

## HIV and AIDS

HIV is a virus which is most commonly passed on by sexual contact. HIV attacks cells of the immune system. Over time (usually several years) the immune system 'weakens' so that you cannot defend the body against various bacteria, viruses and other germs. This is when AIDS develops (acquired immunodeficiency syndrome). Many infections and conditions can develop if you have AIDS. Since 1995 the outlook has greatly improved for people who have access to drugs that have been developed which suppress HIV.

### What are HIV and AIDS?

**HIV stands for human immunodeficiency virus.** This is a virus in the group of viruses called retroviruses. HIV destroys cells in the body called CD4 T-cells. CD4 T-cells are a type of lymphocyte (a white blood cell) which are part of the immune system. These cells are vital to protect the body against various bacteria, viruses and other 'germs'.

**AIDS stands for acquired immunodeficiency syndrome.** This is a term which covers the range of infections and illnesses which can result from a 'weakened' immune system caused by HIV.

Note: when you are first infected with HIV you do not have AIDS. There is usually a time lag of several years between first being infected with HIV, and then developing infections and other AIDS-related problems. This is because it usually takes several years for the number of CD4 T-cells to reduce to a level where your immune system is weakened.

**People with HIV can pass the virus on to others whether or not they have any symptoms.**

### How do you become infected with HIV?

- **Sexual transmission.** This is the most common way the virus is passed on. You can become infected if you have sex with an infected person (vaginal, anal or oral sex). Semen, vaginal secretions and blood from an infected person contains HIV. The virus can enter the body through the lining of the vagina, vulva, penis, rectum, or mouth during sex. You can also become infected from using 'sex toys' previously used by an infected person which have not been washed properly.
- **Needle sharing.** HIV and other viruses such as hepatitis B and C virus can be transmitted by drug users who share

needles, syringes and other injecting equipment which is contaminated with infected blood.

- **Infected blood.** In the past quite a number of cases occurred from infected blood transfusions and other blood products. This is now rare in the UK as all blood products are checked for HIV before being used. It is still a significant problem in developing countries.
- **Accidental needlestick injuries.** The risk is low but some cases have developed in health care workers who have been injured accidentally by contaminated needles.
- **From mother to child.** About 1 in 3 untreated pregnant women with HIV pass the infection on to their babies during pregnancy or childbirth. However, treatment with anti-HIV drugs during pregnancy greatly reduces the risk of passing on the virus. Having a caesarean section to deliver the baby reduces the risk even further. HIV can also be passed to babies through breast milk during breastfeeding. If formula milk is available, mothers with HIV are encouraged not to breast feed.
- **Rare causes.** Some cases have been reported where HIV has been transmitted through organ or tissue transplants, and by contaminated medical or dental equipment which has not been sterilised properly.

Note: To become infected with HIV, some infected blood, semen or vaginal secretions has to get into your body. You cannot catch HIV from ordinary contact with someone with HIV such as hugging, shaking hands, touching, etc, or from sharing food, towels, utensils, swimming pools, telephones, etc. It is also thought that kissing does not transmit the virus.

### **How common is HIV?**

Over the last 20 years about 40 million people worldwide are thought to have become infected with HIV, and about 12 million have died. Each year the number of cases increases. According to the World Health Organization, in 2003 about five million people were newly infected with HIV and about three million people died from AIDS. Most cases are in developing countries. In some parts of Africa, more than half of adult deaths are caused by HIV infection. In the UK over 60,000 cases of HIV infection have been diagnosed since 1982. However, the number of AIDS-related deaths in the UK has greatly fallen since 1995 due to improved treatment.

## **What does HIV do in the body to cause problems?**

Once HIV is in your body the virus attaches to and gets into the CD4 T-cells. The virus then uses the DNA (the genetic code inside the cell) to replicate (make copies of itself). As new virus particles break out of a CD4 T-cell, the cell dies. The new virus particles then attach and enter new CD4 T-cells, and so the process continues. Millions of new virus particles are made in CD4 T-cells each day, and millions of CD4 T-cells die each day.

To counter the virus destruction the body continues to make millions of new CD4 T-cells each day. However, over time, the virus usually 'wins' and the the number of CD4 T-cells gradually falls (usually over several years). Once the level of CD4 T-cells goes below a certain level, your immune system is weakened.

If your immune system is severely weakened you are likely to develop various 'opportunistic' infections. These are infections caused by germs which are commonly around us. You would not normally develop infections from these germs if you have a healthy immune system. However, if your immune system is not working properly these germs have an 'opportunity' to cause infection. A low level of CD4 T-cells also increases the risk of developing other conditions which the immune system helps to prevent such as certain cancers.

## **What are the symptoms of HIV and AIDS?**

### **Primary infection with HIV**

When you first become infected with HIV it is known as the 'primary infection'. You may not have any symptoms at this time. However, many people develop symptoms similar to flu or glandular fever. This commonly happens 2-6 weeks after becoming infected. This is sometimes called 'seroconversion illness' as it is the time when antibodies first appear in the bloodstream (see below). Symptoms may include: fever, sore throat, blotchy red rash, feeling sick, diarrhoea, swollen glands, tiredness and general aches and pains. These symptoms only last a week or so, and are often just thought of as 'flu' or a 'virus illness', and then forgotten about. This is not AIDS but just an initial reaction to being infected with HIV. In a small number of cases, the primary infection quickly progresses into a meningitis-like illness.

### **After the primary infection**

After any primary infection settles, without any treatment you can remain without any symptoms for several years. This is commonly 8 or 9 years, but it can be less or more. As there are often no

symptoms during this time, many people do not realize that they are infected with HIV. However, the virus continues to multiply, the number of CD4 T-cells tends to gradually fall, and you can pass on the virus to others. During this time some people with HIV who are otherwise well develop persistent swollen lymph glands (persistent generalised lymphadenopathy) and/or night sweats.

In time you may start to develop problems such as recurring mouth ulcers, recurring herpes or shingles infections, or severe seborrhoeic dermatitis (a skin condition caused by a yeast). Old TB (tuberculosis) infection may 'reactivate' in some cases even before 'full blown' AIDS develops, especially in people in the developing world.

## **Symptoms of AIDS**

The term AIDS is used to describe the most advanced stages of HIV infection. AIDS is a general term which includes various diseases which can result from a severely weakened immune system.

Typically, a person with AIDS has:

- A very low level of CD4 T-cells (around 200 cells per cubic millimeter of blood or below), and/or:
- One or more severe opportunistic infections such as pneumocystis carinii pneumonia, severe thrush in the vagina or mouth, severe fungal infections, tuberculosis (TB), mycobacterium avium complex, serious eye infection, etc. These infections can cause a range of symptoms such as severe sweats, fever, cough, diarrhoea, weight loss and generally feeling unwell. Without treatment, the severe infections which develop are commonly fatal. Worldwide, TB infection is one of the most common causes of death in people with HIV.

In addition, people with AIDS have an increased risk of developing other conditions such as:

- Certain cancers. Kaposi's sarcoma is a cancer which is usually only seen in people with AIDS. There is also an increased risk of developing cancer of the cervix, and lymphoma.
- An AIDS-related brain illness such as HIV encephalopathy (AIDS dementia).
- A severe body wasting syndrome.

Many different symptoms can develop from the above conditions. Children with AIDS can develop the same opportunistic infections and problems as adults. In addition, they may also develop severe common infections of childhood such as severe ear infections, severe tonsillitis, etc.

## **Variations on the above**

The above progression - that is from primary HIV infection, to several years of no symptoms, to a gradual decline in health, to AIDS - is the common pattern of the disease in untreated people. However, the pattern can vary. Some people with HIV decline in health much quicker than usual. (This is more common in developing countries where general ill health is common.) On the other hand, some people with HIV have lived for many years without developing serious problems. In addition, modern treatment can make a big difference (see below).

## **What tests are done?**

### **Confirming the diagnosis**

A blood test can detect HIV antibodies. (Antibodies are proteins in the blood that attack viruses and other germs. Your body makes antibodies to HIV, although the antibodies are not able to clear HIV from the body.) If you have HIV antibodies (a 'positive' test) it usually means that you are infected with HIV. Occasionally, you can have a positive antibody test without being infected with HIV (a 'false positive' test). Therefore, to confirm the diagnosis, another type of test called the western blot test is usually done. This test detects the presence of HIV particles in your blood.

Note: for several weeks after being first infected, both the antibody test and the western blot test are negative. It takes several weeks, sometimes several months, for you to make antibodies and for either of these tests to become positive. If there is a strong suspicion that you may have recently been infected with HIV and the tests are negative, then the the tests may be repeated a few months later.

### **Assessing the extent of disease**

If you are confirmed to have HIV then your doctor may do a blood test to check amount of virus in your blood (the viral load) and the number of CD4 T-cells in your blood. These tests may be done from time to time to assess how far the disease has progressed (and the response to treatment).

### **Tests to diagnose AIDS-related conditions**

You may have a range of tests to detect opportunistic infections or other AIDS related conditions, depending on the symptoms that you develop.

## **What is the treatment for HIV infection?**

### **Treatment to tackle the virus itself**

Since the 1990s a number of drugs have been developed called antiretroviral drugs. There are several classes of these drugs which include: nucleoside analogue reverse transcriptase inhibitors (NRTIs), protease inhibitors (PI), and non-nucleoside reverse transcriptase inhibitor (NNRTI). The drugs in each class work in different ways, but all work to stop the HIV from replicating itself. (These drugs are not a 'cure' and do not clear the body of HIV, but stop it from replicating very much.)

Research has shown that by taking three or more antiretroviral drugs at the same time, each attacking HIV at different points in its cycle of replication, then treatment is more effective than one or two drugs alone. So the common treatment is to use a combination of three or more drugs which include drugs from different classes. This is called HAART (highly active antiretroviral therapy). Also, drug combinations reduce the risk that the virus will become resistant to any individual drug.

The aim of treatment is to reduce the 'viral load' to low levels. In most people who are treated with HAART, the viral load reduces to very low levels, and the number of CD4 T-cells rises. This means your immune system is no longer as weakened and you are not likely to develop opportunistic infections. However, it is vital to take the medication regularly and as exactly as prescribed to maintain success, and to help prevent the virus from becoming resistant to the drugs.

As with other powerful drugs, antiretroviral drugs can cause side-effects in some cases. In addition, some of these drugs react quite badly with other commonly used medications. It may be necessary to change an initial combination of drugs to a different combination because of problems with side-effects, reactions, or resistance of the virus to an initial drug. Therefore, different people with HIV can take different combinations of drugs.

### **When is treatment with antiretroviral drugs started**

As a general rule antiretroviral drugs are usually started if:

- opportunistic infections or other AIDS-related problems develop, or:
- your CD4 T-cells fall below a certain level (around 350 cells per cubic millimeter of blood or less) - even without

symptoms. The exact level when treatment may be advised can depend on other factors such as symptoms, 'viral load', rate of decline of the CD4 T-cells, etc.

However, the treatment of HIV is a rapidly changing area of medicine. Trials are underway to assess whether antiretroviral drugs should be started earlier in people who have no symptoms, even as early as when first infected with HIV. The trials aim to show whether there are benefits from treatment before symptoms develop which outweigh the risk of side-effects from the drugs. See the [British HIV Association](#) for up-to-date guidelines.

## **Treatment and prevention of infections**

Opportunistic infections can often be treated with antibiotics, antifungals, anti-TB drugs, etc, depending on what infection develops. Even if you have not developed an infection, once the CD4 T-cells falls to a low level you will normally be advised to take a regular dose of one or more antibiotics or other drugs to prevent certain opportunistic infections from developing.

## **How can infection with HIV be prevented?**

There is no vaccine to HIV. Therefore the main way to prevent infection by HIV is to avoid activities that put you at risk such as sharing needles and having unprotected sex.

## **Sex and HIV**

The most effective way to remain free of HIV infection (and other sexually transmitted infections) is to have only one sexual partner in your life. (This also assumes that your partner has only you as a partner.) Otherwise, use a condom when you have sex. This advice is summarized as ABC.

- **A**bstinence from sex until marriage (or a committed monogamous relationship).
- **B**e faithful from then on (both parties).
- **C**ondoms should be used otherwise.

A campaign to promote ABC has shown some success in preventing the spread of HIV in some developing countries, particularly Uganda. Some groups are critical of this approach as they claim that promoting condom use should be the primary weapon in reducing the spread of HIV rather than promoting abstinence and faithfulness. Partly this is because the groups at the highest risk of acquiring HIV are sex workers and their clients where A and B are

not appropriate. For example, condoms have been promoted as a frontline defence against HIV by countries such as Thailand where a campaign to get sex workers to insist on condoms significantly reduced HIV rates.

Note: although condoms can greatly reduce your risk of getting HIV, they don't eliminate the risk entirely. Condoms can break or develop small tears, and they may not always be used properly.

### **Other ways**

Some cases of HIV can be prevented in other ways. For example:

- If you are an injecting drug user then do not share needles or other injecting equipment. If available, use local needle exchange schemes.
- Health care workers should follow local guidelines to reduce the chance of needlestick injury. If you do have an injury, see your occupational health specialist urgently. A course of anti-HIV drugs started within 1-2 hours may prevent infection with HIV developing.
- If you are pregnant and have HIV infection then you need special antenatal care to reduce the risk of passing on the virus to your baby.

### **What is the prognosis (outlook)?**

Before the mid 1990s, most people did not survive more than 1-2 years after AIDS had developed. Since the introduction of antiretroviral drugs in the mid 1990s the outlook has greatly improved for those who have access to such treatment. Many people with HIV and AIDS in richer countries are now living much longer than previously.

However, most people with HIV live in developing countries and do not have access to effective drugs. Therefore the HIV epidemic worldwide continues to claim millions of lives each year.