabetes have this type. Patients with type II diabetes cannot produce enough insulin or cannot use insulin properly. It occurs mostly in middle-aged people, but children and young adults can also develop it, particularly if they are obese, have an unhealthy diet, and are physically inactive. The number of children and young adults with type II diabetes is increasing. This type of diabetes can usually be treated through lifestyle changes and oral medicines.

The causes of diabetes include hereditary factors, obesity, an unhealthy diet and lack of physical activity. If you keep an ideal body weight, regularly take physical activity, and consume a healthy diet, you reduce your risk of getting diabetes.

### How do I know if I have diabetes?

Some people have few or no symptoms at all until they start having serious problems. The early signs of diabetes include:

- tiredness and weakness;
- frequent need to urinate (pass water);
- unusual thirst;
- weight loss or gain;
- blurred vision;
- frequent infections;
- wounds that heal slowly.

A doctor can diagnose diabetes by measuring the blood sugar level using a simple blood test. If necessary, you may be asked to take a special drink with glucose (sugar) so that your blood sugar level can be measured afterwards.

## Diagnostic criteria for diabetes

Condition		Blood glucose level
Diabetes		fasting blood glucose: 7.0 mmol/l (126 mg/dl) and above or 2 hours after glucose load: 11.1 mmol/l (200mg/dl) and above
Blood glucose level higher than normal but not yet diabetes	Impaired glucose tolerance	fasting blood glucose (if measured): less than 7.0 mmol/l (126 mg/dl) and 2 hours after glucose load: 11.1 mmol/l (200mg/dl) and above and less than 11.1mmol/l(200mg/dl)
	Impaired fasting glucose	fasting blood glucose: 6.1 mmol/l (110 mg/dl) and above and less than 7.0 mmol/l (126mg/dl) and 2 hours after glucose load: less than 7.8 mmol/l (140mg/dl)

Modified from Definition, diagnosis and classification of diabetes mellitus and its complications. Report of a WHO consultation (WHO, Geneva, 1999) and the International Diabetes Federation IGT/IFG consensus statement (Unwin N, et al. International Diabetes Federation IGT/IFG Consensus Statement. Report of an Expert Consensus Workshop 1-4 August 2001, Stoke Poges, UK. Diabetic Medicine 2002; 19: 708-723).

Individuals with a fasting blood sugar level between 6.1 mmol/l (110 mg/dl) and 7.0 mmol/l (126 mg/dl) are at high risk of developing diabetes and should improve their lifestyle to reduce the risk.

## How can I control my diabetes?

If diabetes is well controlled, the risk of developing heart attack, stroke, or heart failure will decrease. Lifestyle changes can often help to control blood sugar levels. These changes include:

- eating a healthy diet;
- avoiding foods that are high in sugars, fats, and calories;
- maintaining a healthy body weight;
- drinking less alcohol;
- staying active.

If lifestyle changes do not reduce your blood sugar levels enough, you will need to take medicine. Many people with type II diabetes can be treated with oral medicine alone. Some may need insulin injections, or sometimes both.

At the time of diagnosis, the doctor will do tests to detect any complications from the diabetes and will advise on treatment. If you have diabetes, you should have regular check-ups. You should also follow carefully instructions for making lifestyle changes and taking medicine. Be sure to ask questions if there is anything you do not understand.

You may have to measure the sugar levels in your blood or urine in between check-ups. Your doctor will show you how to do this if it is necessary.

## Medicines used to treat diabetes

Many people with type II diabetes can be treated with oral medicines (medicine taken by mouth). You can read more about them in the Annex.

If lifestyle changes and oral medicines are not enough to control the diabetes, the doctor will prescribe insulin. This is injected, using a syringe or a “pen-type” injector.

Patients with type I diabetes need insulin injections; they cannot be treated with oral medicine.

## Watching your blood sugar levels

When you have diabetes, you have to watch your blood sugar level, because if it is too low or too high you could get very sick. When the blood sugar level drops, you could become nervous, shaky, and confused. You may be advised to carry sugar cubes or drops to take when you feel these symptoms. If level drops very low, it can lead to fainting, coma, and even death. If the blood sugar level is too high, it can also lead to a diabetic coma.

Here are some tips for keeping your blood sugar level correct:

- Never miss doses of your medicine.
- Do not stop taking your medicines without asking your doctor.
- Do not miss meals.
- Be careful about taking your medicine when you are sick and not eating as much as you usually do (e.g. When you have a cold and your appetite is less than usual and cannot eat as much as you usually do). Seek your doctor’s advice on this.

Control your blood pressure and blood sugar if you have diabetes.

# 11. Reduce high blood fat levels

Blood fats, or lipids, include cholesterol and triglycerides. The body needs a certain amount of cholesterol, but when there are too many fats in the blood (hyperlipidaemia), fatty deposits build up in the arteries, increasing the risk of heart attacks and strokes.

## “Good” and “bad” cholesterol

Cholesterol cannot dissolve in blood, so it needs “carrier” proteins to transport it around the body. The carrier proteins are called lipoproteins. There are two main kinds:

*High density lipoprotein (HDL):* When cholesterol is carried by HDL, it is called HDL cholesterol. This is “good” cholesterol, and reduces the risk of heart disease and strokes.

*Low density lipoprotein (LDL):* When cholesterol is carried by LDL, it is called LDL cholesterol. This is “bad” cholesterol, and increases the risks of heart attacks and strokes.

## Current recommended blood fat levels (European guidelines)

<b>Total cholesterol</b>	<b>less than 5.0 mmol/l (190 mg/dl)</b>
LDL-cholesterol	less than 3.0 mmol/l (115 mg/dl)
HDL-cholesterol	more than 1.0 mmol/l (40 mg/dl) in men more than 1.2 mmol/l (46 mg/dl) in women
Triglycerides (fasting)	less than 1.7 mmol/l (150 mg/dl)

Modified from: Mackay J, Mensah GA, Mendis S and Greenlund K. The atlas of heart disease and stroke (Geneva, World Health Organization, 2004).

Healthy diet is  
low in fat, low in  
salt and sugar and  
high in fruits and  
vegetables.



## What causes high blood fat levels?

High cholesterol levels may run in some families. But most often, high blood fat levels are caused by an unhealthy diet and lack of physical activity. High blood fat levels rarely produce symptoms or warning signs. When cholesterol levels are very high, some people develop skin growths called xanthomas. To check your blood fat levels, ask your doctor for a simple blood test.

In some cases, a high blood fat level may be associated with an undiagnosed medical condition, like diabetes.

## What should I do if I have a high blood fat level?

- Eat a healthy diet that is rich in fruits and vegetables, and low in animal fat, saturated fat, and cholesterol (read about the kinds of fats and oils you can eat more of in Section 7).
- Maintain a healthy body weight.
- Stay active.

If these things do not lower your blood fat levels enough, your doctor can prescribe medicines. You must take these regularly, even if you cannot feel their effects, and you must keep following a healthy lifestyle.

## Annex. Medicines for treating and managing heart attacks and strokes

This table shows medicines commonly used to treat heart attacks, strokes, and the physical problems that cause them.

*Warning:* Most of these medicines are prescribed by doctors and must only be used under medical care. Never take them without your doctor's advice. Used wrongly, these medicines can be fatal.

Type of medicine	What it does	Examples
Antiplatelet agent	Prevents blood clots that cause heart attacks and strokes.	Aspirin
Anticoagulant or blood thinner	Prevents blood clots. Used for patients with an irregular heartbeat (atrial fibrillation) and after surgery to replace damaged heart valves.	Warfarin
Vasodilator	Relaxes blood vessels, relieves and prevents angina. Used also for heart failure to reduce the burden on the heart by relaxing blood vessels.	Nitrates (such as isosorbide dinitrate)
Diuretic	Removes excess water from the body and prevents build-up. Lowers blood pressure. Used for high blood pressure and heart failure.	Furosemide Thiazides
Calcium-channel blocker	Relaxes blood vessels and lowers blood pressure. Used for high blood pressure and angina.	Nifedipine (long-acting)
Beta-blocker	Slows the heart rate and makes it beat with less force. Used for high blood pressure and angina. Some can be used for heart failure to decrease the workload of the heart.	Atenolol Metoprolol
Angiotensin converting enzyme (ACE) inhibitor	Relaxes blood vessels and reduces the strain on the heart. Used for high blood pressure and to reduce the risk of heart attacks. Also used for heart failure to prevent further damage to the heart.	Enalapril
Centrally acting antihypertensive	Lowers blood pressure by acting on the brain.	Methyldopa
Angiotensin II receptor blocker (ARB)	Dilates blood vessels and lowers blood pressure.	Candesartan
Cardiac glycoside	Increases the strength of heart muscles and helps the heart pump blood. Used for heart failure.	Digoxin

Type of medicine	What it does	Examples
Blood cholesterol-lowering agent	Lowers cholesterol levels in the blood. Used for high blood fats (high cholesterol).	Statins
Biguanide	Helps the cells of the body to take in sugar. Used for diabetes to lower blood sugar level.	Metformin
Sulfonylurease	Increases the production of insulin. Used for diabetes to lower blood sugar level.	Glibenclamide

## Side-effects of heart and stroke medicines

Ask your doctor about possible side-effects before you start taking medicine. Contact your doctor if you have any symptoms that you think could be side-effects.

### Allergic reactions

The most common side-effects are allergic reactions such as:

- itching, red or swollen skin;
- stomach pain and vomiting;
- diarrhoea;
- high heart rate;
- feeling giddy or dizzy.

### Dry cough

Dry cough sometimes occurs with ACE inhibitors.

### Bleeding

If you are using an antiplatelet agent like aspirin, or an anticoagulant like warfarin, it can produce bleeding. Watch out for:

- blood in the urine or faeces (stool);
- bleeding from the gums when eating or brushing teeth;
- abnormal pain in the stomach area.

If you have any of these symptoms, talk to your doctor before taking another dose of medicine. People taking warfarin need to be carefully monitored. If you are taking warfarin, you should follow closely your doctor's recommendations, which will include regular blood tests.

### High or low blood sugar

If you are taking medicine for diabetes, you must make sure your blood sugar levels do not become too low or too high.

# Explanation of terms used in this booklet

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**abdomen:** the part of the body between the chest and the hips.

**angina:** chest pain caused by a reduction in blood flow to the heart muscle.

**angioplasty:** a procedure to open up blocked blood vessels, particularly coronary arteries. Often performed with either a balloon or a wire mesh (stent, see also stenting).

**antibiotic:** a drug used to treat bacterial infections.

**arteriogram:** an imaging procedure in which contrast medium (dye) is injected into the blood vessels, which are then X-rayed, to find out whether they are blocked or narrowed.

**coronary arteriogram:** an arteriogram performed on the heart blood vessels (coronary arteries) to see if they are narrowed or not.

**atrial fibrillation:** a type of irregular heart-beat, which can be a risk factor for stroke.

**blood fats/lipids:** fats or fat like substances such as cholesterol and triglyceride present in blood.

**blood pressure:** the force with which blood pushes against the walls of arteries.

**diastolic blood pressure:** blood pressure when the heart is resting between contractions.

**systolic blood pressure:** blood pressure when the heart is contracting.

**blood sugar:** sugar that circulates in the blood.

**body mass index (BMI):** a measure of weight in relation to height, calculated as weight in kilograms divided by the square of height in metres.

**bypass surgery:** a type of surgery, in which blood is rerouted around a blocked artery, often using a segment of a healthy blood vessel removed from another part of the body.

**coronary artery bypass surgery (CABG):** a bypass surgery performed on coronary arteries to improve the supply of blood to the heart.

**carotid endarterectomy:** a surgical procedure to remove the thickened and hardened parts inner walls of the artery that supplies blood to the brain.

**cholesterol:** a waxy substance that can be produced by the liver, or absorbed from certain animal foods, such as dairy products, meat, animal fats and egg yolks. It can be found in the blood stream.

**high density lipoprotein (HDL) cholesterol:** so-called 'good' cholesterol, which protects against heart attacks and strokes.

**low density lipoprotein (LDL) cholesterol:** so-called 'bad' cholesterol, which can increase the risk of heart attacks and strokes.

**coma:** a state in which a person is not conscious, usually due to serious illness or injury.

**computerized tomography (CT):** an imaging procedure, in which X-rays are used to produce cross-sectional images of the body.

**coronary arteries:** blood vessels on the surface of the heart, which feed the heart muscles.

**diabetes:** a chronic disease characterized by inability of the body to produce or use insulin properly. Associated with high levels of sugar in the blood.

**echocardiogram:** a medical examination that uses ultrasound to record the movement and structure of the heart.

**electrocardiogram:** a medical examination in which electrodes are attached to the surface of the body to record electrical signals associated with the contractions of the heart.

**endocarditis, infective:** an infection inside the heart, which can damage heart valves.

**exercise stress test:** a medical examination in which an electrocardiogram is performed on a person who is exercising, to measure the response of the heart to physical activity and how much physical activity the heart can tolerate.

**fasting plasma glucose:** blood sugar levels when you have not had meals at least for 8 hours. Plasma is the yellowish liquid part of the blood used for the measurement of the blood sugar levels are measured.

**heart attack:** death of part of the heart muscle as a result of a coronary artery becoming blocked.

**heart failure:** a condition in which the heart cannot pump enough blood to meet the needs of the body.

**heart murmur:** abnormal heart sounds produced by blood flow in the heart. Often associated with an abnormality of the heart (such as damaged or abnormal heart valves).

**heart valves:** valves between the heart chambers and the large blood vessels, which control blood flow by opening and closing in accordance with the heartbeat. If damaged, blood flow within the heart will become erratic.

**haemoglobin:** substance contained in red blood cells, which carries oxygen through the body.

**hormone:** a substance produced by various glands in the body with specific functions. Insulin is an example of a hormone.

**insulin:** a hormone produced by the body, which allows cells to use sugar.

**magnetic resonance imaging (MRI):** an imaging technique, in which powerful electromagnets are used to produce detailed pictures of the inside of the human body.

**Omega-3 fatty acids:** 'good fats' that can protect people from heart attacks and strokes. Fish oils are rich in omega-3 fatty acids.

**DHA(docosahexanoic acid):** a type of omega-3 fatty acid ('good fat') that can protect blood vessels from heart attacks and strokes.

**EPA(eicosapentanoic acid):** a type of omega-3 fatty acid ('good fat') that can protect blood vessels from heart attacks and strokes.

**penicillin:** an antibiotic, which is usually used to treat streptococcal infections, such as strep-sore throat and rheumatic fever.

**physical activity:** any kind of activity that involves bodily movements.

**physiotherapy (physical therapy):** treatment using exercises, heat, etc.

**saturated fat:** a type of fat that can increase the risk of heart attacks and strokes. Found in foods from animals and some plants, e.g. coconuts. Known to increase the risk of heart attacks and strokes by elevating blood fat levels.

**stenting:** a procedure to open up hardened and narrowed arteries, using a wire mesh called a stent (see also angioplasty).

**strep-sore throat:** infection in the throat caused by streptococcal bacteria.

**streptococci, group A:** the bacteria that cause strep-sore throat and rheumatic fever

**stroke:** a condition in which brain tissue is damaged as a result of interruption of the blood supply, usually because a blood vessel bursts or is blocked by a clot.

**thrombolytic therapy:** treatment for heart attacks and strokes, in which a drug that dissolves blood clots is injected to recover blood flow in the area suffering from the lack of blood flow into the bloodstream.

**tonsils:** two large lymph nodes located at the back of the mouth.

**trans-fat:** a type of fat that increases the risk of heart attacks and strokes. It is generated when oil is processed to stay fresh longer, and is often found in foods like stick margarines and fast foods.

**transient ischaemic attack:** a small stroke-like event, which resolves in a day or less (minor stroke). Often a warning sign of an impending major stroke.

**triglyceride:** a type of fat found in food and in the body.

**unsaturated fat:** a type of fat usually found in foods from plants, such as safflower, sesame, sunflower, canola, and olives.

**waist-to-hip ratio:** ratio of waist circumference and hip circumference. Can be used as an indicator of overweight and obesity.

**xanthoma:** a soft yellowish bulge of skin containing cholesterol. High blood fats (cholesterol) can cause xanthomas.

**X-ray:** an imaging procedure that uses electromagnetic radiation called x-ray to obtain a picture of inside the human body.

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**Tobacco use**

**Unhealthy diet**

**Lack of physical activity**



**Hypertension**

**Diabetes**

**Hyperlipidaemia**



# **Heart attacks and Strokes**



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