

Patient information from the BMJ Group

Underactive thyroid

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Underactive thyroid

Your thyroid gland makes hormones. If you have an underactive thyroid, it doesn't make enough of these hormones. This can make you feel low. You may also put on weight and get dry skin. There are good treatments for this condition.

We've brought together the best research about an underactive thyroid and weighed up the evidence about how to treat it. You can use our information to talk to your doctor and decide which treatments are best for you.

What is an underactive thyroid?

If your thyroid gland is underactive, it doesn't make enough hormones. These hormones control how much energy your body uses.

An underactive thyroid can make you feel tired and depressed. You may also put on weight or have dry skin or hair. But you can have an underactive thyroid without noticing any symptoms.

Treatment for an underactive thyroid works well. You can take hormone tablets to replace the hormones your body isn't making.

Doctors call an underactive thyroid **hypothyroidism**.

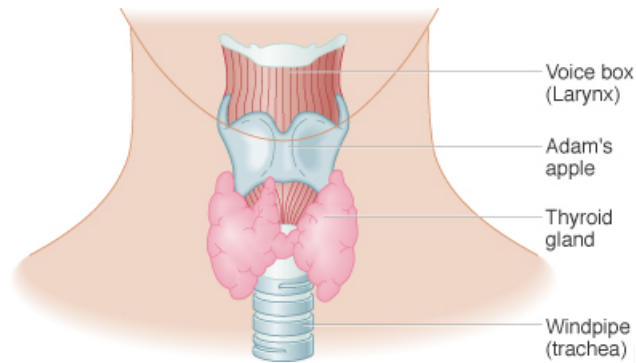
Key points for people with an underactive thyroid

- An underactive thyroid is common in women. It affects about 1 in 10 women in the UK. ^[1] It can affect men too.
- The most common cause of an underactive thyroid is when the body's immune system attacks its own thyroid gland. ^[2]
- You can take tablets to replace the hormones your thyroid should be making. You'll usually need to take these for the rest of your life.

Underactive thyroid

What is your thyroid?

Your thyroid is a small gland in your neck. It's just below your voice box (larynx), in front of your windpipe (trachea).^[3] It's shaped like a butterfly.



Your thyroid gland sits just below your voice box, in front of your windpipe.

There are two thyroid hormones.

- The main one is **thyroxine**, also called T4. It's made by your thyroid gland and pumped into your blood.
- The second hormone is **triiodothyronine**. It's sometimes called T3. Your **liver** and **kidneys** make T3 out of T4. Some T3 is made in the thyroid gland.

These hormones are chemicals that travel around your body in your blood. They control how fast your body makes and uses energy from food.

Problems with your thyroid can make it underactive or overactive. Here, we're looking at an underactive thyroid. This is called **hypothyroidism**.

A hormone called **thyroid-stimulating hormone** (TSH) controls how much of the thyroid hormones your body needs. TSH is made by your pituitary gland, which is in your brain.

- If the amount of T4 and T3 in your blood drops too low, your pituitary gland releases more TSH. This tells your thyroid to make more hormones.
- If the amount of T4 and T3 is too high, your pituitary gland stops releasing TSH. Your thyroid then stops making T3 and T4.

If your doctor thinks there might be a problem with your thyroid, he or she may do some blood tests to measure your levels of T4, T3, and TSH. To read more, see [How do doctors diagnose an underactive thyroid?](#)

How severe is my underactive thyroid?

If you have symptoms, such as feeling tired or putting on weight, and blood tests show you have an underactive thyroid, doctors call this condition **overt hypothyroidism**.

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But you may not notice any symptoms. If you don't have symptoms, but blood tests show you have a slightly underactive thyroid, your doctor may say you have **mild hypothyroidism**.

What causes an underactive thyroid?

There are two causes of an underactive thyroid.

- A problem with the thyroid gland itself. This is the most common cause.
- Something else, such as a tumour, stopping the pituitary gland working properly. So the pituitary gland doesn't produce the hormones that encourage the thyroid to work. This is less common.

Here are some of the things that can go wrong with the thyroid itself.

Hashimoto's disease

This is the most common reason for your thyroid to stop working properly. It means your immune system, which normally helps your body fight infections, attacks your thyroid gland. If you have this type of hypothyroidism, your thyroid gland may grow larger. But not everyone gets this.

We don't know why your immune system can attack your thyroid gland. But your genes (the genetic material you inherit from your parents) could be a cause. You're more likely to get this type of hypothyroidism if a brother or sister has it. ^[3]

Damage to the thyroid from surgery or X-rays

Your thyroid can be damaged by surgery or X-ray treatment. For example, you might have surgery to remove a growth or cancer near your thyroid. Or, if you have an overactive thyroid (hyperthyroidism), you might have radiation treatment to destroy some of your thyroid gland.

If too much tissue is destroyed or removed, this could mean there isn't enough healthy gland left to make the hormones your body needs.

Medicines

Some medicines can stop your thyroid gland working properly. Drugs that can do this include lithium (used to treat some kinds of depression), amiodarone (used to treat abnormal heart rhythms), and interferon (used to treat hepatitis).

After childbirth

About 5 in 100 pregnant women get an underactive thyroid after they have their baby. ^[4] It usually clears up by itself after a few months.

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Another immune disorder

You're more likely to get an underactive thyroid if you have another condition where your immune system attacks part of your body. This is called autoimmune disease. Addison's disease (a disease of the adrenal gland) and vitiligo (where you get white patches on your skin) are examples of autoimmune disease. ^[4]

Not enough iodine

Your thyroid gland needs iodine from your food to make hormones. But in some parts of the world, there's not enough iodine in the soil, water, and food supply. This can make people's thyroid glands become diseased and grow bigger. An enlarged thyroid is called a **goitre**. This problem is more common in developing countries. It can be treated by adding iodine to flour or salt.

What are the symptoms of an underactive thyroid?

It's easy to miss the symptoms of an underactive thyroid gland. They are often mild and quite vague.

You may not realise you have an underactive thyroid for many months. You might put your symptoms down to things like working too hard or eating badly. You're more likely to think there's something wrong if you get several symptoms together. ^[5]

An underactive thyroid gland can give you several different symptoms. This is because it affects lots of different parts of your body.

The most common symptoms of an underactive thyroid gland are: ^[6]

- Feeling tired or low
- Dry skin
- Putting on weight
- Being extra sensitive to cold
- Constipation
- If you're a woman, irregular periods.

If an underactive thyroid isn't treated, your symptoms may gradually get worse. After a few months or years, you may notice you:

- Have very dry, flaky skin
- Have coarse hair

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- Put on weight, even though you're not eating any more
- Feel depressed
- Feel sluggish and find it difficult to think clearly
- Have a hoarse voice
- Lose some of your hair.

If you go even longer without treatment, you may get:

- A puffy face
- A large tongue
- Weak muscles
- Painful joints
- Poor hearing
- Painful tingling in your hands (carpal tunnel syndrome).

Doctors call these later symptoms **myxoedema**.

How do doctors diagnose an underactive thyroid?

To check whether you have an underactive thyroid gland, your doctor will ask you some questions, examine your neck, and do some blood tests.

Questions your doctor might ask

Your doctor might ask you some of these questions. ^[15] ^[16]

- Do you feel very tired?
- Have you put on weight?
- Do you have constipation ?
- Do you feel extra sensitive to cold?
- If you are a woman, are your periods heavier than usual?
- Have you noticed a swelling in your neck?

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Your doctor might ask you when your symptoms started, and if they all started at the same time. He or she might also ask you about changes to your hair, skin, and voice.

Your doctor will probably ask whether any members of your family have thyroid problems. He or she will also want to know about any operations or X-rays you've had, any illnesses you've had, and any medicines you're taking.

Physical check-up

Your doctor will examine your neck to see if your thyroid gland is bigger than usual. Your doctor may also:

- Measure your weight
- Examine your skin and hair
- Test the strength of your muscles
- Check your blood pressure and pulse. This is because an underactive thyroid gland can affect your heart.

Tests your doctor might order

Your doctor will order blood tests to check the levels of hormones in your blood. These hormones are thyroid-stimulating hormone (TSH) and thyroxine (T4). If you have more TSH than normal, or less T4, you may have an underactive thyroid gland.

If your TSH level is only slightly raised and your T4 level is normal, you may have mild hypothyroidism.

Your doctor will also check for thyroid antibodies in your blood. Your immune system makes antibodies to fight infections. If you have thyroid antibodies in your blood, you may have autoimmune thyroid disease. This can be a cause of an underactive thyroid. To read more about causes of the condition, see [What is an underactive thyroid?](#)

You might also have blood tests to look for conditions that you can get alongside an underactive thyroid gland, such as raised cholesterol.

Seeing a specialist

Your doctor may refer you to a doctor who specialises in hormones (an endocrinologist) if you have any of the following: ^[15] ^[17]

- Any other endocrine disease, such as Addison's disease (a disease of the adrenal gland) or vitiligo (where you get white patches on your skin)
- If you are pregnant. To read more, see [Pregnancy and an underactive thyroid gland](#)
- A heart condition

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- An enlarged thyroid gland
- You are taking medicine that might be causing your thyroid problem.

How common is an underactive thyroid?

Both men and women can get an underactive thyroid. But it's more common among women.^[7]

- About 1 in 10 women have an underactive thyroid. This compares with about 1 in 100 men.^[7]
- About 1 in 10 women over 60 have an underactive thyroid without getting any symptoms.^{[8] [9]}

It's more common to have a mildly underactive thyroid without any symptoms (**mild hypothyroidism**). If you have symptoms it's called **overt hypothyroidism**. Both kinds of underactive thyroid are more likely as you get older.

What treatments work for an underactive thyroid?

The main treatment for an underactive thyroid gland is hormone tablets.

These tablets contain thyroxine. This is the **hormone** that your thyroid gland stops making enough of. The full name for replacement thyroxine is levothyroxine.

You'll usually need treatment for the rest of your life.

If you have an underactive thyroid but don't have any symptoms, you'll need to talk to your doctor about whether to have treatment.

Key messages about treating an underactive thyroid

- If you're getting symptoms from an underactive thyroid, doctors agree that it's important to get treatment, even though there's not much research on this.
- You'll be treated with levothyroxine. The dose you take needs to be adjusted carefully to make sure that you don't have too much.
- If you're a woman taking levothyroxine after the menopause, your bones may start to thin (this is called **osteoporosis**) if you take too high a dose.
- Too much levothyroxine increases your risk of getting an abnormal heartbeat (**atrial fibrillation**).
- Liothyronine is another replacement hormone. But there's no evidence that taking it as well as levothyroxine gives you any extra benefit.

Underactive thyroid

Which treatments work best for an underactive thyroid? We've looked at the research and given a rating for each treatment according to how well it works.

For help deciding what treatment is best for you, see [How to make the best decisions about treatment](#).

Treatment Group 1

Treatments for an underactive thyroid

Treatments that work

- [Levothyroxine \(l-thyroxine\)](#) : This is a man-made form of a natural thyroid hormone. You usually take it as a tablet. [More...](#)

Treatments that are unlikely to work

- [Adding liothyronine to levothyroxine](#) : Liothyronine is a man-made form of the hormone T3. Some doctors have tried adding it to the standard treatment, levothyroxine. But taking the two drugs together doesn't seem to work any better than just taking levothyroxine. [More...](#)

What will happen to me?

If your underactive thyroid is treated, you should be able to lead a normal, active life. But if it's not treated, your symptoms may gradually get worse.

If you have symptoms

If your underactive thyroid isn't treated, your symptoms may get gradually worse.

You may not be able to think as clearly or as fast. You may get depressed, put on weight, or become **constipated**, or your skin may become very dry. Your voice could get hoarse. If you are a woman, your periods may become irregular. This could affect whether you can get pregnant.

An underactive thyroid can also make your heart beat more slowly and your **cholesterol** level rise.^[10] Although researchers aren't certain, both of these things may put you at risk of getting **heart disease**.

Very occasionally, an underactive thyroid can cause a more serious illness that needs treating in hospital.^[11] These illnesses include:

- A very low body temperature (hypothermia)
- Heart failure
- Fluid around the lungs or heart

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- An obstruction in the gut
- Serious mental health problems such as psychosis (being out of touch with reality) or [dementia](#) .

If you don't have symptoms

If you have the mild form of this condition and don't get any symptoms, you could go on to get the more serious form in time. Each year between 2 in 100 and 4 in 100 women with mild hypothyroidism go on to get symptoms. ^[12] The risk is much higher in men. ^[12]

You may also be more likely to get heart disease, although researchers aren't yet sure. One study found that people with a mildly underactive thyroid had higher levels of cholesterol in their blood. ^[10]

Another study showed that older women with a mildly underactive thyroid were more likely to have a heart attack and to have fatty deposits in the blood vessels of their heart. ^[13]

But we're not sure whether getting treatment for a slightly underactive thyroid gland reduces your risk of heart disease. Some research shows it may help your heart to work better. ^[14]

Questions to ask your doctor

If you've been told you have an underactive thyroid, you may want to find out more about the condition. Here are some questions you might like to ask your doctor.

- Why did I get an underactive thyroid?
- Will I get better?
- Do I need treatment?
- What's the best treatment for me?
- Will I need to have treatment for the rest of my life?
- What are the side effects of treatment? How can I cope with them?
- Should I change what I eat?
- What are the chances that someone else in my family will have an underactive thyroid?
- Can I still have children?

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- Will I get a swelling in my neck (a goitre)?
-

Treatments:

Levothyroxine (l-thyroxine)

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[How good is the research on levothyroxine?](#)

This information is for people who have an underactive thyroid. It tells you about levothyroxine (l-thyroxine), a treatment used for an underactive thyroid. It is based on the best and most up-to-date research.

Does it work?

Yes. Although there isn't much research, doctors agree that if you have symptoms of an underactive thyroid, levothyroxine will make you feel better. Levothyroxine is also called l-thyroxine.

What is it?

Levothyroxine is a man-made version of thyroxine. Thyroxine is the **hormone** that your body doesn't make enough of when you have an underactive thyroid.

Not everyone with an underactive thyroid needs treatment straight away. Your doctor will usually decide whether you need treatment by looking at the results of your blood tests. If you have a mildly underactive thyroid, your doctor might advise you not to have treatment. You may have a blood test every year to see how well your thyroid gland is working.

If your doctor thinks you need treatment, he or she will work out what dose of levothyroxine you need. This is done by checking the level of thyroid-stimulating hormone (TSH) in your blood. You'll need several blood tests to check your TSH level while your doctor finds the right dose for you. You'll need to be checked again eight weeks after each change to your treatment. ^[21]

You usually take levothyroxine as tablets. You'll need to take one a day on an empty stomach. Most people take them before breakfast.

It may take several weeks before you notice much of a difference to your symptoms.

You'll need to take treatment for the rest of your life. Don't skip doses or stop taking the drug because you're feeling better. If you do, the symptoms of an underactive thyroid will gradually come back.

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It's especially important to keep taking your treatment if you're pregnant or thinking about getting pregnant. Taking levothyroxine when pregnant won't harm your baby. To read more, see [Pregnancy and an underactive thyroid gland](#) .

If you're taking some other medicines, your dose of levothyroxine may need to be changed. Examples of these medicines are the contraceptive pill, rifampin, carbamazepine, and phenytoin.

If you're older or have **heart disease** , you'll be given a lower starting dose. This is because there's a risk that this treatment could make your heart problem worse.

How can it help?

Levothyroxine should make you feel less tired and sluggish. If you were **constipated** or depressed, these symptoms should also improve.

If you have the mild form of this condition and have no symptoms, talk to your doctor about whether you need to take levothyroxine. There's no evidence that it will help you live longer or feel better. ^[22]

But it might help your heart work better or stop you getting symptoms of an underactive thyroid in future. ^[14] ^[12]

How does it work?

Levothyroxine replaces the hormone your thyroid should make with an artificial version. The natural hormone is called **thyroxine**, or T4.

Without enough thyroxine you become sluggish and tired. This is because your body doesn't get the energy it needs. Your metabolism slows down. This can cause many problems. For example, your bowel muscles may slow down, so you get constipated. Or your heart may slow down or your **cholesterol** level may rise, putting you at risk of heart problems.

Levothyroxine gives your body the thyroxine it needs to keep your metabolism at the correct level.

Can it be harmful?

In older people, taking too much levothyroxine has been linked with getting a fast and irregular heart beat (**atrial fibrillation**). About 1 in 5 people over 60 who have low levels of TSH get this problem. But it's not clear whether the problem is because of taking levothyroxine, or because of having an underactive thyroid. ^[23]

If you're a woman and have already been through the menopause, taking too much levothyroxine can cause thinning of the bones (**osteoporosis**). This can happen to women who've been taking high doses of levothyroxine for 10 years. ^[24]

Underactive thyroid

If your bones get thinner, you have a higher risk of getting fractures. But there's no evidence that women who take levothyroxine are more likely to have a bone fracture than women who don't. ^[25]

If you have an underactive thyroid without having any symptoms, there's a small chance that taking levothyroxine will make you feel more anxious. ^[26] There's also a small risk of heart problems, such as chest pain ([angina](#)) and a fast, irregular heart beat (atrial fibrillation). In one study of 18 people, two stopped taking levothyroxine because of heart problems. ^[27]

How good is the research on levothyroxine?

If you have symptoms

There isn't much research on levothyroxine for people with symptoms of an underactive thyroid. But doctors agree that taking this drug can help.

Because doctors think that levothyroxine helps, it wouldn't be fair to stop some people taking it just to do a comparison in a study. So most of the studies we found only looked at the harmful effects of levothyroxine. ^[28] ^[29] ^[30]

If you don't have symptoms

We found one summary of the evidence (called a [systematic review](#)), which looked at 12 studies. ^[22] The summary found levothyroxine had no effect on whether people lived longer, had a reduced chance of [heart disease](#) , or felt any better, if they had treatment. But one of the studies in the review showed that people's hearts might work better if they took treatment.

Liothyronine plus levothyroxine

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[How good is the research on levothyroxine plus liothyronine?](#)

This information is for people who have an underactive thyroid. It tells you about liothyronine plus levothyroxine, a treatment used for an underactive thyroid. It is based on the best and most up-to-date research.

Do they work?

Research shows that taking liothyronine together with levothyroxine doesn't help you more than taking just levothyroxine.

Underactive thyroid

What are they?

Liothyronine is a man-made version of the hormone **triiodothyronine** (T3), which is made by the thyroid gland. Doctors sometimes use it in emergencies to treat severe symptoms of an underactive thyroid.^[31] It starts to work more quickly than levothyroxine. It comes as tablets and injections.

Levothyroxine is a man-made version of the hormone **thyroxine** (T4). Thyroxine is the hormone that your body doesn't make enough of when you have an underactive thyroid. [Levothyroxine](#) is the treatment doctors usually use alone for an underactive thyroid.

How can they help?

Research shows that levothyroxine alone works just as well as levothyroxine plus liothyronine. Most people don't get any extra benefit from taking liothyronine as well.^[32]
^[33] ^[34] ^[35] ^[36]

How do they work?

Levothyroxine and liothyronine work by replacing your body's own thyroid hormones T4 and T3. Without enough of these hormones, you become sluggish and tired. This is because your body doesn't get the energy it needs. Your metabolism slows down. This can cause many problems. For example, your bowel muscles may slow down, so you get **constipated**. Or your heart may slow down or your **cholesterol** level may rise, putting you at risk of heart problems.

Taking synthetic versions of these hormones gives back to your body the T4 and T3 it needs to keep your metabolism at the correct level. Researchers hoped that using both these hormones together would help more than just one.

Can they be harmful?

We didn't find any research on the harmful effects of liothyronine alone. But in studies, taking the two drugs together caused about the same amount of side effects as taking just levothyroxine.^[32]

In older people, taking too much levothyroxine has been linked with getting a fast and irregular heart beat (**atrial fibrillation**). About 1 in 5 people over 60 who have low levels of TSH get this problem. But it's not clear whether the problem is because of taking levothyroxine, or because of having an underactive thyroid.^[37]

If you're a woman and have already been through the menopause, taking too much levothyroxine can cause thinning of the bones (**osteoporosis**). This can happen to women who've been taking high doses of levothyroxine for 10 years.^[38]

If your bones get thinner, you have a higher risk of getting fractures. But there's no evidence that women who take levothyroxine are more likely to have a bone fracture than women who don't.^[39]

Underactive thyroid

If you have an underactive thyroid without having any symptoms, there's a small chance that taking levothyroxine will make you feel more anxious.^[26] There's also a small risk of heart problems, such as chest pain (angina) and a fast, irregular heart beat (atrial fibrillation). In one study of 18 people, two stopped taking levothyroxine because of heart problems.^[27]

How good is the research on levothyroxine plus liothyronine?

We found two summaries of the research (systematic review) that compared levothyroxine plus liothyronine with [levothyroxine](#) on its own. The first summary looked at 11 studies with more than 1,200 people.^[32] The second looked at nine of the same studies.^[33] Both summaries found that adding liothyronine didn't seem to make any difference to people's symptoms.

Further informations:

Pregnancy and an underactive thyroid gland

If you're pregnant and have an underactive thyroid gland, it's important to keep taking your treatment.

If you think you might have an underactive thyroid and are pregnant or thinking about getting pregnant, see your doctor. Not treating your underactive thyroid may harm your health or your baby's health.^[18]

For example, you are at a higher risk of getting high blood pressure , bleeding, or having a stillborn baby if you don't get the right amount of thyroid hormones when you're pregnant. There's also a chance that your baby will be born with a low birth weight.

You'll have treatment with levothyroxine. This is a man-made version of the natural hormone thyroxine, the main hormone your body stops making when you have an underactive thyroid. It's safe to take levothyroxine during pregnancy. It won't harm your baby.

Even if you have a mildly underactive thyroid with no symptoms, it's still important to get treatment.

You'll need to have your levels of thyroid hormones checked at least every six weeks during your pregnancy. This is because your dose of levothyroxine may need to change.^[19]

About 5 in 100 women get a mild form of hypothyroidism after they have their baby.^[20] Most women get better on their own after a few months.

Glossary:

Underactive thyroid

hormones

Hormones are chemicals that are made in certain parts of the body. They travel through the bloodstream and have an effect on other parts of the body. For example, the female sex hormone oestrogen is made in a woman's ovaries. Oestrogen has many different effects on a woman's body. It makes the breasts grow at puberty and helps control periods. It is also needed to get pregnant.

immune system

Your immune system is made up of the parts of your body that fight infection. When bacteria or viruses get into your body, it's your immune system that kills them. Antibodies and white blood cells are part of your immune system. They travel in your blood and attack bacteria, viruses and other things that could damage your body.

liver

Your liver is on the right side of your body, just below your ribcage. Your liver does several things in your body, including processing and storing nutrients from food, and breaking down chemicals, such as alcohol.

kidney

Your kidneys are organs that filter your blood to make urine. You have two kidneys, on either side of your body. They are underneath your ribcage, near your back.

X-ray

X-rays are pictures taken of the inside of your body. They are made by passing small amounts of radiation through your body and then onto film.

constipated

When you're constipated, you have difficulty passing stools (faeces). Your bowel movements may be dry and hard. You may have fewer bowel movements than usual, and it may be a strain when you try to go.

cholesterol

Cholesterol is a fat-like substance made by your liver or absorbed from food. It is used by your body to make bile acids (which help your intestines absorb nutrients) and steroid hormones (like testosterone or oestrogen). Cholesterol is also an important part of cell membranes, which are the structures that surround cells. 'Good cholesterol' is called HDL; 'bad cholesterol' is LDL.

heart disease

You get heart disease when your heart isn't able to pump blood as well as it should. This can happen for a variety of reasons.

dementia

Dementia is when your brain stops working properly. Someone with dementia may become gradually more confused and forgetful. A common cause of dementia is Alzheimer's disease.

antibodies

Antibodies are an important part of your immune system. They are proteins made by white blood cells (another part of your immune system). They help destroy bacteria and other agents that cause infections.

high blood pressure

Your blood pressure is considered to be high when it is above the accepted normal range. The usual limit for normal blood pressure is 140/90. If either the first (systolic) number is above 140 or the lower (diastolic) number is above 90, a person is considered to have high blood pressure. Doctors sometimes call high blood pressure 'hypertension'.

osteoporosis

Osteoporosis is when your bones get too brittle. It happens if not enough new bone tissue is growing to keep bones strong. If you have osteoporosis, the bones in your body may break easily.

atrial fibrillation

Atrial fibrillation happens when your heart beats in an uneven or irregular way. Normally the beating of your heart is controlled by electrical signals. The signals make the upper parts of your heart (the atria) squeeze blood into the lower parts, which then squeeze blood out into your blood vessels. If you have atrial fibrillation, the electrical signal doesn't work well, so the upper parts of your heart don't beat at the right time.

angina

Angina is the name that doctors use for a pain in your chest that you get when your heart muscle isn't getting enough oxygen.

systematic reviews

A systematic review is a thorough look through published research on a particular topic. Only studies that have been carried out to a high standard are included. A systematic review may or may not include a meta-analysis, which is when the results from individual studies are put together.

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