

## Patient information from the BMJ Group

# HIV infection

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## HIV infection

HIV stands for human immunodeficiency virus. The virus is passed on through blood and some bodily fluids, for example during unprotected sex, through injecting drugs, or from mother to child during childbirth. HIV damages your immune system, so you're more likely to get other infections.

You may be devastated to find out that you have HIV. But drugs can help control the virus and slow down or stop the damage it causes to the immune system. Drug treatments allow people with HIV to stay well and live relatively normal lives. If you start treatment early and keep yourself healthy, you could live almost as long as someone without HIV.

But treatments can't get rid of HIV infection, and you can pass the virus on to others even while you're taking treatment. You will probably need treatment for the rest of your life.

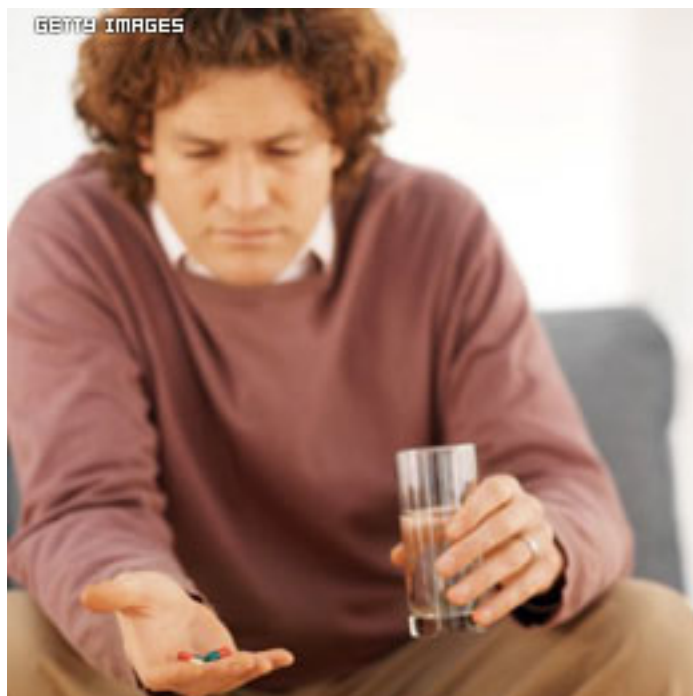
We've brought together the best research about HIV infection and weighed up the evidence about how to treat it. You can use our information to talk to your doctor and decide which treatments are best for you.

## What is HIV infection?

HIV is short for **human immunodeficiency virus**. If you become infected with HIV and don't have treatment, it will eventually damage your **immune system**. You slowly lose the ability to defend yourself against infections and certain types of cancer.

HIV destroys cells that are part of your immune system, the name given to the parts of your body that protect you from infections. This reduces your ability to fight off infections.

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Finding out that you have HIV can be a shock, but there are drugs that can keep the virus under control.

You may be devastated to find out you have HIV. But it is not the bad news it used to be. Treatments can't get rid of HIV completely, but they can keep it and other infections under control.

### What is AIDS?

Doctors used to talk about people with HIV getting AIDS, which stands for **acquired immunodeficiency syndrome**. This term was used to describe a wide range of infections and cancers that can happen when the immune system is too damaged by HIV to work properly.

However, the name AIDS is less often used now. Specialists may talk about late-stage HIV infection and the individual infections and cancers that can happen at that stage. They think that AIDS is too general a name to be helpful when treating these different infections. <sup>[1]</sup>

The name is still used quite widely. But in this information we talk about advanced HIV infection, or late-stage HIV, instead of AIDS.

### Key points about HIV

- The only way to find out whether you have HIV is to have a blood test.
- HIV lives in blood and in men's semen and women's vaginal fluid and breast milk. You can get the virus when fluids from an infected person get inside your body.
- Most people get HIV by having **unprotected sex** with someone who has the virus.

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- You can also get the virus by sharing a needle or syringe with someone who injects drugs.
- Pregnant women with HIV can pass the virus to their baby during pregnancy or birth, or when breastfeeding. <sup>[2]</sup>
- You can't get HIV from non-sexual contact such as kissing someone who has the virus. <sup>[2]</sup>
- You can have HIV for many years before it starts to affect your health. <sup>[2]</sup>
- There's no cure for HIV. But there are good treatments that can help you keep the virus under control.

### Your immune system and how it works

Your immune system is the name given to the parts of your body that protect you against infections. Bacteria , viruses , fungi , and parasites are all types of germs that may make you sick. If they infect you by entering your body, your immune system tries to kill them.

Your immune system includes many different types of immune cells. They travel in your blood looking for infections. When your immune cells meet a virus, for example, they recognise that the virus may be dangerous. They work together to try to destroy the virus. Your immune system also kills any of your own cells that have begun to grow incorrectly. For example, it can help stop cancers developing.

Certain cells called **CD4 cells** (or **T helper cells**) help pass a message to other cells to help destroy the viruses that cause infection, and cancer cells.

### What happens when you get infected with HIV?

HIV is a type of virus called a **retrovirus**. When it meets your immune cells, it enters and destroys them. So your immune system can't fight back and get rid of HIV as it does with other viruses.

- When HIV enters your body, the virus gets inside your CD4 cells, where it can live for many years.
- At some point, HIV starts to make thousands of copies of itself. These copies of HIV leave the CD4 cell, killing it on the way.
- These copies of HIV move on to other CD4 cells, eventually killing them.
- Gradually, the number of CD4 cells in your blood (called your [CD4 count](#) ) drops very low.

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- With fewer CD4 cells in your blood, you start to get infections and types of cancer that you wouldn't normally get.
- Even without treatment, you may not get these infections for 10 years after you were infected.<sup>[3]</sup> If you take treatments, it may be 20 years or more before you start getting these infections. We don't know exactly how long treatments can protect you, because the newer combinations have not been used long enough to tell. It will also depend on how healthy you are when you start treatment.

To learn more, see [How HIV damages your immune system](#) .

### How can you get HIV?

HIV doesn't spread through the air like cold and flu viruses. So you can't catch it by being around someone who has HIV or breathing in after they have sneezed.

HIV lives in people's blood and in some body fluids. To get HIV, one of these fluids from someone with HIV has to get into your blood.<sup>[4]</sup> The chance of catching HIV is different with different fluids and with different activities. For example, it is easier to become infected with HIV from anal sex than through vaginal sex.

Blood contains the most virus particles. You only need a tiny amount of blood from someone with HIV to get into your body to become infected.

In men, HIV also lives in semen. And it may be possible to get HIV from the fluid that comes out of the penis before ejaculation.<sup>[4]</sup>

In women, HIV lives in vaginal fluid. And in women who have recently had a baby, the virus can get into breast milk.

You can't get HIV from saliva, tears, sweat, faeces, or urine.<sup>[4]</sup>

### How does HIV get into your body?

- HIV can get into your blood through cuts or sores on your skin.
- HIV can get through the thin, moist lining of your **anus** , **rectum** , or genitals. These thin layers are called mucous membranes. HIV can also enter your body through the lining of your mouth and eyes.
- HIV can't get through normal skin that's not broken. So you won't get infected if some blood from a person with HIV splashes on your unbroken skin.

### How do people get infected?

Here are the main ways that people get infected with HIV:<sup>[2]</sup>

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- Through having unprotected sex. This is the most common way that people get infected with HIV. For more information, see [HIV and unprotected sex](#) .
- From sharing needles or syringes. For more information, see [HIV and sharing needles](#) .
- From HIV passing from mother to baby. For more information, see [HIV passing from mother to baby](#) .
- From accidentally pricking themselves with an infected needle, for example in a laboratory accident. It's very rare to get infected with HIV this way. For more information, see [HIV and accidentally pricking yourself with a needle](#) .
- Through a blood transfusion. This is also very rare nowadays. For more information, see [HIV and blood transfusions](#) .

There are lots of myths about how you can get HIV. You may have many questions about how you can and can't get HIV. For example, some people worry they can get it by kissing. To learn more, see [Your questions about HIV answered](#) .

### **HIV: why me?**

Some people are more likely to get HIV than others. You're at higher risk if:

- You have unprotected sex with someone who is infected (unprotected means not using a condom)
- You share someone else's needle or syringe to inject drugs
- Your mother had the virus when you were born
- You're a health care worker. This is because you might have an accident with a needle. However, only a handful of people have been infected with HIV in this way.

### **What are the symptoms of HIV infection?**

Most people get some mild symptoms about two weeks to four weeks after they get infected with HIV. More serious symptoms usually don't happen until 10 years later.

You can easily miss the early symptoms because they're like the symptoms you get with other virus infections, such as flu. Once the early symptoms have cleared up, most people don't have any other signs of infections for many years. So it's hard to tell whether you have HIV.

It takes a long time for HIV to damage your **immune system** enough to make you sick. Most people show some signs of a weak immune system after about 10 years to 12

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years.<sup>[3]</sup> Doctors call these later symptoms. But if you get treatment early, it may be much longer before you get these symptoms.

### Early symptoms

Most people who get infected with HIV get some symptoms after a few weeks. They are like the symptoms you get with a cold or flu. Doctors call these early symptoms a **seroconversion illness**. It means your body is starting to make **antibodies** against HIV.<sup>[40]</sup> Antibodies are small particles that your immune system makes to help fight infections.

The symptoms of this stage usually last about three weeks and clear up without any treatment.

You may get:<sup>[5]</sup>

- Fever
- A rash
- Headaches
- A sore throat
- Loss of appetite
- Aching muscles and joints.

You might also have swollen lymph nodes (the glands in your armpits, groin, and neck) or keep getting cold sores.

Because some of these symptoms are so general, many people don't realise that they have been infected with HIV. But if you think that you may have caught HIV, you should go to your GP or local genitourinary medicine (GUM) clinic. This is important because:

- If you do get a [positive HIV test](#) , you will get support and advice, including advice about when to start treatment
- At this early stage you're very infectious, which means it's very easy for you to spread the virus to other people. If you know you have the virus you can stop spreading it to other people.<sup>[41]</sup>

### Later symptoms

About 10 years to 12 years after getting infected with HIV, many people who are not taking drug treatments start to get opportunistic infections.<sup>[3]</sup> These are infections that you get when your immune system isn't working well. Examples of opportunistic infections

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are **pneumonia** and **tuberculosis** . When you're healthy you don't usually get these infections, because your immune system fights them off.

You may also get certain types of cancer.

Opportunistic infections and cancer can cause many different symptoms. You may have an opportunistic infection if you get any of the following: <sup>[6]</sup>

- A bad cough
- Shortness of breath
- Difficulty or pain swallowing
- Confusion or forgetfulness
- Diarrhoea
- Fever
- Problems seeing clearly
- Nausea, stomach cramps, and vomiting
- Weight loss
- Extreme tiredness
- Bad headaches.

These symptoms may show that your immune system is damaged and can't protect you very well against infections. You may need treatment for these infections with drugs. You can also have treatment that reduces your chances of getting these infections.

To learn more, see [Opportunistic infections and cancers](#) and [Antiretroviral drugs](#) .

### **How do doctors diagnose HIV infection?**

The only way to find out whether you have HIV is to have a blood test.

You can't tell if someone has HIV by looking at them. Many people don't get any symptoms for 10 or more years after becoming infected. During those years, they look and feel well. <sup>[87]</sup>

It's important to get a blood test if you think you may have been infected. There are several different kinds of blood test. To learn more, see [Blood tests for HIV](#) .

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## Why should I have an HIV test?

Most people worry a lot about having an HIV test. It's a big decision. But if you're worried that you may have been in contact with the virus then there are a few reasons why you should have a test sooner rather than later. <sup>[2]</sup>

- If you have a positive result, you will also get information about the damage HIV has caused to your immune system. This will help you decide about when to start treatment.
- You'll be able to take care to avoid spreading the virus to other people. (See [What should I do if I get a positive result?](#) )
- If you're pregnant, or planning to become pregnant, there are treatments that can reduce the chances of your baby getting the virus. See [HIV passing from mother to baby](#) .

## What does a positive result mean?

If you get a positive HIV blood test, it means that you have been infected with HIV. And it means you can pass it on to other people.

Once you're infected with HIV, the virus starts to attack your immune system. But it takes many years for this damage to affect your health. And there are drugs that can help you stay healthy for a long time.

If you get a positive HIV test, your doctor will usually do two more blood tests to see whether HIV has damaged your immune system. These tests are called a **viral load test** and a **CD4 count test**.

To find out more, see [Viral load](#) and [CD4 count](#).

Getting a positive test result can be a huge shock. And you'll probably have lots of questions. Your doctor will be able to answer these for you. He or she will also tell you about the people and organisations you can turn to for advice. To learn more, see [What should I do if I get a positive result?](#)

## How common is HIV infection?

Here's what we know about the number of people in the UK with HIV.

- There are about 130,000 people with HIV in the UK. But about a quarter of them don't know they have it. <sup>[63]</sup>
- Better treatments mean fewer people are getting very sick or dying from an HIV-related infection or cancer. There were 1,722 HIV-related deaths in 1995. <sup>[64]</sup> In 2012, because of modern treatments, there were just 488 deaths. <sup>[65]</sup>



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- In 2012, 6,364 people in the UK were diagnosed with HIV. Of this number, 2,964 were gay men. <sup>[65]</sup>
- Most people who get HIV from heterosexual sex are infected abroad, especially in Africa. <sup>[64]</sup>

### What treatments work for HIV infection?

Treatments for HIV are much more successful than they used to be. Taking drugs to treat HIV can help you stay healthy for many years.

Treating HIV infection can be complicated. You'll probably take many different drugs over time.

To learn more, see [How HIV is treated](#) .

### Key points about treating HIV infection

- There's no cure for HIV infection. But a combination of antiretroviral drugs can slow down the damage the virus does to your **immune system** .
- Taking three or four antiretroviral drugs together works best.
- You should begin taking antiretroviral drugs before your immune system has become too damaged. For more information, see [When to start treatment for HIV](#) .
- Once you start taking antiretroviral drugs you'll probably need to take them for life. Researchers are still looking at whether it is safe to take a break from taking medication (called a treatment holiday) once the virus is well controlled.
- Many people get side effects from antiretroviral drugs. If you get serious side effects, you may need to change to a different combination.
- You may need to change the drugs you're taking if the drugs stop working. This means the virus has become resistant to the drugs.
- If your immune system is already damaged, which means your CD4 count is low, you may need to take other drugs to stop you getting [opportunistic infections and cancers](#) .
- If you're pregnant, there are treatments that can stop you passing HIV on to your child. See [HIV passing from mother to baby](#) .

### Treatment Group 1

#### Treatment of HIV infection

Which treatments work best? We've looked at the best research and given a rating for each treatment according to how well it works. We have looked only at drugs to slow down the virus. We haven't looked at drugs to prevent infections.

For help in deciding which treatments are best for you, see [How to use research to support your treatment decisions](#).

#### Treatments that work

- [Antiretroviral drugs](#) : Taking three or four antiretroviral drugs together works best. There are lots of antiretroviral drugs and lots of different combinations of drugs. [More...](#)

#### Treatments that need further study

- [Combination treatments including enfuvirtide](#) : Enfuvirtide is a newer HIV drug. [More...](#)
- [Combination treatments including CCR5-inhibitors](#) : These are newer HIV drugs. [More...](#)

#### Other treatments

We haven't looked at the research on these treatments in as much detail as we've looked at the research on most of the treatments we cover. (To read more, see [Our method](#).) But we've included some information because you may have heard of them or be interested in them.

- [HIV vaccines](#) : Scientists are trying to make treatments to keep you from getting infected with HIV. [More...](#)

#### What will happen to me?

Treatments for HIV are much more successful than they used to be. Modern drugs for HIV can help you stay healthy for many years.

Without treatments that slow down HIV, you may start to get ill about 10 years after being infected. But if you are taking treatments then it is likely to be much longer before you start to get ill. As treatment for HIV keeps improving, people are living for longer. And it's still too soon to know the full benefit of the newest drugs.

The life expectancy of someone with HIV is getting closer and closer to that of a healthy person.<sup>[66]</sup> Some experts believe that people who have good treatment and who take care of themselves may be able to live a normal lifespan.<sup>[67]</sup>

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In the UK, the most common treatment is a combination of three or four [antiretroviral drugs](#) (combination therapy or HAART). These drugs slow down the [damage HIV does to your immune system](#). Since combination therapy was first used, the number of people dying from HIV-related conditions in the UK has fallen dramatically. <sup>[67]</sup>

A recent study looked at thousands of people taking a combination of drugs for HIV. It found that someone starting the most modern treatments at age 20 could expect to live until around 70. <sup>[68]</sup>

But if you've been told that you have HIV, you probably feel scared. To help you understand what can happen, see:

- [What happens when I'm first diagnosed?](#)
- [What happens in the first few years after diagnosis?](#)
- [What happens if I have advanced HIV infection?](#)
- [What can I do to help myself and stay healthy?](#)

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## Treatments:

### Antiretroviral drugs

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[How can they help?](#)

[How do they work?](#)

[Can they be harmful?](#)

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

This information is for people who have HIV infection. It tells you about antiretroviral drugs, a treatment used for HIV infection. It is based on the best and most up-to-date research.

### Do they work?

Yes. Antiretroviral drugs can slow down [the damage that the virus does to your immune system](#). They help to stop you getting the infections and cancers that go with advanced HIV infection.

Taking a combination of three or more different antiretroviral drugs together works better than taking two drugs. However, the same combination may not work for everyone, and your doctor may need to change your drugs to stop HIV damaging your **immune system**.

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## What are they?

HIV is a type of virus called a **retrovirus**. Drugs that help to keep HIV under control are called **antiretroviral drugs**.

You can take antiretroviral drugs as tablets, liquids, or powders. Most need to be taken once or twice a day. And you may need to take them at certain times of the day. For example, some antiretroviral drugs should be taken after a meal.

In the UK, the standard first treatment for HIV infection is a combination therapy called HAART. It stands for **highly active antiretroviral therapy**. It normally means you take at least three different antiretroviral drugs.

There are three main types of antiretroviral drugs:

- **Nucleoside or nucleotide reverse transcriptase inhibitors** (NRTIs or 'nukes'), such as emtricitabine (Emtriva), lamivudine, also known as 3TC (Epivir), and tenofovir (Viread)
- **Non-nucleoside reverse transcriptase inhibitors** (NNRTIs or 'non-nukes'), such as efavirenz (Sustiva) and nevirapine (Viramune)
- **Protease inhibitors** (PIs), such as lopinavir (in combination with ritonavir as Kaletra) and ritonavir (Norvir).

There are many different drugs in each group. You take them in different ways and at different times.

To read about all the drugs, see [More about antiretroviral drugs](#) .

Most people with HIV are started on three different antiretroviral drugs. This is called triple therapy. Some common combinations are:<sup>[90]</sup>

- A protease inhibitor plus two NRTIs. Doctors call this a protease inhibitor-based triple regimen.
- Two protease inhibitors (one of which is ritonavir) plus two NRTIs. Doctors call this a boosted protease inhibitor-based regimen.
- One NNRTI plus two NRTIs. Doctors call this an NNRTI-based triple regimen.

Most people with HIV infection start treatment with antiretroviral drugs when the virus has started to damage their immune system. When you start taking antiretroviral drugs, you'll probably need to take them for the rest of your life.

To learn more, see [When to start treatment for HIV](#) .

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The aim of treatment is to reduce the amount of HIV in your blood so that it becomes 'undetectable' with a blood test. This indicates that the drugs have stopped HIV making copies of itself. The immune system can then begin to recover. Most people see an increase in their [CD4 count](#) within a few months of starting treatment. (CD4 cells are part of your immune system, and how many you have is a sign of how healthy your immune system is.)

You may need to change which drugs you take if:

- You get bad side effects
- The combination of drugs you're taking isn't working. You will know that your treatment is not working if your viral load does not come down, or starts to go up
- You become pregnant
- You are finding it difficult to stick to the combination you are on
- New drugs become available that have fewer side effects or are less likely to stop working
- You need to have treatment for another condition with a drug that interacts with one of the drugs in your combination therapy.

It can be hard to keep taking the drugs. You'll probably have several different tablets to take at different times of the day. But it's important to keep taking the drugs that your doctor recommends.

To learn more, see [Sticking with drug treatment for HIV](#) .

### How can they help?

Taking a combination of three or more antiretroviral drugs reduces the amount of HIV in your blood (your [viral load](#) ) and increases your [CD4 count](#) . As a result, combination therapy can:<sup>[90]</sup>

- Slow down the damage to your immune system caused by HIV
- Keep you healthy for longer
- Lower your chances of getting late-stage HIV
- Lower your chances of dying from infections related to late-stage HIV.

Researchers have looked at large numbers of people taking combination therapy and worked out how long people using this treatment can expect to live, on average. A person who started combination therapy at age 20 between 2003 and 2005 could expect to live

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until nearly 70. <sup>[68]</sup> A 35-year-old starting treatment at the same time could expect to live until 72.

This is what the research says about the combinations of drugs that are used to treat HIV:

- Taking a combination of three antiretroviral drugs works better than taking two drugs (dual therapy) <sup>[91]</sup>
- Boosted protease inhibitor-based triple regimens may work better than standard protease inhibitor-based regimens <sup>[92] [93]</sup>
- NNRTI-based triple regimens may work better than protease inhibitor-based triple regimens, including boosted protease inhibitor regimens <sup>[94] [95]</sup>
- Protease inhibitor-based triple regimens seem to work about the same as triple-NRTI regimens. <sup>[96]</sup>

One combination of drugs may work well for one person, but less well for another. Your doctor has to consider several factors when deciding what drugs you should have (for example, what side effects you get and whether you are resistant to certain drugs). So the research results will probably guide your doctor, but they are not the only thing that's important.

### When to start treatment

There isn't much recent research to help doctors decide on the best time to start treatment. <sup>[97]</sup> Most of the studies on this were done when there was only one drug available to help control HIV (zidovudine). <sup>[98]</sup> These studies showed that starting treatment early or later didn't make any difference to how long a person lived.

Nowadays doctors decide when to start treatment based on how healthy a person's immune system is, the risk of side effects, and their resistance to drugs. To learn more, see [When to start treatment for HIV](#) .

### How do they work?

Antiretroviral drugs slow down HIV and prevent it causing further damage to your immune system. The drugs can't kill the virus. But they stop the virus making copies of itself. So there's less virus in your body to damage your immune system.

See [How HIV damages your immune system](#) .

HIV makes chemicals called **enzymes** . These help the virus get inside your cells and make copies of itself. Antiretroviral drugs work by stopping these enzymes doing their jobs.

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## NRTIs and NNRTIs

Nucleoside or nucleotide reverse transcriptase inhibitors (NRTIs) and non-nucleoside reverse transcriptase inhibitors (NNRTIs) work by blocking (inhibiting) an enzyme called reverse transcriptase.

To understand how these drugs work, it helps to know how HIV makes copies of itself. HIV contains a strand of a chemical called RNA (short for ribonucleic acid). The RNA carries HIV's 'blueprint' (or genetic code). It has all the information about HIV's **genes**.

HIV uses the mechanisms inside your own cells to make extra copies of itself. To do this, HIV needs to insert its blueprint into your genetic code. But your genes are made of DNA (short for deoxyribonucleic acid), not RNA. So HIV needs to change its RNA into a piece of DNA that will fit into your genes. Reverse transcriptase changes RNA into DNA. So drugs that block reverse transcriptase stop the virus making copies of itself.

## Protease inhibitors

Protease inhibitors work by blocking (inhibiting) an enzyme called protease.

The job of protease is to chop up long chains of **proteins** into smaller pieces. This needs to happen when HIV is making extra copies of itself. The small pieces of protein that make up the virus come from long chains of protein. If protease isn't working, the extra copies can't form.

## Can they be harmful?

Most people who take antiretroviral drugs get some side effects. Some people may need to change the combination of drugs because of the side effects.

Side effects vary from drug to drug and from person to person. Some antiretroviral drugs can make other medical conditions worse, so your doctor will ask you about other medical conditions you have had. For example, conditions such as pancreatitis (when your **pancreas** is **inflamed**) and peripheral neuropathy (problems with the nerves in your legs or arms) can start up again if you take some antiretroviral drugs. <sup>[99]</sup>

The most common side effects of antiretroviral drugs include: <sup>[43]</sup> <sup>[44]</sup>

- Nausea
- Diarrhoea
- Vomiting
- Feeling tired
- Stomach pains
- Headaches

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- A rash
- Losing your appetite.

Some of the side effects, such as those that affect the digestive system, may go away after you take a drug for a few weeks.

It's important that you don't stop taking any of your drugs or skip a dose without talking to your doctor. If you stop taking the drugs, or take them irregularly, HIV might start to fight back. To learn more about why it's so important to take your drugs on time, see [Sticking with drug treatment for HIV](#) .

If you take antiretroviral drugs, you may notice that the shape of your body changes. This is one of the main symptoms of a condition that doctors call lipodystrophy syndrome. Your arms, legs, and face may get thinner, or you may have more fat on your stomach, back, or neck. <sup>[90]</sup>

You and your doctor should also look out for signs of more serious side effects. These include liver problems, too much lactic acid in your blood, a severe rash with ulcers, allergic reactions, kidney stones and kidney damage, a shortage of red or white blood cells, heart problems, high cholesterol, diabetes, bone damage and nervous system problems. To learn more about some of these side effects, see [Side effects of antiretroviral drugs](#) and [More serious problems with antiretroviral drugs](#) .

### How good is the research on antiretroviral drugs?

There is good evidence that combination therapy based on three drugs (either protease inhibitor-based, NNRTI-based, or triple NRTI-based) is the best treatment for people with HIV.

There have been lots of good summaries of the research (called [systematic reviews](#) ) and good-quality studies that have shown that this treatment works. <sup>[100] [101] [102] [103] [104]</sup>

We can't say from the research which type of combination therapy will work best for you. Different people respond to drug combinations in different ways.

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## Combination treatments including enfuvirtide

In this section

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[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on combination treatments including enfuvirtide?](#)

This information is for people who have HIV infection. It tells you about combination treatments including enfuvirtide, a drug used for HIV infection. It is based on the best and most up-to-date research.



### Does it work?

We don't know. There hasn't been enough good-quality research to be sure. Enfuvirtide is only used when other treatments no longer work (the virus has become resistant to them) or if you can't take other treatments because of side effects.

### What is it?

Enfuvirtide is a newer type of drug to treat HIV infection. It's sometimes known as T-20 and its brand name is Fuzeon. It's a type of drug called a **fusion inhibitor**. It works by stopping HIV getting inside your cells.

It's used in combination with other antiretroviral drugs. You take it as an injection twice a day.

### How can it help?

We don't know for sure how enfuvirtide can help. There haven't been any of the best type of studies (double-blind randomised controlled trials).

The research so far suggests it may help improve [CD4 count](#) and reduce [viral load](#) for people whose other treatments are no longer working.<sup>[105]</sup> CD4 cells are part of your [immune system](#), and how many you have (your CD4 count) is a sign of how healthy your immune system is. Your viral load is how much HIV is in your blood.

### How does it work?

Fusion inhibitors are designed to stop HIV sticking to your CD4 cells. This should stop the virus's DNA getting inside the cells.

If the drugs can prevent HIV from getting into your cells, then the virus will be unable to reproduce and kill the cells. Your viral load should go down and your CD4 count should go up.

### Can it be harmful?

Yes, like all antiretroviral drugs, enfuvirtide has side effects. These include:<sup>[59]</sup>

- Soreness and redness where you inject the drug (this happens to most people)
- Losing your appetite and losing weight
- Heartburn
- Damage to nerve endings
- Shakiness
- Changes to your mood, such as feeling irritable and finding it hard to concentrate

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- Nightmares
- Diabetes
- Dizziness
- Flu-like symptoms
- Dry skin and acne.

Rarely, people get more serious symptoms, which show that the body is over-reacting to the drug. These are called hypersensitivity reactions. Signs of a hypersensitivity reaction include:

- Rash
- High temperature
- Feeling sick or vomiting
- Chills
- Finding it hard to breathe.

Your doctor should tell you which signs to watch out for. If you get them, you need to stop taking the medicine and see your doctor quickly.

### **How good is the research on combination treatments including enfuvirtide?**

We didn't find any good-quality studies (double-blind randomised controlled trials ) looking at combination treatments including enfuvirtide.

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## **Combination treatments including CCR5-inhibitors**

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on combination treatments including CCR5-inhibitors?](#)

This information is for people who have HIV infection. It tells you about combination treatments including CCR5-inhibitors, which are drugs used for HIV infection. It is based on the best and most up-to-date research.

### Does it work?

We don't know for sure. We need to see more long-term research to find out how well these drugs work.

### What is it?

CCR5-inhibitors are a newer type of **antiretroviral drug**. They aim to stop HIV getting into your cells.

There's only one CCR5-inhibitor available in the UK at the moment. It's called maraviroc (brand name Celsentri). It comes as tablets taken twice a day.

These drugs will only help protect cells against certain types of HIV. If your doctor thinks it might be worth trying, you'll need a test to see if it can help you.

### How can it help?

There haven't been many studies into these drugs yet. But research so far suggests: <sup>[106]</sup>  
<sup>[107]</sup>

- Maraviroc may reduce your [viral load](#)
- Maraviroc may help increase your [CD4 count](#) .

CD4 cells are part of your [immune system](#) , and how many you have (your CD4 count) is a sign of how healthy your immune system is. Your viral load is how much HIV is in your blood.

### How does it work?

CCR5-inhibitors are intended to stop HIV getting into your CD4 cells. They do this by blocking certain receptors on the cells. This works against forms of the virus that can only use these particular receptors. But some forms of HIV can use other receptors, so CCR5-inhibitors won't work against them.

If the drugs prevent HIV from getting into your cells, then the virus will be unable to reproduce and kill the cells. Your viral load should go down and your CD4 count should go up.

### Can it be harmful?

Yes, like all antiretroviral drugs, CCR5-inhibitors can have side effects. As maraviroc is the only one available so far, we've listed only the side effects for this drug: <sup>[59]</sup>

- Feeling sick and vomiting
- Stomach pain

## HIV infection

- Stomach problems like indigestion, constipation, or diarrhoea
- A cough
- Dizziness
- Difficulty sleeping
- A headache
- Muscle spasms
- A rash and itchiness.

Less commonly, some people have more serious problems including pancreatitis, liver damage, heart attacks, seizures, and kidney failure.

### How good is the research on combination treatments including CCR5-inhibitors?

We didn't find any good-quality studies ( randomised controlled trials ) looking at CCR5-inhibitors.

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## HIV vaccines

In this section

This information tells you about vaccines being developed to help protect people from getting HIV.

We haven't looked at the research on HIV vaccines in as much detail as we've looked at the research on most of the treatments we cover. (To read more, see Our method.) But we've included some information because you may have heard about these vaccines or be interested in them.

Scientists are trying to make HIV vaccines. These would stop you getting infected with HIV in the same way that a measles vaccine protects you against measles.

And researchers think that HIV vaccines may also help people who already have the virus. But so far there is no vaccine against HIV.

Many different HIV vaccines have been tested in studies, but they aren't available yet. One big study included about 5,000 people who weren't infected with HIV.<sup>[108]</sup>

- About two-thirds of the people had a certain type of HIV vaccine. But the people who had the vaccine were just as likely to get infected with HIV as the people who didn't get the vaccine.

## HIV infection

- The vaccine seemed to work for some people in certain ethnic groups. People in these ethnic groups who were vaccinated were less likely to get HIV than those who didn't get the vaccine. But the study included only a small number of people in these ethnic groups, so these results may not be reliable.

In a more recent study, 3 in 100 people got HIV, whether they'd been vaccinated or not. <sup>[109]</sup> Scientists are still working towards a successful vaccine.

A study from Thailand, combining two types of vaccine, showed mixed results. The researchers analysed their results in three different ways. Only one of the analyses showed a reduced risk of HIV infection for the people who had the vaccine. This makes it hard to rely on the results. More research needs to be done to find out whether this was a true result or just a chance finding. <sup>[110]</sup>

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### Further informations:

#### CD4 count

Your CD4 count is the number of CD4 cells in a small amount of your blood (written as the number of cells per cubic millimetre, or mm<sup>3</sup>).

- CD4 cells are part of your immune system, which includes your cells that help fight infections.
- HIV destroys CD4 cells. The fewer CD4 cells you have, the more damage HIV has done to your immune system.
- People who don't have HIV normally have about 1,000 CD4 cells per cubic millimetre of blood.
- As the number of cells falls you're more at risk of getting certain infections and types of cancer. <sup>[5]</sup>
- You can have a CD4 count test. Doctors use your CD4 count to help decide whether you're at risk of getting the infections and types of cancer that go along with HIV. This helps them decide what treatment you need. See [Opportunistic infections and cancers](#) for more.

Here's what your CD4 count result means.

- More than 500 cells/mm<sup>3</sup>: Your risk of getting opportunistic infections is low. But you may get some general symptoms of HIV infection, such as a fever or swollen glands.

## HIV infection

- 200 cells/mm<sup>3</sup> to 500 cells/mm<sup>3</sup>: You're at risk of getting pneumonia , [tuberculosis](#) , fungal infections , or types of cancer of the blood cells.
- Less than 200 cells/mm<sup>3</sup>: You're also at risk of getting [pneumocystis pneumonia](#) and fungal diseases. You may find it hard to keep your weight up.
- Less than 50 cells/mm<sup>3</sup>: You're also at risk of getting [Cytomegalovirus infection](#) (CMV) and [Mycobacterium avium complex infection](#) .

To learn more, see [Opportunistic infections and cancers](#) .

### Opportunistic infections and cancers

It's normal to have many different germs in your body. We all carry some kinds of viruses , fungi , and bacteria . If you have a healthy immune system , you can easily control these germs and stay healthy. But if you have HIV, your immune system is damaged. So you aren't as well protected against infections. If you don't keep these infections under control, they can make you ill.

The infections that you get when you have a weak immune system are called **opportunistic infections**. You can also get some types of cancer if your immune system is weak.

Many opportunistic infections can be serious. And some can kill. But modern treatments that keep HIV under control are making this less likely. In the past, people with late-stage HIV were likely to get a serious infection called [Pneumocystis pneumonia](#) (or PCP for short). Many people with late-stage HIV died of this condition. But PCP can often be prevented, and it has become less common. The same is true for most of the other opportunistic infections.

If HIV has weakened your immune system, there are treatments that can reduce your chances of getting these infections.

We've listed some common infections and types of cancer that can happen in late-stage HIV here. <sup>[6]</sup>

- [Cytomegalovirus infection](#) (CMV): A viral infection that damages your eyes
- [Mycobacterium avium complex infection](#) (MAC): A serious disease caused by common bacteria. MAC can cause diarrhoea and loss of weight
- [Pneumocystis pneumonia](#) (PCP): An infection that can cause pneumonia
- [Herpes](#) : This can be cold sores in your mouth or small, painful blisters around your genital area. Both are caused by a virus

## HIV infection

- [Toxoplasmosis](#) : An infection that often affects the brain. It can also cause fever, rashes, and a cough. It's sometimes called 'toxoplasmosis' for short
- [Tuberculosis](#) (TB): An infection that harms your lungs
- Fungal diseases, such as [candidiasis](#) (thrush), [cryptococcal meningitis](#) , and [histoplasmosis](#) : These are yeast infections that usually affect your mouth, brain, or lungs. These also commonly affect the skin and the vagina.
- [Shingles](#) : This is caused by the same virus that causes chickenpox
- [Kaposi's sarcoma](#) : This is a type of cancer that grows in the lining of some blood vessels. It causes purple or black blotches on your skin and inside your mouth
- [Human papillomavirus infection](#) (HPV): This is a virus that can cause cancer in the anus or cervix (neck of a woman's womb)
- [Lymphoma](#) : This is a type of cancer that affects your lymphatic system , the network of tubes that helps your body fight infections.

### **Pneumocystis pneumonia (PCP) and HIV**

Pneumocystis pneumonia (PCP) is the most common opportunistic infection in people with HIV. It's sometimes called pneumocystis. *Pneumocystis jirovecii* (which used to be known as *Pneumocystis carinii*) is the germ that causes the disease.

Almost everyone has this germ in their body. But it only causes problems if your immune system is weak and can't keep it under control.

#### **What are the symptoms?**

PCP affects your lungs. It's a type of pneumonia . You may find it hard to breathe and you may cough a lot. You may also lose weight or feel weak.

#### **How it is treated?**

PCP is usually treated with a combination of two antibiotics called sulfamethoxazole and trimethoprim. This combination is called co-trimoxazole. A common brand name for this combination is Septrin. You may also need to take drugs called steroids with your antibiotics.

If you have a bad infection, you may need to have the drugs put directly into your veins as an infusion (an IV) for two to three weeks.<sup>[7]</sup>

If you get side effects from this treatment, there are other drugs you can try.<sup>[7]</sup>

### Can it be prevented?

The best way to prevent PCP is to take combination therapy for HIV. See [Antiretroviral drugs](#) .

You can also take drugs to stop you getting PCP if your immune system has been badly damaged by HIV. Doctors call this prophylaxis. PCP prophylaxis is usually a low daily dose of co-trimoxazole, the same antibiotic that is used to treat an infection. If your immune system recovers after taking combination therapy, you may be able to stop taking PCP prophylaxis.

### Cytomegalovirus infection and HIV

Cytomegalovirus is often called CMV for short. It's a virus that can affect many different parts of your body. But it mostly affects the eyes.

About half of the population are infected with CMV, but in healthy people, CMV doesn't normally cause any problems. About 9 in 10 people with HIV have it. In people with HIV, CMV can damage their eyes or other parts of their body.

### What are the symptoms?

If CMV affects your eyes, you may:

- Have blurred vision
- Lose the central part of your vision
- Go blind.

If CMV affects your gut, you may get:

- Diarrhoea
- Pain in your stomach.

### How is it treated?

Antiviral drugs can get rid of CMV.<sup>[7]</sup> Some examples (and their brand names) are:

- cidofovir (Vistide)
- foscarnet (Foscavir)
- ganciclovir (Cymevine).



## HIV infection

If you get CMV infection in your eyes, you can have injections or implants directly into your eyes. It's important to get it treated as soon as you get symptoms. If you don't get treatment straight away, you may go blind.

### Can it be prevented?

The best way to prevent CMV infection is to take drugs that slow down HIV. These are called [antiretroviral drugs](#). You can also take drugs to stop you getting CMV if your [immune system](#) has been badly damaged by HIV.

You should have your eyes examined regularly to check for CMV infection.

## Mycobacterium avium complex infection and HIV

Mycobacterium avium complex (MAC) is the term used to describe two very similar bacteria: *Mycobacterium avium* and *Mycobacterium intracellulare*. The same illness is also sometimes called *Mycobacterium avium intracellulare* (MAI). Both are types of bacteria that live in water, soil, dust, and food. Almost everyone has them. But if you have HIV, MAC can cause problems because your [immune system](#) is weak.

MAC can cause an infection in one part of your body or it can spread through your whole body. Your lungs, intestines, [bone marrow](#), [liver](#), and [spleen](#) are most likely to be affected.

### What are the symptoms?

You may get:

- A fever
- Diarrhoea
- Weight loss
- Stomach ache
- Tiredness
- [Anaemia](#) .

If MAC spreads, it can cause blood infections and chest infections, which can make it hard to breathe.

## HIV infection

### How is it treated?

There are many different drugs that kill MAC. You'll probably need at least two drugs together. Two common combinations are:<sup>[7]</sup>

- Clarithromycin (Klaricid), ethambutol, and rifampicin (Rifadin, Rimactane)
- Clarithromycin (Klaricid), ethambutol, and rifabutin (Mycobutin).

The manufacturer of saquinavir, Roche, has warned that people with HIV who are taking ritonavir plus saquinavir (called ritonavir-boosted saquinavir) should not be treated with rifampicin.<sup>[8]</sup> This is because there is a chance that taking the three drugs together could lead to liver damage. This problem has been seen in healthy volunteers taking this combination of drugs.

### Can it be prevented?

The best way to prevent MAC infection is to take combination therapy for HIV. See [Antiretroviral drugs](#). You can also take drugs to stop you getting MAC if your immune system has been badly damaged by HIV.

## Herpes and HIV

Herpes is an infection that can affect your mouth or your genital area. It's caused by the **herpes simplex virus**.

### What are the symptoms?

If you have herpes, you'll get cold sores on your lips or small blisters on your genitals. The blisters are filled with fluid and can be painful.

Before you get the blisters, you may notice a tingling feeling in the area.

### How is it treated?

You can take tablets to treat herpes. Two common tablets (and their brand names) are:

- Aciclovir (Zovirax)
- Valaciclovir (Valtrex).

The blisters can be painful, so you may also need to take painkillers.

### Can it be prevented?

The best way to prevent herpes is to take drugs that slow down HIV. See [Antiretroviral drugs](#) . You can also take drugs to stop you getting herpes if HIV has damaged your immune system .

### Toxoplasmosis and HIV

Toxoplasmosis is an infection caused by a germ called *Toxoplasma gondii*. You can catch *Toxoplasma gondii* from animal droppings (especially from cats), raw meat, raw vegetables, soil, or dust.

About half of us have these bacteria in our bodies. They don't usually cause problems. But if you have HIV your immune system may be weak and unable to keep them under control.

### What are the symptoms?

Toxoplasmosis usually affects your brain and nervous system. If this happens, it's called **toxoplasmic encephalitis**. The symptoms include:

- Headaches
- Seizures (fits)
- Fever
- Confusion
- Problems with your vision
- Problems talking.

You may also get symptoms in your lungs, heart, or other parts of your body.

### How is it treated?

The usual treatment for toxoplasmosis is a combination of antibiotics . There are many different combinations of drugs that you can have. The most common are:

- clindamycin (Dalacin C) and pyrimethamine (Daraprim)
- sulfadiazine and pyrimethamine (Daraprim).

## HIV infection

You may also take a drug called calcium folinate to treat some of the side effects you may get from the antibiotics. This drug is also known as calcium leucovorin or folinic acid.

Most people get better after about two to three weeks.

### Can it be prevented?

You can get toxoplasmosis from cats that are infected. If you have HIV you shouldn't empty a cat's litter box.

The best way to prevent toxoplasmosis is to take combination therapy for HIV. See [Antiretroviral drugs](#) . You can also take drugs to stop you getting toxoplasmosis if HIV has damaged your immune system.

## Tuberculosis and HIV

Tuberculosis (TB) is an infection caused by a type of bacteria. About 1 in 3 people have the bacteria in their bodies. But it only causes problems if your immune system is weak and can't keep it under control.

You can catch the bacteria that cause tuberculosis when someone who has the infection coughs or sneezes.

### What are the symptoms?

People who have tuberculosis usually get quite sick. They can get bad coughs, weight loss, and night sweats and it can make them feel weak. Also, they might cough up blood.

### How is it treated?

If you have HIV and TB, you'll probably be treated with the following drugs: <sup>[9]</sup>

- isoniazid, rifampacin\* (Rifadin, Rimactene), pyrazinamide, and ethambutol for the first two months
- isoniazid and rifampacin\* (Rifadin, Rimactene) for the next four months.

But some people need to take drugs for TB for 12 months.

\* The manufacturer of saquinavir, Roche, has warned that people with HIV who are taking ritonavir plus saquinavir (called ritonavir-boosted saquinavir) should not be treated with rifampicin. <sup>[10]</sup> This is because there is a chance that taking the three drugs together could lead to liver damage. This problem has been seen in healthy volunteers taking this combination of drugs.

### Can it be prevented?

The best way to prevent tuberculosis is to take drugs that slow down HIV. See [Antiretroviral drugs](#) . You can also take drugs to stop you getting tuberculosis if HIV has damaged your immune system.

### Candidiasis and HIV

Candidiasis is a yeast infection caused by a type of fungus called **candida**. It usually affects your mouth or your throat (then it's called **thrush**). Women may also get candidiasis in their vagina. And it can affect other parts of your body, such as your kidneys , liver , and lungs.

Almost everyone has this yeast in their body. But it can cause problems if your immune system is weakened by HIV and can't keep it under control.

### What are the symptoms?

Thrush causes white patches on your tongue, your gums, or the lining of your mouth. If these patches grow at the back of your mouth, they can make it difficult to swallow.

If you're a woman with candidiasis in your vagina, you'll feel very itchy and you'll have a thick white discharge.

### How is it treated?

Mild candidiasis can be treated with creams or solutions that contain an antifungal drug. This is a drug that kills the fungus.

For more severe infections, you can take antifungal tablets. Some common tablets (and their brand names) are:

- fluconazole (Diflucan)
- itraconazole (Sporanox)

Another antifungal that you may have heard of, called ketoconazole (Nizoral), is no longer recommended, as it can cause serious liver damage. <sup>[11]</sup>

If these treatments don't get rid of the infection, you can try a more powerful antifungal drug called amphotericin (Amphocil, Abelcet, AmBisome, Fungizone). You have this as an injection directly into a vein.

### Can it be prevented?

The best way to prevent candidiasis is to take drugs that slow down HIV. See [Antiretroviral drugs](#) . You can also take drugs to stop you getting candidiasis if HIV has damaged your immune system.

### Cryptococcal meningitis and HIV

Cryptococcus is a yeast infection that can affect your brain, causing a serious condition called cryptococcal meningitis.

Many people have this yeast in their body. But it only causes problems if your immune system is weak and can't keep it under control.

#### What are the symptoms?

Cryptococcal meningitis usually starts with a headache. You may feel sick or tired. And you may get a fever. Later, you may start to feel irritable and you may get a seizure .

#### How is it treated?

This condition is treated with antifungal drugs. You usually have to go to hospital and have the drugs injected directly into your veins. You may need to take a combination of drugs.

The drugs (and their brand names) most commonly used to treat cryptococcal meningitis are: <sup>[7]</sup>

- amphotericin (Amphocil, Abelcet, AmBisome, Fungizone)
- fluconazole (Diflucan)
- flucytosine (Ancotil).

### Can it be prevented?

The best way to prevent cryptococcal meningitis is to take drugs that slow down HIV. See [Antiretroviral drugs](#) . You can also take drugs to stop you getting cryptococcal meningitis if HIV has damaged your immune system.

### Histoplasmosis and HIV

Histoplasmosis is an infection caused by a certain type of fungus .

## HIV infection

### What are the symptoms?

You may get a fever, feel tired, lose weight, and find it hard to breathe.

### How is it treated?

You can take antifungal drugs to treat this infection.

You may be able to take these drugs as tablets. A common antifungal tablet is itraconazole (brand name Sporanox). But you may need to go to hospital to have the drugs injected directly into your veins.

### Can it be prevented?

The best way to prevent histoplasmosis is to take drugs that slow down HIV. See [Antiretroviral drugs](#) . You can also take drugs to stop you getting histoplasmosis if HIV has damaged your immune system .

## Shingles and HIV

Shingles is an illness caused by a virus called **varicella-zoster virus**. It's like the virus that causes herpes. Shingles is sometimes called zoster or herpes zoster.

It's the same virus that causes chickenpox. Most people have had chickenpox when they were young. Afterwards, the virus stays hidden in their body. If your immune system is weak, the virus can come out of hiding and cause shingles.

### What are the symptoms?

Chickenpox is a rash of blisters or spots, usually on your face, head, or abdomen. They are itchy and sore.

Shingles is also a rash. It starts as numbness, itching, or severe pain. Then you get a strip of blisters on one side of your body. These blisters can be very painful.

### How is it treated?

Shingles is usually treated with high doses of a drug called **aciclovir** (Zovirax). You take it as a tablet. <sup>[7]</sup>

If you have a severe infection, you may need to go to hospital to have aciclovir put directly into your veins. <sup>[12]</sup>

### Can it be prevented?

The best way to prevent shingles is to take combination therapy for HIV. See [Antiretroviral drugs](#) .

## Kaposi's sarcoma

Kaposi's sarcoma is a type of cancer that grows in the lining of your blood vessels.



The main symptom of Kaposi's sarcoma is purple or black blotches.

It usually shows up as purple blotches on your skin. Doctors call these blotches **lesions**. You can also get the blotches inside your mouth. The disease can spread to your liver, stomach, and intestines.

It seems to be caused by a virus called **human herpesvirus 8** (HHV-8 for short).

Kaposi's sarcoma is most common in gay men. About 1 in 5 people with HIV who aren't taking drugs to control HIV get Kaposi's sarcoma. But with more people taking stronger [antiretroviral drugs](#), fewer people are getting Kaposi's sarcoma.

### What are the symptoms?

The symptoms you get depend on which parts of your body are affected by the disease.

You may get:

- Purple blotches on your face, arms, legs, or other parts of your body. These don't normally hurt
- Problems walking if you have blotches on the soles of your feet
- Problems eating or swallowing if you have large blotches in your mouth or throat
- Blood in your stools if you have Kaposi's sarcoma in your stomach or gut
- Swellings in your arms, legs, face, or scrotum if the cancer is blocking your lymph nodes
- A cough or shortness of breath if the disease affects your lungs. Sometimes fluid collects in your lungs, which can be serious.



### How is it treated?

Taking strong [drugs](#) that slow down HIV can help to clear up Kaposi's sarcoma and also stop the blotches getting bigger.

If you have blotches on your skin, they can be removed by:

- Liquid nitrogen
- Radiation therapy
- Surgery.

If Kaposi's sarcoma has spread inside your body, you may need treatment with chemotherapy.

### Can it be prevented?

Antiretroviral drugs help to keep your immune system healthy and HHV-8 under control.  
[\[13\]](#)

## Human papillomavirus infection and HIV

Human papillomavirus (HPV) is a virus that you can catch when you have sex (it's a sexually transmitted disease, or STD).

**In men**, HPV can cause:

- Warts on the penis or anus
- Cancer of the penis or anus.

**In women**, HPV can cause:

- Warts on the vulva, in the vagina, or in the anus
- Cervical cancer (cancer in the neck of the womb)
- Cancer in the anus.

People who have HIV seem to be more likely to get cancer caused by HPV. This is because their immune system is damaged and less able to fight off the virus.

## HIV infection

If you're a woman with HIV, your doctor may examine your **pelvis** by putting a gloved finger in your vagina. You'll probably need to have a cervical screening test. This checks the cells on your cervix to see if any of them show signs of cancer.

### What are the symptoms?

You may not know if you're infected with human papillomavirus. You can have it for many years without getting any symptoms.

The first sign that you may have been infected is warts in your genital area. Or you may get bleeding from your anus.

### How is it treated?

Warts on the genitals can be treated with chemicals, by freezing them with liquid nitrogen (this is called **cryotherapy**), or by cutting them away with surgery.

Other possible treatments for stubborn warts include the drug imiquimod (brand name Aldara). This is a cream that you apply every day to the warts. It helps the body's immune system to recognise and kill off the wart virus.

If you're a woman and abnormal cells show up in your cervical screening test, you may need some more tests or treatment. It depends what the abnormal cells look like.

- If the cells look only slightly unusual, they may clear up on their own. So you may not need any treatment. But your doctor will keep a close check on you. You may need to have a cervical screening test every few months.
- If the changes in your cells look more serious, you may need to have part of the neck of your womb (cervix) removed by a surgeon. Patches of abnormal cells (cells that could become cancer) can also be treated with cryotherapy.

Doctors aren't sure how to treat this kind of cancer in men. <sup>[13]</sup>

### Can it be prevented?

The best way to control cervical cancer is for all women with HIV to have regular cervical screening tests. <sup>[13]</sup> Screening with a cervical screening test helps to find and treat cells that could become cancer. Women should carry on having tests even if they have been treated for cervical cancer.

A drug called fluorouracil (5-FU) may keep the cancer away. <sup>[13]</sup> But doctors need more research to know for sure.

There are vaccines that can prevent infection with HPV. They're called Gardasil and Cervarix. They're most effective if they're given before someone becomes sexually active. In the UK, girls are offered vaccination at the age of 12 or 13. Researchers are looking at whether these vaccines could help people who are HIV-positive.

### Lymphoma and HIV

Lymphoma is a type of cancer that affects your lymphatic system . Your lymphatic system is a network of tubes (a bit like blood vessels), glands, and lumps (called lymph nodes ) that help you fight infections and cancer.

Anyone can get lymphoma. But you're more likely to get it when you have HIV, because your immune system doesn't work as well and can't clear your body of cancer.

There are many types of lymphoma. People with late-stage HIV infection often get a type called **non-Hodgkin's lymphoma**. It's a serious disease that can kill. People who have HIV and get lymphoma are most likely to get the types of lymphoma that affect their brain.

### What are the symptoms?

People with lymphoma often get swollen lymph nodes. There are many lymph nodes in your body. Most of them are deep inside your body, so you won't notice if they are swollen. But you may be able to feel the lymph nodes in your neck, your armpits, and your groin. Your doctor will check your lymph nodes regularly.

Other symptoms of lymphoma are:

- Fever
- Night sweats
- Weight loss
- Headaches.

If your doctor thinks you may have lymphoma, you'll probably have some tests. Your doctor may remove some cells from one of your lymph nodes. This is called a **biopsy** . Doctors look at the cells under a microscope to see whether any are cancerous.

### How is it treated?

Lymphoma is treated in the same way as other types of cancer. The best treatment is a combination of drugs that kill cancer cells ( **chemotherapy** ) and **radiotherapy** .

But if you have late-stage HIV infection, you should have lower doses of the drugs than otherwise healthy people. This is because these drugs can damage your immune system even more.

[Antiretroviral drugs](#) can make your immune system stronger so that you can have higher doses of chemotherapy.

# HIV infection

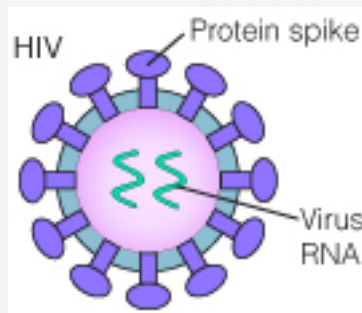
## Can it be prevented?

Taking combination therapy for HIV can help keep your immune system healthy. Since people started taking modern antiretroviral drugs, fewer people with HIV are getting lymphoma. <sup>[14]</sup>

## How HIV damages your immune system

### What HIV looks like

To understand how HIV damages your immune system, it may help to know what the virus looks like.



The HIV virus has a strand of RNA in its centre.

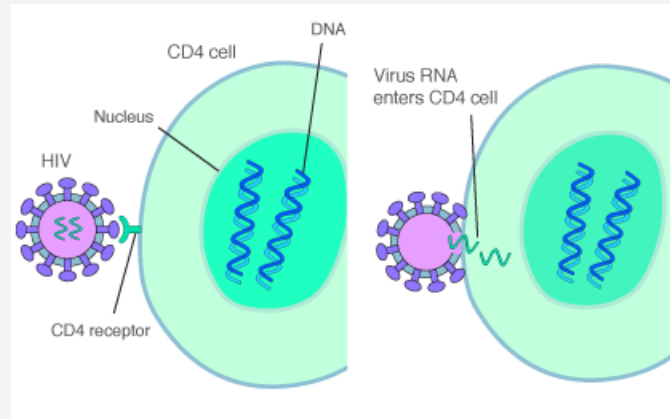
- At the centre of the virus is a strand of RNA (short for **ribonucleic acid**).
- The RNA is the blueprint (or genetic code) that the virus uses to make more copies of itself. It contains just nine genes. (You have about 30,000 genes.)
- Small spikes of proteins stick out of the surface of the virus. Doctors call them gp120 antigens.
- These protein spikes fit exactly onto the surface of your **CD4 cells**, which are part of your immune system.

### When HIV meets a CD4 cell

Here's what happens when HIV gets into your blood and meets a CD4 cell.

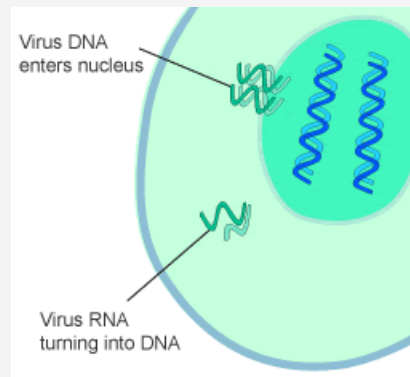
- The protein spikes on the surface of HIV stick onto certain receptors on the surface of the CD4 cell.
- These receptors are called **CD4 receptors**.

## HIV infection



The protein spikes around the HIV virus can stick onto CD4 receptors.

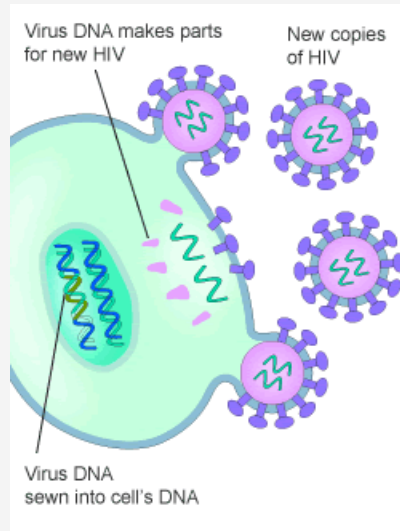
- When HIV has stuck to the CD4 receptor, its RNA can get inside the CD4 cell.



HIV virus RNA can turn into DNA when it gets into CD4 cells.

- Once inside the cell, HIV does something that only a few viruses can do. It changes its RNA into DNA, which stands for deoxyribonucleic acid.
- It does this using a special chemical called **reverse transcriptase**.
- The virus's DNA can get inside the centre part (the **nucleus**) of your CD4 cell.
- Inside the nucleus, the virus DNA becomes part of the CD4 cell's own DNA.
- The HIV DNA can stay in the human DNA for many years.

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When HIV makes copies of itself, many of your CD4 cells get killed.

- At some point, the virus DNA 'wakes up' and starts to make extra copies of the HIV RNA.
- The new pieces of RNA act as the blueprint for many new copies of HIV.
- When they are finished, the new viruses pop out from the CD4 cell. Along the way, the CD4 cell dies, but we're not sure exactly how.
- Millions of new viruses are made in this way. The new viruses move on to infect other CD4 cells.
- Many of your CD4 cells are killed when HIV makes new copies of itself. Without CD4 cells, your body can't fight off infections.

### **HIV and unprotected sex**

Most people who have HIV got the virus by having unprotected sex with someone who has HIV. Unprotected sex means not using a male or female condom or another kind of barrier.

HIV lives in a man's semen and a woman's vaginal fluid. If you have unprotected sex with someone who has HIV, the virus can pass from their semen or vaginal fluid into your body through the thin lining of your vagina, anus, rectum, or the surface of your penis.

HIV can also get into your blood through cuts and sores you may have in and around your genitals or anus (some of which you may not know about).

## HIV infection

Other factors may also increase the risk of getting HIV through sex. For example, someone who has recently become infected with HIV may be more infectious because they can have a very high level of virus in their blood and semen or vaginal fluid. Also, if you have another sexually transmitted infection, such as gonorrhoea or genital herpes, you are two to five times more likely to get HIV than if you didn't have another sexually transmitted infection. <sup>[15]</sup> This is because infections can cause breaks such as ulcers or sores in the membranes that protect the body's surfaces. These breaks make it easier for the virus to get inside your body. Taking antiretroviral drugs reduces the amount of HIV in your body, and can reduce the risk of infecting another person, though by not as much as having safer sex. <sup>[16]</sup>

### Vaginal sex

The lining of the vagina is thin and has lots of blood vessels. So a woman can easily get infected if she has sex with an infected man and neither partner is using a barrier, like a condom. A woman is more likely to become infected with HIV through vaginal sex than a man is.

### Anal sex

In anal sex, whether male-male or male-female, both partners are at risk of getting infected. It's more risky than vaginal sex. The highest risk is to the partner being entered. This is because the lining of the anus and rectum is very thin and filled with many small blood vessels that can be easily damaged. <sup>[15]</sup>

### Oral sex (on a man)

HIV lives in semen. So if you give unprotected oral sex to a man who is HIV-positive, there's a chance that you'll get infected. One study found that about 3 in 100 men who have HIV probably got it by having oral sex with an infected man. <sup>[17]</sup> Unprotected sex means not using a condom or a dental dam.

The risk is greatest if:

- The man ejaculates in your mouth
- You have cuts or sores in your mouth
- The man has another sexually transmitted disease (STD).

It is difficult to get reliable information on the risk of oral sex, as it is rarely the only type of sex people have. Also, the studies rely on people telling researchers about their sexual activity, which is not always reliable.

### Oral sex (on a woman)

The risk of getting infected with HIV during oral sex on a woman is small. But some people have become infected in this way.<sup>[3]</sup>

### How to have safer sex

You can't tell if someone has HIV by how they look. A person who has HIV is infectious all the time. The only way to lower your chance of getting HIV from someone who may have the virus is to have safe sex or to wait until you know for certain that they don't have HIV.

In safe sex you create a barrier between you and your partner. The barrier stops your partner's semen or vaginal fluid getting into your body. Condoms, dental dams (for oral sex), and latex gloves are all examples of barriers used to prevent the spread of HIV.

### What's the risk?

The risk of becoming infected with HIV for a woman who has vaginal sex with a man who is already infected is about 1 in every 1,000 times you have sex.<sup>[15]</sup> The risk for the woman increases to about 5 in 1,000 for anal intercourse.

There hasn't been much research on the risk of HIV infection for women who have sex with women. But HIV can live in vaginal fluids, so getting infected in this way is possible.

If you regularly have sex with someone who has HIV, using a condom lowers your risk of getting infected by more than 80 percent.<sup>[18]</sup> This statistic comes from studies of heterosexual partners.

The more sexual partners you have, the more likely it is that one of your partners will be HIV-positive. You are more at risk if you or your partner has several sexual partners at the same time.

You may think you can have sex without using safer sex practices if you and your partner have tested negative for HIV since the last time you had sex. But you still need to be careful. Because the HIV test works by detecting antibodies to HIV and these can take around six weeks to develop, it is possible to have a negative result even after you've been infected with HIV. This means that before you can think about stopping safe sex practices:

- Both partners must only have sex with each other
- Both partners must have tested negative at least six weeks after the last possible exposure to HIV.

A summary of the evidence (a systematic review) that looked at studies in couples in which one partner had HIV and the other didn't, found that giving antiretroviral drug



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treatment to the infected partner meant that the risk of them transmitting the virus to their uninfected partner was at least three times smaller.<sup>[16]</sup>

A different summary found that giving antiretroviral drug treatment to the uninfected partner meant that the risk of them getting the virus from their partner was halved.<sup>[19]</sup>

There are treatments for people who think they may have been in contact with HIV. See [Emergency treatment if you think you've been exposed to HIV](#) .

### Emergency treatment if you think you've been exposed to HIV

If you think you may have been in contact with HIV (through sex or an injury at work, or because you injected drugs, for example), there are drugs you can take that may lower your chances of getting infected. You should get medical help immediately.

This type of treatment is called **postexposure prophylaxis** or PEP for short. The drugs used are [antiretroviral drugs](#) , the same drugs that are used for people who already have the infection. You have to take these drugs as soon as possible and preferably sooner than 24 to 36 hours after sex or your accident. It may still be worth starting PEP up to two weeks after you might have been exposed to HIV, but doctors are not sure how well this works.<sup>[20]</sup>

It is very difficult to do studies to see if drugs that slow down HIV stop people becoming infected. This is because it wouldn't be fair not to give someone treatment if doctors thought it might help. But one study of 31 health workers from the US and France suggests that taking drugs against HIV reduces the odds of becoming infected by 81 percent.<sup>[21]</sup>

The people in the study were all accidentally exposed to the virus through their work (for example, they were stuck by a needle). We don't know how well this treatment works if you've been exposed to HIV through sex. However, many genitourinary clinics do provide PEP for people who have had unprotected sex with a person known to be infected with HIV.

Typically you would take two nucleoside reverse transcriptase inhibitors (NRTIs) for four weeks.<sup>[22]</sup> (To read more about NRTIs, see [Antiretroviral drugs](#) .) In some cases, you may have to take two, three, or more antiretroviral drugs to avoid being infected with the virus. This is because some strains of the virus may have become resistant to one of the earliest drugs used to treat HIV, called zidovudine (AZT).

### HIV and sharing needles

If you inject yourself with any kind of drug, you should never use needles or syringes that someone else has used.

## HIV infection

If you inject yourself with drugs, some of your blood will get on the needle and into the syringe. HIV can stay in the small amount of blood that remains on a needle after it's used. <sup>[23]</sup>

If someone else then uses the same needle or syringe, there's a chance that they'll get infected with HIV. <sup>[3]</sup>

You are also at risk of infection if you are using separate needles and syringes, but dipping in and out of a shared pool of liquid.

### HIV passing from mother to baby

HIV can pass from mother to child during pregnancy or childbirth, or when breastfeeding. <sup>[24]</sup> <sup>[25]</sup> <sup>[26]</sup> <sup>[27]</sup> If you are pregnant and have HIV, there are things you can do to help protect your baby from HIV.

#### Pregnancy

If you're pregnant and have HIV infection, the virus can pass to your baby by crossing the placenta and passing through the umbilical cord. <sup>[24]</sup> This is the tube that links the mother's blood vessels to the baby.

If you don't take any treatments, there's about a 1 in 4 chance that your baby will be born with the virus. <sup>[28]</sup> <sup>[29]</sup> Taking [antiretroviral drugs](#) can greatly reduce the chance that your baby will get HIV. <sup>[30]</sup> The exact amount of protection depends on the types of drugs you can take and the levels of virus in your blood (your viral load).

By having a caesarean section and not breastfeeding you can reduce the risk of your baby becoming infected with HIV by even more (see below). <sup>[30]</sup>

All pregnant women in England are offered a test for HIV. If this is positive, you'll be able to talk to doctors and nurses about how you can reduce the risk of passing the infection to your baby. <sup>[31]</sup>

If you're pregnant and have HIV but are not on antiretroviral treatment, you should be given drugs to slow down HIV late in your pregnancy, probably starting some time in your second trimester. Your baby also should be given drug treatment for HIV soon after he or she is born. Starting treatment soon after a baby is born can keep babies with HIV healthy for longer. <sup>[32]</sup>

If you are already taking antiretroviral treatment, you will continue taking this during the pregnancy, although your doctor may make some changes to the drugs you take. This is because certain drugs are thought to be safer and more effective if you're pregnant.

## HIV infection

The risk of passing on HIV to the baby is higher for women who have late-stage HIV infection, who have lower CD4 counts, or who have other infections at the time. <sup>[24]</sup> <sup>[27]</sup>  
<sup>[33]</sup>

### Birth

Babies may get infected with HIV during birth. You can lower the chances of this happening by having your baby by caesarean section rather than by vaginal delivery. <sup>[30]</sup>  
<sup>[34]</sup>

One study of pregnant women with HIV found that only 2 in 100 babies born by caesarean section were infected with HIV at 18 months. Of those who were born by vaginal delivery, 10 in 100 had the virus. <sup>[34]</sup> About 60 in 100 women in the study in both groups (caesarean and vaginal delivery) were also taking drugs to slow down HIV. The evidence so far suggests that babies born to women who take antiretroviral drugs and have their baby by caesarean section have a very low risk of becoming infected. But we need more research to be sure.

### Breastfeeding

If you have HIV and you breastfeed your baby or feed your baby with your expressed breast milk, there's a chance that HIV in the milk could infect your baby.

In one study in Kenya, breastfed babies had a 37 percent chance of being HIV-positive at the age of 2 years. The risk was only 21 percent for formula-fed babies. <sup>[35]</sup>

So, if you have HIV, you should feed your baby with formula, not breast milk. <sup>[30]</sup> <sup>[31]</sup>

### Vitamin supplements

One big review looked at whether giving vitamins to pregnant women would help stop their babies getting the virus. It showed vitamins didn't help. <sup>[36]</sup> But doctors recommend that pregnant women with HIV should take vitamins to help them stay healthy during pregnancy. <sup>[37]</sup>

## HIV and accidentally pricking yourself with a needle (needlestick injury)

Health care workers can get HIV if they prick themselves with a needle that's been used on someone who has the virus. The chance that they'll get HIV is very small. The chance of getting infected from a needlestick is less than 1 in every 300 accidents. <sup>[38]</sup>

There's also a chance that you can become infected if blood from someone with HIV gets inside your body. For example, if you're taking a blood sample and some of the blood gets into a cut on your skin or splashes into your eye. However, the chances of this happening are very small.

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There have been five health care workers in the UK that have become infected with HIV through their work. <sup>[39]</sup> There's also a chance that a further 14 people may have got HIV through a needlestick injury. But these people may have got HIV another way. Most of these people worked in countries where many people had HIV. They are not thought to have been infected through their work in the UK.

It's important to remember that casual, everyday contact with a person who has HIV doesn't put you at risk of catching the virus.

If you do prick yourself with a needle then you should get medical help immediately. There are drugs you can take to lower your chances of getting infected.

To learn more, see [Emergency treatment if you think you've been exposed to HIV](#) .

### HIV and blood transfusions

Some people have become infected with HIV by having blood transfusions or receiving other blood products that contained HIV. (For example, people with a condition called haemophilia get a blood product called factor VIII to help their blood clot.)

But since 1985, all blood used in transfusions has been tested for HIV. So the risk of getting HIV from a blood transfusion is now very small.

### Your questions about HIV answered

#### Can I get HIV from kissing?

No one has ever been infected with HIV from shaking hands, hugging, or kissing on the cheek.

Kissing, including open-mouth kissing, is also thought to be safe. <sup>[2]</sup>

- HIV doesn't live in saliva. Lots of research has been done to find out whether HIV lives in saliva. If someone has HIV in their saliva, it has probably come from blood in their mouth. In one study, researchers looked at saliva from 79 men with HIV. Only one of the men had HIV in his saliva and it probably came from blood in his mouth. This man had some sores in his mouth and throat. And the amount of HIV in his saliva was 10,000 times less than the amount in his blood.
- Saliva may kill HIV. Researchers think that the chemicals in saliva kill HIV.

There's a very small chance that you could get HIV from open-mouth kissing. This can only happen if you kiss someone who has the virus when one or both of you has sores or cuts in your mouth.

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It's safe to share food with someone who is HIV-positive.

### **Can I get HIV from sharing food or cutlery with someone who has HIV?**

No. You can't get HIV from sharing food or utensils with someone who has the virus.

HIV doesn't live in saliva. So you can't catch HIV from someone else's saliva.

It's perfectly safe to share a sandwich, apple, cup of coffee, or spoon with someone who has HIV. <sup>[2]</sup>

### **Can I get HIV from public swimming pools?**

No. The chemicals in swimming pools kill HIV instantly. So there's no chance of getting infected. <sup>[2]</sup>

### **Can I get HIV from insects or pets?**

No. HIV does not live in insects, pets, or farmyard animals.

You may think that you can get HIV from insects that suck blood, such as mosquitoes. But if a mosquito bites someone who has HIV, the virus dies as soon as it gets inside the mosquito. So the mosquito can't pass on the infection. <sup>[2]</sup>

You can't get HIV from a pet. And if you have HIV, you can't pass it on to your pet. The only animals that could be a risk to people are chimpanzees kept in laboratories that have been deliberately infected with HIV for medical research.

## **Blood tests for HIV**

When you have a blood test for HIV, doctors don't look for the virus in your blood. They look for antibodies to the virus. Antibodies are particles that your immune system makes to fight an infection. They look different for every virus you're infected with.

It takes about three weeks for most people's bodies to make antibodies to HIV. So, if you have a negative result, your doctor may advise you to have a repeat test later on to

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make sure your result is correct. Doctors usually advise you to have another test after three months. <sup>[42]</sup>

It's normal to feel nervous about having a test for HIV. You'll usually be offered some counselling before your test to make sure you understand what's going to happen and that you're ready to cope with it.

There are a few different tests for HIV.

### Where can I get an HIV test?

You can get a test for HIV at any genitourinary medicine (GUM) clinic. You can also get an HIV test at your GP's surgery. However, you may not get the same amount of counselling before and after your test at your GP's surgery as you would at a specialist clinic.

At a GUM clinic you don't have to give your real name to get it done. No one needs to know if you have had the test or what the result is.

You can also get a HIV test at:

- clinics run by charities such as the Terrence Higgins Trust
- some contraception and young people's clinics
- some drug treatment clinics
- an antenatal clinic, if you are pregnant
- a private clinic (where you will have to pay for the test).

### What happens during a test?

Most clinics use an HIV test called the **ELISA test** (which stands for enzyme-linked immunosorbent assay). To have this test you need to have a sample of blood taken from a vein, usually from the inside of your elbow.

The ELISA test is good at detecting antibodies to HIV in your blood. But the test isn't always accurate. You'll probably be asked to come back to the clinic in one or two weeks to get your results. But some clinics offer same-day testing, where you get your result later the same day.

If you get a positive result, doctors will do another test (on the same blood sample) to be sure. Most clinics use the **Western blot test** to double check the result.

The Western blot test is more expensive than the ELISA test and takes longer to do.

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It's very rare for someone to have a negative result and for this to be wrong. So, if you get a negative result and it's at least three months since you thought you might have been in contact with HIV, you almost certainly don't have the virus. <sup>[42]</sup>

### Rapid HIV tests

These are tests that give you a result in about an hour. At the moment they are still being tested in studies.

If you test positive, you'll need to have a Western blot test to confirm the result.

In the UK it's possible to buy HIV tests over the counter that you can use to test yourself, at home. These home testing kits work in the same way as other blood tests, by testing for antibodies to HIV. Some tests can give results in around an hour. There are other tests that you do at home and send to a laboratory to get the results. If you get a positive test result from a home testing kit it's important to see a specialist doctor to get counselling about what needs to happen next.

Home testing kits are not always accurate. So it's recommended that you get any home HIV test results confirmed by a doctor.

### What does a positive result mean?

If you get a positive HIV blood test it means that you have been infected with HIV.

Once you're infected with HIV, the virus starts to attack your immune system, the cells that protect you from infections. But it takes many years for this damage to affect your health. And there are drugs that can help you stay healthy for longer.

See [What treatments work for HIV?](#)

Getting a positive test result can be a huge shock. And you'll probably have lots of questions. Your doctor will be able to answer these for you. He or she will also tell you about the people and organisations you can turn to for advice. To learn more, see [What should I do if I get a positive result?](#)

### What should I do if I get a positive result?

You may be shocked and upset to find out you have HIV. You'll probably also have lots of questions. It can help to talk about how you feel and what you need to think about for the future. There are lots of different people you can turn to.

Your doctor or clinic might be able to put you in touch with people who have HIV so that you can talk to them about how they coped with the diagnosis and what life is like for them now. Some groups meet regularly to discuss their concerns. Many clinics have professional counsellors. They can listen to your concerns and try to answer questions you might have.

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It's important to remember that HIV can be treated better than ever before. Many people with HIV stay healthy for many years.

If you have a positive HIV test result, you'll be asked to think back to how you could have become infected. And you'll need to think about who you could have passed the virus on to.

Telling people can be difficult. But the clinic where you have your test can help you. The best way to stop the virus spreading is for everyone you've had sex with since you got the infection to have a test. The clinic can contact your former partners without mentioning your name. This is called partner notification. Clinics that test for HIV are used to doing this job.

It will take time to come to terms with having HIV and there are lots of things to think about. One area you may worry about is how to avoid passing the virus on to other people. You don't have to worry about day-to-day contact with people, like hugging, sharing food, or holding hands. But there are some things that can help you to protect the people close to you. <sup>[23]</sup>

- Always use a condom or another kind of protection during sex. Using condoms can stop you passing HIV to your sexual partners.
- Use water-based lubricants. Avoid oil-based lubricants, which can make condoms break more easily. Oil-based lubricants include Vaseline, baby oil, massage oil, hand lotion, or moisturiser. Water should be the first ingredient listed on any lubricant you use.
- For oral sex, use protection such as a condom, or a dental dam (a square piece of latex used by dentists).
- Some personal items should be kept for your use only and not shared. These include razors, your toothbrush, sex toys, and any drug injection equipment, such as syringes and needles.
- If you are pregnant, talk to your doctor about how you can help to protect your unborn baby.

### Side effects of antiretroviral drugs

The most common side effects of antiretroviral drugs are nausea or vomiting, diarrhoea, tiredness, stomach or head pains, a rash, and loss of appetite. <sup>[43]</sup> <sup>[44]</sup> There are many other side effects. Here we've looked at some of these side effects in more detail.



### Nausea

Feeling sick (nausea) is one of the most common side effects of antiretroviral drugs.

There are drugs to help, but you should talk to your doctor before taking anything. The nausea drugs may stop your antiretroviral drugs working.

There are some things you can do to help with nausea. <sup>[45]</sup>

- Eat small amounts of food more often rather than three main meals each day.
- Avoid spicy and rich foods.
- Learn how you should take your tablets. Some tablets can be taken with food, and this may help.
- Some people find that peppermint tea or ginger tea settles their stomach.

### Feeling tired

There are several reasons why you may feel tired if you have HIV infection. Tiredness can be caused by:

- The drugs you're taking
- The virus itself
- The other infections ( [opportunistic infections](#) ) that can go with HIV infection
- Not eating well
- [Feeling depressed](#)
- Being anaemic
- Low levels of hormones, including testosterone and thyroxine.

Your doctor may suggest that you have a blood test. This can help your doctor decide what's making you feel tired. The more information you can give your doctor, the easier it will be to find the cause.

If you feel so tired that you can't do the things you'd like to, you should see your doctor. It's important to get treatment because being tired can make your illness get worse more quickly. <sup>[46]</sup>

### Rashes

Most rashes caused by antiretroviral drugs can affect a large part of the body and might make you feel itchy. But they are not usually serious. Nevirapine, efavirenz, atazanavir, and abacavir are known to cause rashes. More severe rashes, which you can get at the same time as a fever or ulcers, may need a change in treatment.

Around 25 in 100 people who take these drugs get a mild or moderate rash. A more severe rash affects about 1 in 100 people with most of the drugs and about 1 or 2 in 100 with nevirapine. To learn more, see [More serious problems with antiretroviral drugs](#) .

### Lipodystrophy syndrome

If you take antiretroviral drugs, you may find that the shape of your body changes as fat is lost from some areas and gained in others.<sup>[47]</sup> Tests may also show that the level of fats in your blood is higher than normal. This can increase the risk that you will develop heart disease, which can lead to a heart attack.

Also, the way your body controls your blood sugar with insulin may not work as well as it should. Doctors call this **insulin resistance**, and it increases your risk of getting diabetes. Doctors call this combination of effects on body fat and on sugar and fats in the blood **lipodystrophy syndrome**.

If you have lipodystrophy, you lose fat from your arms, legs, or face. So your arms and legs may look thinner. Or your cheeks may look sunken. Doctors call this **lipoatrophy**. You may also gain fat in other parts of your body, such as your stomach, the back of your neck, or your chest.

Doctors don't know exactly what causes this side effect, but being on antiretroviral drugs for many years seems to be responsible.<sup>[48]</sup> Protease inhibitors change the way your body deals with fat, and lipodystrophy was originally blamed on them. However, people taking other types of antiretroviral drugs can also get lipodystrophy syndrome.<sup>[49]</sup>

We're not sure how many people have lipodystrophy. In some reports, 5 in 100 people who took antiretroviral drugs got lipodystrophy. But in other studies, 80 in 100 people got it.<sup>[47]</sup>

Doctors aren't sure how to treat lipodystrophy. You may be able to switch to a different combination of drugs, even if your original combination is still working. Some people have had liposuction, in which doctors remove excess fat from under the skin. Restorative surgery can improve the appearance of sunken cheeks. This uses implants or injections to replace the fat that has been lost. New treatments include polyactic acid (brand name NewFill), which can be used to replace fat lost from the face.

### Tingling, numbness, or pain in your feet or hands

The **nucleoside reverse transcriptase inhibitors (NRTIs)** didanosine (ddi), stavudine (d4T), and zalcitabine (ddC) can damage the nerves in your feet and legs, which can be

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extremely painful. Your hands and arms can also be affected, but this is less common. Doctors call this side effect peripheral neuropathy. It tends to happen some weeks or months after starting treatment, but it may start sooner in people whose nerves are already damaged.

The symptoms of nerve damage begin with numbness and odd sensations (such as pins and needles) in your toes and feet.

Between about 10 and 50 in 100 people are affected, depending on the drug. Treatment with stavudine has the highest risk of these side effects.

### More serious side effects

You and your doctor should also look out for signs of more serious side effects. These include liver problems, too much lactic acid in your blood, allergic reactions, kidney stones and kidney damage, a shortage of red or white blood cells, an inflamed pancreas, heart problems, high cholesterol, diabetes, bone damage, and nervous system problems. See [More serious problems with antiretroviral drugs](#) .

### Side effects of different types of antiretroviral drugs

We have listed the side effects of the main types of antiretroviral drugs.<sup>[50]</sup> Your doctor or nurse will be able to tell you about side effects of drugs that aren't included on these lists.

#### Nucleoside reverse transcriptase inhibitors (NRTIs)

- Abdominal pain
- Diarrhoea
- Nausea
- Vomiting
- Breathing difficulties
- Cough
- Headaches
- Insomnia
- Dizziness
- Feeling tired
- Anaemia and other blood problems

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- Muscle pain
- Nettle-rash type skin problems
- Fever
- Lipodystrophy syndrome
- More serious problems, including liver damage, joint pain, and rashes.

### **Non-nucleoside reverse transcriptase inhibitors (NNRTIs)**

There are only two NNRTIs commonly used in the UK: efavirenz and nevirapine. These are the side effects of nevirapine:

- Abdominal pain
- Diarrhoea
- Nausea
- Vomiting
- Anxiety
- Depression
- Insomnia
- Abnormal dreams
- Difficulty concentrating
- Inflamed pancreas (pancreatitis)
- Psychiatric problems (including mania and suicidal thoughts)
- Memory problems
- Co-ordination problems
- Convulsions
- Blurred vision.

### **Protease inhibitors**

- Diarrhoea
- Nausea
- Vomiting
- Abdominal pain
- Flatulence (excess gas)
- Liver problems
- Inflamed pancreas
- Anaemia and other blood problems
- Insomnia
- Tiredness
- Headaches
- Dizziness
- Abnormal sensations (for example, pins and needles)
- Sore muscles and muscle damage
- Altered sense of taste
- Rash
- Itchiness
- Allergic reactions.

### **More serious problems with antiretroviral drugs**

Your doctor or nurse will tell you about the common side effects of your antiretroviral drugs and encourage you to watch out for them. It is important to tell your doctor or nurse about any serious or unusual side effects quickly.

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If you get side effects, your doctor may suggest a change to the drugs you're taking. But it's important not to stop taking any of your medications without talking to your doctor first.

This page gives information about some of the more serious side effects.

### Liver problems

All the NRTIs (nucleoside reverse transcriptase inhibitors), NNRTIs (non-nucleoside reverse transcriptase inhibitors), and PIs (protease inhibitors) can harm your liver. To check whether your drugs are in these groups, see [More about antiretroviral drugs](#). But liver problems seem to be more common with the drug nevirapine, especially in the first few weeks of treatment.

About 4 in 100 people taking nevirapine have this side effect. It seems to be more common in women than in men. And it's more likely to happen if your [CD4 count](#) is high (over 400 in men or over 250 in women) when you start treatment.

Symptoms include:

- Flu-like symptoms
- Pain in your abdomen
- Yellow skin (called jaundice)
- A rash.

Your doctor can check if your drugs are harming your liver by doing blood tests, called **liver function tests** every few months. If you're taking nevirapine, you might have tests more often.

### Too much lactic acid in the blood

Doctors call this **lactic acidosis**. It is a rare but serious side effect of NRTIs, especially didanosine (ddI), stavudine (d4T), and zidovudine (AZT). It usually happens a few months after starting treatment.

Lactic acid is made inside your cells when they convert food into energy. But antiretroviral drugs can damage the part of your cells involved in making energy. These parts are called mitochondria, and doctors call this problem **mitochondrial toxicity**. It results in too much lactic acid being made. High levels of lactic acid can damage the liver and pancreas. <sup>[51]</sup> You may get these symptoms:

- Nausea
- Loss of appetite

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- Pain in your abdomen
- Vomiting
- Weight loss
- Tiredness.

Lactic acidosis is rare. Less than 1 in 100 people who take NRTIs for a year get this problem. But about half the people who get lactic acidosis die from it.

### Stevens-Johnson syndrome

Some antiretroviral drugs can cause **Stevens-Johnson syndrome**. It is mainly seen in people taking nevirapine and efavirenz. But it can also happen with abacavir and other NRTIs. This side effect usually happens in the first six weeks of taking one of these drugs.

The main symptoms are:

- A rash with **ulcers** (which may form blisters) in your mouth, eyes, or genitals
- Flaking skin (the top of layers of your skin may come away)
- A fever
- Feeling unwell
- Sore muscles and joints.

About 30 in 100 people who take nevirapine get this problem. <sup>[52]</sup> You're much less likely to get a rash with efavirenz. Only about 1 in 1,000 people who take efavirenz get a rash. <sup>[52]</sup>

### Allergic reaction

Some people get severe allergic reactions to certain drugs. Doctors call this a **hypersensitivity reaction**. It tends to happen in the first six weeks of the drug. Symptoms include:

- A fever
- A rash, which spreads all over your body (the rash may be severe)
- Feeling unwell
- Nausea

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- Headaches
- Muscle aches
- Chills
- Diarrhoea
- Vomiting
- Joint pain
- A sore throat
- Finding it difficult to breathe.

HIV drugs known to have caused hypersensitivity reactions include abacavir and etravirine. <sup>[53]</sup> Between about 8 in 100 and 5 in 100 people taking abacavir are affected. <sup>[52]</sup>

Allergic reactions to abacavir are more common in people with a particular genetic type. Doctors in the US have been advised to offer genetic testing, to make sure people taking abacavir aren't at risk. <sup>[54]</sup> <sup>[55]</sup> Some people taking etravirine have died as a result of hypersensitivity reactions. If you get these symptoms while taking etravirine, it's important to see your doctor as soon as possible.

### **Kidney stones and kidney damage**

Your kidneys make urine and help remove waste products from your body. Sometimes a small lump or stone may grow from crystals that come out of urine. This is a common side effect of the drug **indinavir** and it happens to about 12 or 13 in 100 people who take this drug. <sup>[52]</sup>

Indinavir can also damage the kidneys so that they are not able to remove waste products properly. Doctors call this **nephrotoxicity**. Tenofovir (TDF) may also cause kidney damage. But we don't know how often this happens.

If you have kidney stones or kidney damage, you might get the following symptoms:

- Pain in the kidney region (the flanks) or abdomen
- Difficulty passing water
- Having to pass water often.

You can reduce your risk of kidney problems by having plenty of fluids to drink.



### Problems with your bone marrow

Your bone marrow is a jelly-like substance inside your bones. Red blood cells and white blood cells are made in your bone marrow. Zidovudine can interfere with this process, which can lead to a shortage of blood cells. Doctors call this **bone marrow suppression**. A shortage of red blood cells causes anaemia. A shortage of white blood cells can make you more prone to infection. Doctors call this **neutropenia**.

Between 1 in 100 and 4 in 100 people taking zidovudine get anaemia.<sup>[52]</sup> Between 2 in 100 and 8 in 100 people taking zidovudine get neutropenia.<sup>[52]</sup>

### Inflamed pancreas

If your pancreas becomes inflamed, you might get a pain in your abdomen after you eat. You might also feel nauseous and vomit. Doctors call an inflamed pancreas **pancreatitis**.

Didanosine (ddI) or a combination of didanosine plus stavudine (d4T) can cause pancreatitis in adults.<sup>[52]</sup> Lamivudine can cause it in children.<sup>[52]</sup>

Pancreatitis affects between 1 in 100 and 7 in 100 people taking didanosine. It's more likely to happen if you're also taking stavudine (d4T), or other drugs, including ribavirin, which is used to treat [hepatitis C](#).<sup>[52]</sup>

### Heart problems

Any of the protease inhibitors (PIs) can make the arteries that supply blood to your heart narrower. This increases the risk of a blockage in one of the arteries (called **coronary artery disease**). And this increases the risk of having a heart attack.

Heart problems usually take years to develop and you may not get any symptoms. Sometimes an early symptom is a crushing pain in the chest (called *angina*), usually during exercise.

If 1,000 people took a protease inhibitor for a year, doctors would expect between three and six of them to get problems with the arteries in their heart.<sup>[52]</sup>

Abacavir and didanosine have been linked to a higher risk of having a heart attack.<sup>[56]</sup> But the research isn't conclusive yet. One study suggests that your risk of a heart attack goes up while you're taking these drugs, then drops back to normal six months after you stop taking them. The risk with didanosine seems to be lower than with abacavir.

If you're worried about the risk of a heart attack, talk to your doctor. He or she may suggest ways to lower your risk, such as trying to reduce your blood pressure or cholesterol level.

### High cholesterol

Most protease inhibitors can increase the amount of fats in your blood. This doesn't happen with atazanavir or stavudine (d4T). And it's less likely with efavirenz.

Doctors call this problem **hyperlipidaemia**. Over time, having high levels of 'bad' cholesterol (LDL) and low levels of 'good' cholesterol (HDL) in your blood can harden and clog up your arteries. This increases your risk of having a heart attack.

Up to three-quarters of people who take protease inhibitors have high levels of blood fats.

The damage happens over many years and you may not get any symptoms. But your doctor can test for it and change your treatment if necessary.

A summary of the research (a systematic review) showed that a combination of three NRTIs (abacavir, lamivudine, and zidovudine) was less likely to raise cholesterol than a combination including nelfanivir. <sup>[57]</sup>

### Diabetes

Your body carefully controls the amount of sugar in your blood. But if this process stops, you can get partial diabetes (what doctors call **insulin resistance**) or full diabetes. This tends to happen weeks or months after starting protease inhibitors. You might get the following symptoms:

- Passing urine very frequently
- Feeling thirsty
- Feeling tired
- Feeling weak.

About 4 in 100 people who take protease inhibitors have problems controlling their blood sugar. <sup>[52]</sup>

### Bone damage

Protease inhibitors can damage the cells that make up the surface of your bones. Doctors call this **osteonecrosis**. The part of your thigh bones that forms the joint at your hips is affected most often. This might cause joint pain, especially when you stand or move.

About 4 in 100 people may have some bone damage without it causing any symptoms. About 1 or 2 in 100 people may get symptoms. <sup>[52]</sup>

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### Nervous system effects

Efavirenz affects the nerves in your brain and spinal cord (your central nervous system). This can make you:

- Feel drowsy
- Have problems sleeping
- Have abnormal dreams
- Feel dizzy
- Have problems concentrating
- Feel depressed.

More than half of people taking efavirenz get some of these symptoms.<sup>[52]</sup> But they often improve or stop completely after you've been taking efavirenz for two weeks to four weeks.

Starting efavirenz at a low dose and increasing it over two weeks may help avoid these problems.<sup>[58]</sup>

### More about antiretroviral drugs

This list includes most of the antiretroviral drugs available in the UK.<sup>[59]</sup>

#### Nucleoside reverse transcriptase inhibitors (NRTIs)

Drug name	Brand name	How to take it
Abacavir	Ziagen	Tablet or liquid
Didanosine (ddl)	Videx	Tablet
	Videx EC	Coated tablet
Emtricitabine	Emtriva	Capsules
Lamivudine (3TC)	EpiVir	Tablet or liquid
Stavudine (d4T)	Zerit	Tablet or liquid (This drug can cause especially serious side effects so it is only recommended if there are no appropriate alternatives. It should be taken for the shortest possible time.) <sup>[60]</sup>
Zalcitabine (ddC)	Hivid	Tablet

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Zidovudine (AZT)	Retrovir	Tablet or liquid
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### Non-nucleoside reverse transcriptase inhibitors (NNRTIs)

Drug name	Brand name	How to take it
Efavirenz	Sustiva	Tablet or liquid
Etravirine	Intelence	Tablet
Nevirapine	Viramune	Tablet or liquid
Rilpivirine	Edurant	Tablet

### Nucleotide reverse transcriptase inhibitors (NtRTIs)

Drug name	Brand name	How to take it
Tenofovir	Viread	Tablet

### Protease inhibitors

Drug name	Brand name	How to take it
Atazanavir	Reyataz	Tablet
Darunavir	Prezista	Tablet
Fosamprenavir	Telzir	Tablet or liquid
Indinavir	Crixivan	Tablet
Lopinavir and ritonavir	Kaletra	Tablet or liquid
Nelfinavir	Viracept	Tablet
Ritonavir (Rarely used alone. Often combined with other protease inhibitors to boost their activity.)	Norvir	Tablet or liquid
Saquinavir	Fortovase, Invirase	Tablet

### CCR5 inhibitors

Drug name	Brand name	How to take it
Maraviroc	Celsentri	Tablet

### Integrase inhibitors

This is a fairly new type of antiretroviral drug. The only drug of this type is one called raltegravir. It's usually taken along with other antiretroviral drugs.

Drug name	Brand name	How to take it
Raltegravir	Isentress	Tablet

### Other types of drug

Drug name	Brand name	How to take it
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Enfuvirtide	Fuzeon	Powder added to water, or an injection into the skin
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### Combinations of antiretroviral drugs

Drug name	Brand name	How to take it
Lamivudine (3TC) and zidovudine (AZT)	Combivir	Tablet
Abacavir and lamivudine	Kivexa	Tablet
Abacavir, lamivudine, and zidovudine	Trizivir	Tablet
Tenofovir and emtricitabine	Truvada	Tablet
Efavirenz, emtricitabine, and tenofovir	Atripla	Tablet
Emtricitabine, rilpivirine, and tenofovir	Eviplera	Tablet

### Drug withdrawal

An antiretroviral drug called nelfinavir (brand name Viracept) was withdrawn from use in Europe in June 2007 after some batches of the drug were found to have been contaminated with a harmful chemical.<sup>[61]</sup> But the problems were sorted out and it's back in use again now.

Viracept was contaminated with a chemical called ethyl mesylate. This chemical can cause cancer and be harmful to babies if pregnant women take it. But it is not known how much of this chemical got into Viracept, or which packs were affected. So at the moment, doctors do not know what the danger is to anyone who had been taking it.

The European Medicines Agency (EMA), which checks the safety of drugs in Europe, is planning to follow up people who may have been exposed to the chemical, to find out if they are at risk.

### Warning about rifampicin

Your body uses protease inhibitors by breaking them down in your liver. It uses lots of other drugs this way too, and this means that the drugs can affect one another. You might get too much or too little of a drug, or the combination of drugs could damage your liver.

The US Food and Drug Administration, which checks the safety of drugs in the United States, has warned that people with HIV who are taking 100 mg of ritonavir plus 1,000 mg of saquinavir twice daily (called ritonavir-boosted saquinavir) should not be treated with rifampicin.<sup>[8]</sup> This is because there is a chance that taking the three drugs together could lead to liver damage. This problem has been seen in healthy volunteers taking this combination of drugs. Rifampicin is often used to fight infections such as [tuberculosis](#) and [mycobacterium avium complex](#) (MAC for short).

### Hepatitis C and HIV

Hepatitis C is a liver disease caused by a virus. The hepatitis C virus (HCV) is carried in the blood. You can get it if blood from someone with the virus gets into your body. People who inject drugs and share needles are most at risk. But you can also become infected by having sex with someone who has the virus.

You can be infected with the hepatitis C virus and not know it. Many people don't get any health problems for 10 years or more after they've been infected. But the hepatitis C virus can damage your liver. Your liver's main job is to get rid of waste products from your body. If your liver isn't working (called liver failure), poisons collect in your body and may eventually kill you. So it's important to get diagnosed and treated. If you're treated for hepatitis C, you may not get any of the health problems it can cause.

If you have HIV, you should have a blood test to check for hepatitis C.<sup>[62]</sup> The treatment you get for HIV depends partly on whether you have the hepatitis C virus as well. To find out if you have hepatitis C, your doctor will take a sample of blood, usually from the inside of your elbow. If you're infected, you'll probably have more tests to find out if it has damaged your liver.

If you have hepatitis C and HIV, there are some things you need to think about.

- Hepatitis C probably doesn't make your HIV infection any worse, but we can't say for certain.
- But if you have HIV, hepatitis C can be more serious. And it may damage your liver more quickly.
- If your doctor doesn't think that you need to start taking treatments for HIV straight away, you should get the hepatitis C treated first. This will leave your liver in better shape to cope with the drugs used to treat HIV.
- But if your HIV infection needs to be treated straight away, you should do this first before you treat hepatitis C.

For more, see [When to start treating HIV](#) .

### What are the symptoms?

You can be infected with hepatitis C and not know it. Most people only get symptoms after they've had the infection for many years. Some people never get symptoms.

You may:

- Lose your appetite
- Lose weight

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- Feel tired
- Have yellow skin or eyes (jaundice)
- Feel a swelling in your abdomen
- Feel a slight pain or discomfort in your abdomen.

### How is it treated?

There are different types of hepatitis C. The treatment you have may depend on the type of hepatitis C you have.

The usual treatment is a combination of two drugs called pegylated interferon (Pegasys, Peginteron) and ribavirin (Rebetol, Virazole).

- You have pegylated interferon as an injection once a week.
- Ribavirin is a tablet that you take twice a day.
- You'll need to take these drugs for six to 12 months, depending on the type of hepatitis C virus you have.
- These drugs can have serious side effects. You may feel as though you have flu when you take them. You may also feel irritable or depressed.
- You shouldn't get pregnant while you or your partner is taking ribavirin. And you should wait for at least six months after you stop taking the drug before you get pregnant.
- Treatment gets rid of the hepatitis C virus in about 5 in 10 people.
- If you still have the hepatitis C virus after this treatment, you may need to carry on having interferon injections. But the doses will be lower.
- Treatment works better if you don't drink alcohol.

### Can it be prevented?

There's no vaccine for hepatitis C.

The best way to prevent the disease is to avoid getting infected. The hepatitis C virus lives in blood. So you can get infected if blood from someone with the virus gets into your body. If you inject drugs, you should always use sterile needles and syringes and never share equipment. The virus can also be passed on through sex.<sup>[62]</sup>

### What happens when I'm first diagnosed?

If you've been told that you have HIV, your doctor will ask you questions about your health and do some tests to see if the virus has damaged your [immune system](#) . You may need to start taking some treatments straight away.

#### Questions your doctor will ask

Your doctor will ask you about your health. It helps to know what illnesses you've had in the past, because some infections can come back when you have HIV.

And you'll probably have lots of questions for your doctor.

#### Blood tests to check your immune system

Your doctor will usually do two blood tests to see whether HIV has damaged your immune system.

#### Viral load

Your viral load is the amount of HIV in your blood. See [Viral load](#) .

#### CD4 count

This test counts the number of CD4 cells in a small amount of your blood. HIV reduces the number of CD4 cells, which are part of your immune system. See [CD4 count](#) .

#### Other tests

Your doctor may do some blood tests to check your general health. This helps your doctor choose the best treatment.

You may also have blood tests to see if you have some other infections. Some germs may be living in your body even though you don't have the disease. For example, almost everyone with HIV is also infected with [cytomegalovirus](#) (CMV). If you're healthy, this virus doesn't normally cause any problems. But if HIV damages your immune system, you may develop symptoms. This may happen many years after you find out you have HIV.

You'll probably also have tests for some sexually transmitted diseases, such as syphilis, gonorrhoea , and [chlamydia](#) .

You may have a blood test for hepatitis C, an infection that can damage your liver. If you have hepatitis C, your doctor may suggest you have it treated before your HIV needs to be treated. This is because the drugs used to treat HIV are hard on your liver. So you'll cope with antiretroviral drugs better if your liver is healthy. That means being free of hepatitis C.

To learn more, see [Hepatitis C and HIV](#) .



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If doctors know what infections you've had before, they can give you treatments to stop them becoming active again.

You may have a special blood test called **resistance testing**. This looks at the HIV particles in your body to see whether the virus has become resistant to any drugs. Once a virus is resistant to a drug it means that the drug won't work. This will be important when you come to think about taking [antiretroviral drugs](#).<sup>[69]</sup>

You can also have a chest X-ray to see if you've had a disease called tuberculosis before. If you've had tuberculosis it may come back. And your doctor may decide you need some medications to reduce the chances of this happening.

### Vaccinations

HIV gradually damages your immune system. So you may be advised to get one or more vaccinations to stop you getting infections that can be difficult to cope with if you have HIV.<sup>[70]</sup>

#### Hepatitis B vaccine

This protects you against the virus that causes hepatitis B. Hepatitis B is a serious disease, which can lead to liver scarring (**cirrhosis**), liver cancer, and death. It can also cause headaches, nausea, vomiting, stomach cramps, yellow skin, and tiredness. But many people don't get these symptoms. They only find out they have it after they have been diagnosed with cancer.

#### Hepatitis A vaccine

This protects you against the virus that causes hepatitis A. Hepatitis A can cause nausea, vomiting, stomach pain, yellow skin, and liver damage.

#### Flu vaccine

This protects you against some flu (influenza) viruses. You have to get a flu injection each year, as the type of viruses that are about change from one year to the next.

#### Pneumococcal vaccine

This protects you against a type of bacteria that can cause pneumonia and that can be difficult to deal with if you have HIV.

#### Other vaccines

If you have HIV, you should not have some 'live' vaccines, such as BCG (against TB) and yellow fever. (Live vaccines contain a tiny part of the illness they protect you against.) These vaccines work by making your immune system create cells that protect you against these infections. If your immune system is damaged, your body may not be able to make this protection, and the vaccines will either fail to work or could make you ill.<sup>[71]</sup>

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Other live vaccines, including the one against chickenpox, are usually safe. But you should discuss them with your doctor.

### Viral load

The viral load test measures the amount of virus particles in a small amount of blood. Doctors call this your **viral load** (or plasma viral load).

Your result is an indication of how well your body is dealing with HIV.

- Doctors measure viral load as a number, for example 55,000 copies per millilitre (ml).
- If your viral load is high, for example more than 55,000 copies per millilitre (ml), it means there is a lot of the virus in your blood and your body isn't fighting it well.
- If your viral load is low, there isn't much of the virus in your body.
- It is best to have a low viral load because it means that your immune system is keeping the virus at bay.
- Even better is to have what doctors call an undetectable level of the virus. This means that you have so little of the virus in your blood that the test can't find traces even though you're HIV-positive.
- You'll have many viral load tests to track how your body is dealing with HIV. Your doctor will usually do a viral load test at the time you're diagnosed with HIV and then repeat it every few months. You might also have the test when you change your medicine or if your condition gets worse.
- Doctors use your viral load results to help them decide when to start drug treatment and when to change your medicine.

### What happens in the first few years after diagnosis?

Most people don't get any symptoms from HIV for several years after becoming infected. Some people don't get any symptoms for 20 years, even without treatment. Before you get symptoms, you should feel healthy and you should be able to do anything you would normally do.

But you'll still need to see your doctor regularly during these years. Your doctor needs to keep track of your health. And you may need to have blood tests to see if HIV is

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damaging your immune system . In particular, the tests will look at your [CD4 count](#) and the amount of HIV in your blood, which is also called your [viral load](#) .

The most important decision you and your doctor need to make during this time is when to start drug treatments for HIV. [Antiretroviral drugs](#) help stop the virus damaging your immune system. And they protect you from the [infections that go along with HIV](#) .

To learn more, see [When to start treatment for HIV](#) .

Most doctors think that it's best to start taking drug treatment for HIV when your [CD4 count](#) drops to 350. This is a measure of how many CD4 cells there are in your blood.

<sup>[72]</sup> The more cells you have, the healthier your immune system. However, it is also important to consider how fast your CD4 count is falling, your viral load, and any symptoms of opportunistic infections. You'll also want to consider whether the time is right for you to start on a daily medicine regime.

Some doctors think it makes sense to start treating people before their CD4 count drops below 350. They say that these days we know the best way of keeping side effects from these drugs to a minimum. But doctors aren't completely agreed about this. <sup>[73]</sup>

Taking drugs for HIV helps to keep your CD4 count up. This means you're less likely to get infections and cancers linked to HIV. Since 1996, people with HIV have been taking a combination of three or more antiretroviral drugs, and the outlook for most people is now much better than it was before then.

Exactly how well the drugs will work to keep you healthy depends on several factors, including how low your CD4 count was at its lowest level and what your viral load is. Having a low CD4 count at the time of starting treatment is less favourable. Also, people who are over 50 years old when they are diagnosed, or who contracted HIV through intravenous drug use, tend to do less well than others. <sup>[74]</sup>

### When to start treatment for HIV

Doctors usually advise that you should start treatment with [antiretroviral drugs](#) before your CD4 count drops to 350. <sup>[75]</sup> <sup>[76]</sup> CD4 cells are part of your immune system , and how many you have (your [CD4 count](#) ) is a sign of how healthy your immune system is.

Research shows that people are likely to live longer if they begin treatment before their CD4 count drops to 250. <sup>[77]</sup>

If your CD4 count is more than 350, your body is managing to control HIV pretty well on its own. So the drugs may do you more harm than good. They may cause side effects and you may get resistant to the drugs. This means that the drugs won't work later on when you really need them to work. <sup>[76]</sup> But doctors don't all agree about this. Some think it makes sense to start treatment before your count goes down to 350. <sup>[78]</sup>

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If you wait until your CD4 count is much lower than 350 before you start taking antiretroviral drugs, the side effects of the drugs may be much worse. <sup>[79]</sup>

If your CD4 count is 350 or lower, then your HIV doctor will probably offer you treatment, but it is usually up to you to decide when you would like to start. You need to think about:

- How fast your CD4 count has been falling. For example, if it is falling slowly, you may want to hold off treatment for the time being. If it is falling fast, you may feel it is best to start now
- Your [viral load](#)
- Whether you have another illness, such as [hepatitis C](#) , which can affect the progress of HIV. <sup>[75]</sup>

### What happens if I have advanced HIV infection?

If your immune system becomes very damaged and your [CD4 count](#) drops below 200, you are at increased risk of developing late-stage HIV infections. But even if this happens, modern treatments can help.

You may have heard of [Pneumocystis pneumonia](#) (or PCP for short). This is an infection that affects your lungs. It's the most common infection seen in people with late-stage HIV. It can make it difficult to breathe, or cause a fever and a dry cough.

You get these extra infections because your immune system has become so damaged by HIV that it can no longer fight off germs. This normally happens when your CD4 count has fallen to less than 250. Healthy people who aren't infected have CD4 counts of 500 to 1500. (CD4 cells are part of your immune system, and how many you have is a sign of how healthy your immune system is.)

You may have an opportunistic infection if you get any of the following symptoms: <sup>[2]</sup>

- A bad cough
- Shortness of breath
- Difficult or painful swallowing
- Confusion or forgetfulness
- Diarrhoea
- Fever

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- Problems seeing clearly
- Nausea, stomach cramps, and vomiting
- Weight loss
- Extreme tiredness
- Bad headaches.

You'll need to be treated for these infections and may need to go to hospital. See [Opportunistic infections and cancers](#) for more.

It's hard to say how soon you'll start getting infections after being infected with HIV. On average, it takes people with HIV who aren't having drug treatments 10 years to 12 years to get infections associated with late-stage HIV.<sup>[3]</sup> Getting the right treatment can extend this time by many years, although we aren't sure exactly how long, because the treatments have not been around long enough.<sup>[74]</sup>

Remember that the way your body deals with the HIV will be different from the way someone else's does. Some people stay healthy for more than 12 years, while others start to get infections just a few years after getting HIV. So it's impossible to say exactly what will happen to you.

Research done several years ago suggests that if your CD4 count falls below 250, you may have a:<sup>[80]</sup>

- 40 in 100 chance of getting [Pneumocystis pneumonia](#) in the next two years
- 20 in 100 chance of getting [cytomegalovirus](#) (CMV) infection in the next two years
- 20 in 100 chance of getting [mycobacterium avium complex](#) infection in the next two years
- 6 in 100 chance of getting [toxoplasmosis](#) in the next two years
- 5 in 100 chance of getting [cryptococcal meningitis](#) in the next two years.

However, these numbers are from studies that were done before effective combination therapies were available. Newer [antiretroviral drugs](#) lower your chances of getting these infections so much that you may never get them.<sup>[81]</sup> Today, people with HIV get 80 percent fewer infections than people in the 1980s.<sup>[81]</sup>

So, if you get the right treatment for HIV, you're much less likely to get infections.

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See [Opportunistic infections and cancers](#) for more.

If you do get one of the infections or cancers associated with late-stage HIV, you may worry that you'll become ill very quickly. But antiretroviral drugs help people live longer after they get late-stage HIV.<sup>[82]</sup>

- In 1984, people with late-stage HIV lived for an average of 11 months after getting their first infection.
- In 1995, people with late-stage HIV lived for an average of 46 months (just under four years) after getting their first infection.
- We don't have any figures for how long people with late-stage HIV live today. But it's probably much longer than this. Since 1996, people with HIV have been taking a combination of drugs that works very well. It takes some time for doctors to collect figures on how well these drugs are working.

### What can I do to help myself and stay healthy?

Many people with HIV want to help themselves. There are lots of things you can do to stay healthy. We haven't looked at these things in the same detail as other treatments we cover. (See Our method.) But we've included some information because we know patients are interested in what they can do to help themselves.

#### Exercise

Exercising for at least 20 minutes three times a week helps keep your heart and lungs fitter. Regular exercise may help you to feel better about yourself.<sup>[83]</sup>

Swimming, walking, jogging, or going to a gym are all good ways to exercise. If you want to start exercising and have breathing or circulation problems, you should talk to your doctor about it. Everyone else should take care to start exercising gently at first, building up the frequency of exercise (how many times a week) before increasing the intensity (how hard you exercise).

#### Eating healthily

Many people with HIV lose weight. Doctors aren't sure why this happens. It may be because the virus makes you feel less hungry. The infections you may get and the drugs you take for HIV can also give you diarrhoea, which can mean you lose weight. And the drugs can also change how your food tastes or stop you digesting your food properly.

There are some things you can do to try to keep your weight up and give your body the nutrients it needs.

- Eat regular, small meals.

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- Make sure meals include a mixture of vegetables, meat (or fish), and starchy foods (potatoes, rice, or pasta).
- Between meals, eat small snacks that have a lot of energy. Examples are nuts, seeds, fruit, yoghurt, carrots, and peanut butter sandwiches.

Eating healthily helps you stay strong and well.

Many people with HIV also take vitamin or mineral supplements. This can help you stay healthy, especially if you've lost weight.<sup>[84]</sup> If you want to take vitamin supplements, talk to your doctor first. Some supplements (including vitamin A, vitamin E, zinc, and iron) can make you feel sick. And some may cause problems with your kidneys or liver .

### Protecting yourself against STDs

Getting another sexually transmitted disease (STD) may cause HIV to damage your immune system more quickly. This is because your immune system has to put effort into dealing with the new infection. So it can't keep fighting the HIV as well.<sup>[85]</sup> You can protect yourself against STDs by using a condom when you have sex.

### Learning about depression

Up to 8 in 10 people with HIV get depressed.<sup>[86]</sup> Many doctors think that this is a reaction to drug treatments. Learning about depression can help you to cope if it happens to you.

Living with HIV can be hard for many reasons.

- Being told that you have HIV can be unexpected when you feel and look well.
- Although drug treatments allow many people to stay healthy for a long time, many people find their treatment is a burden because of side effects and the need to take drugs at particular times.
- You might feel embarrassed about having HIV.
- You might feel discriminated against.
- You might find it difficult to form intimate relationships.

Many people with HIV get depressed. But there are treatments for depression, so you don't need to live with feeling unhappy or anxious.

To learn more, see our articles on [depression](#) and [anxiety](#) .

### How HIV is treated

If you've been diagnosed with HIV, your doctors will monitor you carefully to see how the virus affects your immune system. This helps your doctors decide when you need to start taking drug treatment ( [antiretroviral drugs](#) ). Treatment for HIV helps to slow down the damage that the virus does to your immune system.

We can't say for sure how you'll be treated. Everyone is different, and the treatments you get may be different from the treatments given to someone else. In most cases, the decision about exactly which combination of drugs you take will be made by both you and your doctor.

In the UK, the British HIV Association (BHIVA) publishes guidelines for doctors and patients, and many clinics use these guidelines to plan treatment for individual patients. These guidelines are updated regularly and can be viewed on the BHIVA website, <http://www.bhiva.org> .

A lot also depends on whether you get any of the [infections that can go with HIV](#) , which ones you get, and how you recover. Even so, we think it's useful to know how you may be treated, so that you know what to expect.

- When you find out you have HIV your doctor may advise you to have some vaccinations to protect you from certain diseases, such as hepatitis B and flu. For more, see [What happens when I'm first diagnosed?](#)
- You'll probably start treatment with antiretroviral drugs once your [CD4 count](#) drops to 350 or below.<sup>[75]</sup> This will decrease your chances of getting [opportunistic infections](#) such as pneumonia .<sup>[13]</sup> However, the final decision about when to start treatment will usually be up to you.
- Most people take three drugs together. This is called combination therapy, or HAART (which stands for **highly active antiretroviral therapy**). It means you take three or more different drugs.
- It's very important to keep taking your drugs as your doctor tells you. This can be hard at times because you'll have lots of tablets to take at different times of the day. Some tablets you have to take with food and some before or after meals. This can get very complicated. To learn more, see [Sticking with drug treatment for HIV](#) .
- If you can't take combination therapy for some reason, or it doesn't work, there are other treatments that can help to prevent opportunistic infections.
- You'll also be offered treatments to prevent opportunistic infections if your CD4 count drops below a certain level.



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- Each infection is different. For example, doctors might give you treatment to prevent [Pneumocystis pneumonia](#) (PCP) when your CD4 count drops below 200. But they won't give you treatment to prevent [toxoplasmosis](#) until your CD4 count drops below 100. <sup>[13]</sup>
- The treatment for each opportunistic infection may be different.
- If your CD4 count rises above the set level for each infection, you may be able to stop the treatment for that infection.
- You may have to take many different drugs at the same time. And the drugs you're taking may change from one week to the next.
- If you get an infection, you'll be treated for it. Most people recover well.
- After you've had an infection, you may get a different treatment that stops you getting the same infection again. These treatments may be different from what you had before you got the infection. You may need to take these treatments for the rest of your life.

### Sticking with drug treatment for HIV

Taking antiretroviral drugs can be quite complicated. You often have to take several different drugs at different times of the day. Some drugs need to be taken with food, others between or after meals. But it's important to take these drugs at the right dose, at the right time, and just the way your doctor tells you. Your doctor might call sticking with your drugs adherence or compliance.

#### Why it matters

Sticking with your drug schedule is important because it gets the best results from your treatment. Antiretroviral drugs create a chemical barrier in your body. This barrier stops the virus getting inside your **CD4 cells** and making more copies of itself. But drugs only stay in your body for a certain amount of time. Your body breaks them down just as it does food. And in the same way you need to eat throughout the day to keep your energy levels up, so you need to keep taking your drugs to keep up the chemical barrier against HIV.

Two things can happen if you don't take your drugs properly.

- HIV can start making copies of itself. It can do this because the chemical barrier against it isn't strong enough. Even missing just a couple of tablets a week can increase the amount of HIV in your blood. As your [viral load](#) goes up, so does the chance that you'll get ill from the infections that go with HIV. Your doctor will check your viral load regularly to make sure your medicine is keeping HIV at bay.

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- The virus can become resistant to your medicine. This means the drugs no longer work. But this can happen anyway and might not be because you haven't taken your tablets on time. But it's more likely to happen if you miss tablets or take them incorrectly. When HIV becomes resistant, it changes (**mutates**) slightly and can multiply even though you are taking your antiretroviral drugs. This new form (**strain**) of the virus will carry on multiplying and damage your immune system. To stop this happening you need to change the drugs you take to another combination that works against the new strain of HIV in your body.

To check if you have become resistant to your medicine, your doctor will do regular blood tests. These tests will help your doctors find the right treatment for you.

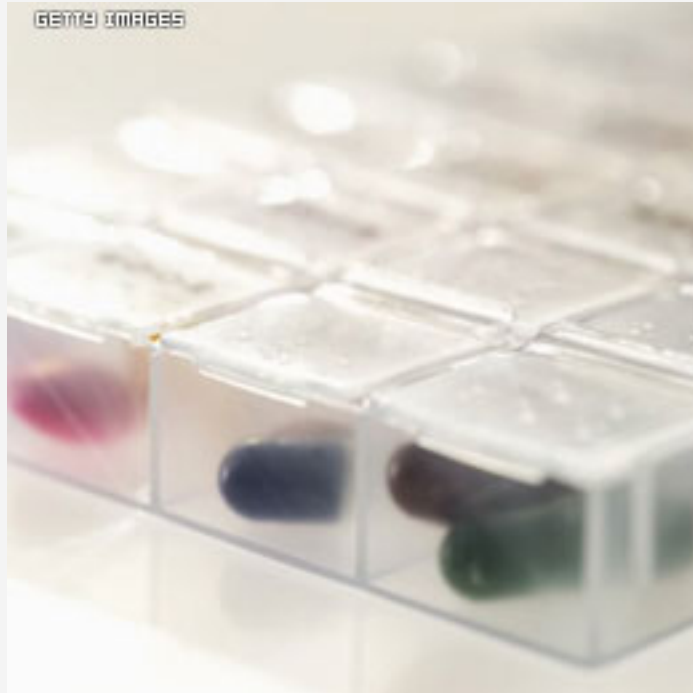
There are lots of different combinations of drugs to treat HIV, but there isn't an endless supply. This is why doctors have been trying different numbers of drugs together. You may need to take three or even four different drugs to keep HIV under control. A small number of people might run out of drugs that work for them. Sticking to the drugs your doctor has prescribed can help prevent resistance.

### Making your treatment a success

There are many things to think about before you start taking [antiretroviral drugs](#). And there are many things you can do to help you stick with your treatment. <sup>[88]</sup> <sup>[89]</sup>

- Make sure the time is right for you. If you're feeling stressed because of your job or other things in your life, it may not be the right time to start taking antiretroviral drugs. Ask your doctor if you can put off starting your drugs for a few weeks.
- Work carefully through your drug schedule with your doctor, nurse, or pharmacist.
- For each drug, find out when to take it, how often to take it, how to take it (with food, on an empty stomach, just before bed?), how to store it (does it need to be kept in the fridge?), what side effects to expect, and what you should do if you get side effects.
- Write out a daily schedule for your drugs. Your doctor or nurse should be able to help you.
- Make copies of your personal treatment plan (telling you when to take each drug and how to take them). Put these in places where you'll see them around your home.
- Try to plan your schedule around what you do. For example, if you go to the gym at 8 a.m. every day, you may want to make this the start of your treatment day. So you know you should take your first tablet before you get to the gym.

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You may find that a tablet container helps you keep track of your tablets.

- You may want to use a tablet container to store your tablets and help you remember when to take them. This is a plastic container with separate compartments. You put the tablets you need at certain times of day in different compartments. Your clinic should be able to give you a container.
- You can usually fit a week's worth of tablets in a tablet container. That means you can sort out your drugs at the start of each week. You'll also know if you've missed a tablet by checking your box.
- You can keep a diary instead of using a container. Or you may want to use both. Tick each drug off as you take it. You can also record side effects.
- You could set an alarm to go off when you need to take a tablet, for example on your mobile phone.
- If you miss a dose don't feel bad about it. We're all human. However hard you try you're probably going to make some mistakes.
- Make sure you know what to do if you miss a dose. Ask your doctor who you should contact if this happens. Keep an emergency telephone number with you at all times.

### Glossary:

**immune system**

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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.

## **unprotected sex**

Unprotected sex means having sex (vaginal, anal or oral) without using a protective barrier like a condom or dental dam.

## **bacteria**

Bacteria are tiny organisms. There are lots of different types. Some are harmful and can cause disease. But some bacteria live in your body without causing any harm.

## **viruses**

Viruses are microbes (tiny organisms) that need the cells of humans or other animals to exist. They use the machinery of cells to reproduce. Then they spread to other cells in the body.

## **fungus**

A fungus is an organism that is sometimes considered to be a type of plant. A fungus lives by feeding on other organisms. The mushrooms we eat in salads are fungi, but so are candida and cryptococcus, which can cause infections in people's bodies.

## **parasite**

Parasites are germs or creatures that can only survive by living on or in another living thing.

## **anus**

The anus, which is at the end of the rectum, is where stools leave your body when you go to the toilet. Part of the anus is a muscle that helps you hold in the stool until you are on the toilet.

## **rectum**

The rectum is the last 15 to 20 centimetres (six to eight inches) of the large intestine, ending with the anus (where you empty your bowels from).

## **pneumonia**

Pneumonia is an infection in your lungs. Anything that causes infections (bacteria, viruses or fungi, for example) can give you pneumonia.

## **yeast infection**

Infections with certain types of fungus are called yeast infections. These infections are common and can affect many different parts of your body. For example, a yeast infection called thrush can affect people's mouths or, if they're women, their vaginas. If you get infected with thrush in your mouth, it makes white spots appear on your tongue or on the roof of your mouth. If thrush affects your vagina, you can get itchy, sore and have a discharge. You're more likely to get a yeast infection if your immune system is weakened.

## **chickenpox**

Chickenpox is a common childhood illness caused by a virus. It usually leads to a fever, tiredness and an itchy rash. The virus can easily spread from person to person, and people usually get it about two weeks after they were near someone with the illness. About two days before the rash starts, you can give the virus to others. Chickenpox clears up on its own in most children, but adults and some children may get complications such as pneumonia, kidney problems or heart problems. In the UK, people aren't usually immunised against chickenpox unless they have an immune disease (or another disease that would make infection dangerous for them).

## **lymphatic system**

The lymphatic system is your body's way of clearing unwanted materials from your blood and tissues. It includes a network of lymph nodes that filter these materials to detect if there is an infection that needs to be dealt with by your immune system.

## **antibiotics**

These medicines are used to help your immune system fight infection. There are a number of different types of antibiotics that work in different ways to get rid of bacteria, parasites, and other infectious agents. Antibiotics do not work against viruses.

## **steroids**

Steroids are a type of chemical. Your body naturally produces steroids, which play a part in many of its processes. For example, steroids are involved in how your immune system, reproductive system and metabolism work. Steroids can also be given as medicines and are used for a number of different conditions: including asthma, rheumatoid arthritis and eczema. Corticosteroids are not the same as the steroids used by some body builders and athletes. Those steroids are called 'anabolic steroids'.

## **bone marrow**

Your bone marrow is the soft material inside your bones. Bone marrow makes and stores blood cells.

## **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.

## **spleen**

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Your spleen is an organ that sits on the left side of your body just below your ribs. It helps your body fight infections.

## **anaemia**

Anaemia is when you have too few red blood cells. Anaemia can make you get tired and breathless easily. It can also make you look pale. Anaemia can be caused by a number of different things, including problems with your diet, blood loss and some diseases.

## **seizure**

A seizure (or fit) is when there is too much electrical activity in your brain, which results in muscle twitching and other symptoms.

## **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.

## **lymph nodes**

Lymph nodes (also called lymph glands) are small, bean-shaped lumps that you can't usually see or feel easily. You have them in various parts of your body, such as your neck, armpits, and groin. Lymph nodes filter lymph and remove unwanted things from your body, such as bacteria and cancer cells.

## **sexually transmitted infection**

An infection that is spread by people having sex is called a sexually transmitted infection (STI) or a sexually transmitted disease (STD). Examples are HIV, gonorrhoea and syphilis.

## **warts**

Warts are small lumps that can grow on your skin. Warts are often caused by an infection with a kind of virus called a papillomavirus.

## **pelvis**

Your pelvis is the area between your hips.

## **biopsy**

Biopsy is when doctors remove some tissue from a part of your body, so that it can be examined under a microscope.

## **chemotherapy**

The use of chemicals or drugs to treat or prevent disease, usually cancer.

## **radiotherapy**

This is also called radiation therapy. It is a treatment that uses high-energy X-rays to kill cancer cells. It's most often used for tumours that are hard to treat with surgery alone. You won't feel any pain during this treatment, but you may get some side effects afterwards.

## **genes**

Your genes are the parts of your cells that contain instructions for how your body works. Genes are found on chromosomes, structures that sit in the nucleus at the middle of each of your cells. You have 23 pairs of chromosomes in your normal cells, each of which has thousands of genes. You get one set of chromosomes, and all of the genes that are on them, from each of your parents.

## **ejaculation**

When a man ejaculates, his penis suddenly releases semen, the white or transparent fluid that carries sperm.

## **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.

## **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.

## **caesarean section**

A caesarean section is an operation to take a baby out of a mother's womb. The surgeon makes a cut through her abdomen to take the baby out. You have this if there's a risk that a normal delivery through your vagina would cause harm to you or your baby.

## **tuberculosis**

Tuberculosis (also known as TB) is an infection caused by certain bacteria. The most common type of tuberculosis affects your lungs. This can give cause chest pain, tiredness and a severe cough.

## **counsellor**

A counsellor is a professional who is trained to help people, usually with the emotional part of their illness. Counsellors talk to people about their illness. They also suggest ways that people can make changes for the better.

## **ulcer**

An ulcer is an open sore. Ulcers can happen in many parts of your body, such as in your stomach, and the skin of your legs, mouth, or genitals.

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## **diarrhoea**

Diarrhoea is when you have loose, watery stools and you need to go to the toilet far more often than usual. Doctors say you have diarrhoea if you need to go to the toilet more than three times a day.

## **red blood cells**

Red blood cells are the part of your blood that makes it red. Their main job is to carry oxygen from your heart and lungs to the tissues of your body. Once these cells unload oxygen, they pick up carbon dioxide. They take carbon dioxide back to your lungs so it can be breathed out of your body.

## **white blood cells**

White blood cells are the cells in your blood that help your body fight infections. They are part of your immune system. The other cells in your blood, red blood cells, carry oxygen around your body.

## **pancreas**

Your pancreas is an organ that's behind your stomach. It makes several different chemicals. Some of the chemicals help your body digest food. Your pancreas also makes a chemical called insulin, which helps your body use the sugar in your blood.

## **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.

## **LDL cholesterol**

Cholesterol is a fatty substance in your blood. You can get it from food and it is also made by your liver. Having a lot of cholesterol in your blood can cause health problems. LDL cholesterol is often called 'bad' cholesterol. It can build up in your arteries and increase your risk of heart disease. LDL stands for low-density lipoprotein.

## **HDL cholesterol**

Cholesterol is a fatty substance in your blood. You can get it from food and it is also made by the liver. Having a lot of cholesterol in your blood can cause health problems. But HDL cholesterol is sometimes called 'good' cholesterol, because it may lower the risk of heart disease. HDL stands for high-density lipoprotein.

## **diabetes**

Diabetes is a condition that causes too much sugar (glucose) to circulate in the blood. It happens when the body stops making a hormone called insulin (type 1 diabetes) or when insulin stops working (type 2 diabetes).

## **gonorrhoea**

Gonorrhoea is an infection you can get by having sex without a condom. If you're a man, it can cause pain in the tube (the urethra) inside your penis and give you a milky discharge from your penis. If you're a woman, it may not cause you any symptoms, but it can damage your tubes and ovaries, making you infertile.

## **chlamydia**

Chlamydia is an infection you can get by having sex without a condom. It can cause pain or discomfort and discharge from your sexual organs. If you're a woman, it can also cause infertility or a painful infection inside your body.

## **enzymes**

Enzymes are chemicals in your body. They have lots of different functions, including playing a part in helping to digest food and starting other chemical reactions that keep the body working.

## **proteins**

A lot of your body's tissues are made out of proteins. Proteins can be made in your cells. Proteins are also part of the food you eat, particularly meat and dairy products. Your body breaks down the protein you eat into amino acids. Your cells then use these amino acids to build new proteins, which make up muscles, joints, hair and other parts of your body.

## **inflammation**

Inflammation is when your skin or some other part of your body becomes red, swollen, hot, and sore. Inflammation happens because your body is trying to protect you from germs, from something that's in your body and could harm you (like a splinter) or from things that cause allergies (these things are called allergens). Inflammation is one of the ways in which your body heals an infection or an injury.

## **randomised controlled trials**

Randomised controlled trials are medical studies designed to test whether a treatment works. Patients are split into groups. One group is given the treatment being tested (for example, an antidepressant drug) while another group (called the comparison or control group) is given an alternative treatment. This could be a different type of drug or a dummy treatment (a placebo). Researchers then compare the effects of the different treatments.

## **randomised controlled trials**

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