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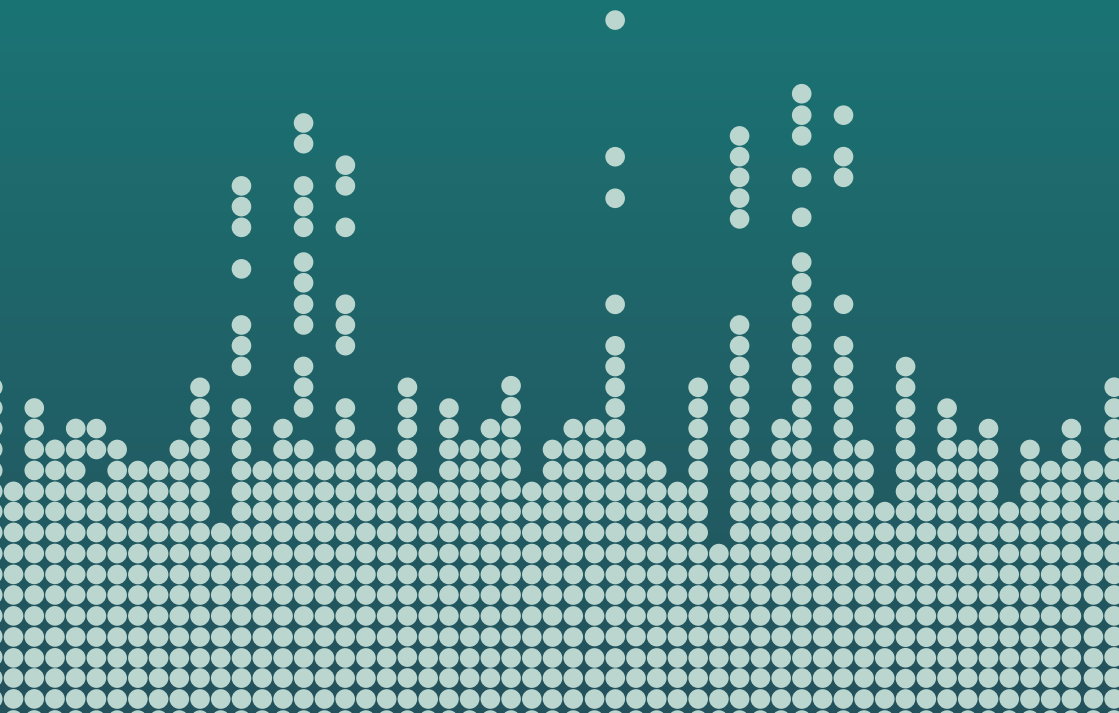
Information and advice to help you make decisions

2009 Edition

HIV Tests & Treatments



What this booklet is about

This booklet describes the currently available antiviral drugs for the treatment and management of HIV infection. It also describes some common tests used to monitor the health of people with HIV, and how these tests can be used to help you look after your health, or make decisions about starting, stopping or changing antiviral treatments.

Who this booklet is for

This booklet is for anyone with HIV who may be considering starting, stopping or changing treatment. It is designed for all people with HIV, whether you have been recently diagnosed, or have known about your HIV positive status for some time.

This booklet is for anyone with HIV who may be considering starting, stopping or changing treatments.

The information in this booklet is designed to help you:

- understand how HIV antiviral treatments work, and what drugs are currently available;
- understand the different tests which might be suggested by your doctor to help monitor your health; and
- work with your doctor to come up with the most appropriate HIV treatment and management strategy for you – whether with or without antiviral drugs.

It also contains some information about:

- drug side effects and how they might be managed; and
- tips and tricks for getting the most out of your drugs.

What this book does not do

This book is primarily concerned with HIV antiviral treatments, viral load tests and CD4 (T-cell; also called CD4 lymphocyte) tests. It is designed to update the previous edition of this popular resource with the current state of knowledge in 2008. The book is deliberately limited in its scope, and you are likely to find it does not answer all your questions about treating and managing HIV. Because information about HIV is becoming much more complex and comprehensive, it is virtually impossible for any single resource to cover all the issues about living with HIV for all positive people.

This booklet will not cover the following issues:

- prophylactic drugs or treatments for HIV-related opportunistic illnesses;
- the treatment, prevention and management of specific side effects;
- depression and other mental health and psychosocial issues for people living with HIV;
- complementary or alternative therapies;
- co-infection with hepatitis B or C;
- women, pregnancy, breast-feeding or treatments for HIV positive children;
- injecting drug use and HIV, and
- detailed strategies for choosing a GP.

These issues are well-covered by a range of existing publications which are available through AIDS councils and other organisations or online at **www.afao.org.au.**

This booklet aims to take you through some of the choices, but in the end they are your choices to make.

The information contained in this book is very general. It is not intended to direct you towards or promote any particular drugs, drug combinations, tests or treatments. You won't find an answer to the question: 'Which particular combination of drugs should I be taking?'. No two people experience living with HIV in the same way. People respond differently to HIV treatments and combinations, and this is often difficult to predict. All decisions about how you treat and manage HIV infection should be discussed with your doctor. Ultimately, treating or managing HIV is a very personal decision. This book aims to take you through some of the choices, but in the end they are your choices to make.

The basics of HIV

Over the past twenty-five years, there have been a number of changes in the ways HIV infection is understood and managed. These changes have led to great improvements in treatment and management of HIV infection and have greatly increased the range of options available. Since the advent of Highly Active Anti-Retroviral Treatment (HAART) involving combinations of antiviral drugs, deaths from AIDS have dramatically declined and people with HIV on treatments have a much longer life expectancy.

There are a number of changes which have led to these improvements:

- we have a clearer understanding of how HIV works inside the body;
- the use of the viral load test measuring the amount of HIV circulating in your blood is now standard practice in Australia, Europe and North America. The results of this test can help in making treatment decisions. It can also show how well the treatments you are taking are working against HIV;
- the use of genotyping and phenotyping assays (most commonly referred to as resistance testing) used to measure the likelihood of resistance to antiviral drugs and provide an indication of which drugs and combinations of drugs are working; and
- we have a clearer idea of the short and long-term side effects sometimes experienced by people using these drugs, and how to manage most of them.

This booklet explains these changes and what they might mean for people living with HIV.

This booklet is primarily about treatments and tests available for HIV, and how they might work for you. However, current HIV treatments are still far from perfect, and for some people, deciding to take HIV treatments raises a number of important issues which you may need to talk about with someone. You may have questions about side effects, confidentiality, or how treatments will affect your day-to-day life. At the back of this booklet, there is a list of AIDS Councils and PLWHA organisations where you can access counsellors and treatments officers who will be able to help you understand what taking combination therapy might mean for you.

Chapter 1
How HIV works

The initials HIV stand for Human Immunodeficiency Virus. HIV attacks your immune system, a system of organs and cells throughout the body which usually fight off infection and keep you well. HIV affects the immune system by targeting and destroying cells which normally fight off infection. The main cells infected by HIV are called the CD4 (or T4) cells — a type of white blood cell. These cells are a major part of your immune system.

If you have been told that you are HIV positive, this means that you have been infected with HIV, and your immune system has made antibodies specifically to fight the virus. But HIV antibodies don't kill the virus. Instead, HIV continues to reproduce itself within the CD4 cells, creating 'viral copies' which cause further damage to the immune system. The more HIV is reproduced, the greater the number of new cells likely to become infected and destroyed by the virus. If your immune system is weakened, this is often described as being 'immunosuppressed' or 'immunocompromised'. This means that you are at risk of developing 'opportunistic illnesses' or other more serious diseases that are associated with AIDS.

HIV antiviral treatments are drugs which aim to stop the virus from reproducing, and so dramatically inhibit its ability to infect and destroy new cells. Sometimes people with HIV commence or restart treatments when their immune system has already been damaged. Treatments have proven to have the ability to prevent further damage and additionally allow the immune system to partially restore itself.

Natural history of HIV without HIV antiviral treatment

The following is a description of what is called the 'natural history' of HIV: that is, it describes what often happens in HIV disease without antiviral treatment. It's important to remember that antiviral treatment has significantly altered this natural history, often stalling disease progression before immune system damage can cause AIDS or illness, and improving health and survival for many people – including people who have previously had opportunistic infections or been diagnosed with AIDS.

The natural history below describes the stages of HIV disease. It is a common, but not universal description of HIV disease. People often think that without treatment, HIV leads inevitably to illness and AIDS. However, even without treatments, a small but significant number of people have been able to live with HIV for a long time. This is often called being a "long-term non-progressor".

For the majority of people, treatments have changed this 'natural history', improving health and survival.

Stage 1
Primary infection

When people first become infected with HIV, they may in many cases experience a flu-like illness, sometimes accompanied by a rash, which is referred to as seroconversion illness. Not all people who have been exposed to HIV will experience seroconversion illness, though: some people don't have any symptoms at all.

Stage 2
Asymptomatic infection

For a number of years following infection, many people with HIV remain well and symptom-free.

Stage 3
Symptomatic illness

The symptoms people might experience at this stage include diarrhoea, minor skin conditions, minor oral (mouth) conditions, lack of energy, night sweats, and/or persistently swollen glands lasting longer than two months.

Stage 4
Advanced disease (AIDS)

At this stage, HIV will have done great damage to your body's ability to cope with illness and infection. People with AIDS experience severe symptoms, and are at risk of opportunistic illnesses.

What are opportunistic illnesses?

Opportunistic illnesses are infections which most people have been exposed to at some point in their lives but which are suppressed by healthy immune systems. HIV can weaken a person's immune system to the point where these infections can overcome the immune system and establish themselves as acute (sudden onset) or ongoing infections or illnesses. Alternately, some people with weakened immune systems may become sick if exposed to an opportunistic illness for the first time, whereas people with stronger immune systems would not.

Some opportunistic illnesses can cause serious illness (including some types of cancers) or can be fatal. There are effective treatments available for most opportunistic illnesses. You can reduce the risk of some opportunistic illnesses by taking treatments which may prevent the illness from occurring. This is called prophylaxis. In particular, if your CD4 count is under 250, or you have ever had an AIDS-defining illness, you should talk to your doctor about whether you should be taking prophylaxis. For some people, treating HIV involves using both antiviral and prophylactic treatments.

The "history" of HIV taking into account current antiviral treatments.

Although treatments have improved there remain a number of unanswered questions about the impact of this on the life expectancy and long-term health of people with HIV. Prior to the advent of effective antiviral treatments it was estimated that 50% of people with HIV infection would progress to an AIDS diagnosis within 10 years.

A number of studies have attempted to estimate the average life expectancy of people with HIV, presuming they have access to the most effective antiviral treatments. The average estimate is that with early access to the current antiviral treatments the number of years of expected life for people with HIV from the time they get HIV infection has more than doubled from the time when no treatments were available. It is possible that with optimal treatments, many people with HIV will be able to live long lives. However, there is a large range in these estimates and the impact of long term and potentially serious side effects of current treatments are, at this stage, only rough estimates. Prior to the advent of effective treatments the illnesses and symptoms caused by HIV were due to opportunistic illnesses and to those caused directly by HIV itself. Now the side effects of antiviral drugs – both short and long term – can be a significant cause of illness for people with HIV and may have an impact on quality of life.

Chapter 2
Viral load

'Viral load' is the term used to describe the amount of the HIV virus present in your bloodstream. Knowing how much HIV is present is an important indicator of how much your immune system is at risk of damage, how well your treatments are working, or whether you should consider starting or changing treatments.

A viral load test is a simple blood test. The result of a test is given as the number of viral copies of HIV per millilitre of blood. A 'copy' is what HIV produces every time it grows inside a cell: the more copies, the more virus.

The amount of virus in your blood may range from a very small number of copies in your blood (below 50 copies per millilitre of blood) to levels in the thousands, hundreds of thousands, or even millions. In some Australian states and territories the tests can measure down to 40 copies per millilitre of blood.

Understanding Your Viral Load results

Viral load is perhaps the simplest and easiest HIV test to understand as it is simply a count of the virus expressed in number per millilitre.

When you first have your viral load tested, you will usually have two tests several weeks apart, which gives a result known as your 'baseline', and which can be used to compare changes over time. These results can be a useful guide if you are considering treatment:

a) 'Undetectable' viral load?

One result you can get back from a viral load test result is 'undetectable'. Undetectable viral load does not mean that you have 'cleared' the virus from your body. It means that HIV is present, but in very small amounts (below the capacity of current commercial tests to accurately measure: that is, below 40 to 50 copies per millilitre of blood). Virus at such levels is replicating so slowly that little, if any, damage will be happening to your CD4 cells and immune system.

Viral load tests are slowly becoming more sensitive. However, special laboratory tests are able to detect HIV in even minute quantities. HIV infects cells which may remain active in lymph glands, known as resting cells, and has also been shown to infect small amounts of other types of cells. To totally cure or eradicate HIV, you would need to also eradicate the virus in these 'resting cells'.

b) Detectable viral load results

You will often be told that your viral load result is 'high' (i.e. more than 100,000 copies per ml), 'moderate' (i.e. 10,000 to 100,000 copies per ml), or 'low' (i.e. less than 10,000 copies per ml). On their own your viral load results are no cause for alarm. For example, a high viral load result does not mean you are going to be sick tomorrow. Or a low result after your results have been undetectable for some time does not mean you have suddenly "failed" in any way.

Your viral load level is a rough guide to the likelihood of future damage to the immune system. So if your viral load is high it means that future damage is more likely. If it is low or undetectable it means future damage is less likely.

In order to make decisions about treatments, the viral load has to be read in conjunction with the CD4 cell count. (See *Putting it all together - Viral load* and *CD4 count results* Page 12)

Viral load and the pattern over time is important

You may be asked to have viral load tests fairly frequently so you and your doctor can keep track of changes over time, or of any sudden variations between test results. In fact, an unexplained and significant upward trend in viral load over a number of tests may be a stronger indicator that you should consider changing or starting treatments than a single, detectable result in isolation. The magnitude of the change is important. For example, a rise of viral load from 5,000 to 6,000 does not necessarily indicate there is a problem. But a rise from 5,000 to 50,000 may suggest that the virus is beginning to replicate very rapidly for some reason, and that you should take this into consideration when thinking about starting or changing treatments

Other factors can affect viral load

No one viral load result should be considered alone. It's the pattern over time which counts. There are a number of reasons why you may experience a sudden temporary rise, or 'spike' in your viral load. These include:

- another infection (e.g. the flu, hepatitis, or another sexually transmitted infection such as gonorrhoea or syphilis); and
- recent vaccination (eg. routine travel-related vaccinations or hepatitis A or B vaccination), which can stimulate your immune system for a brief period causing only a temporary rise.

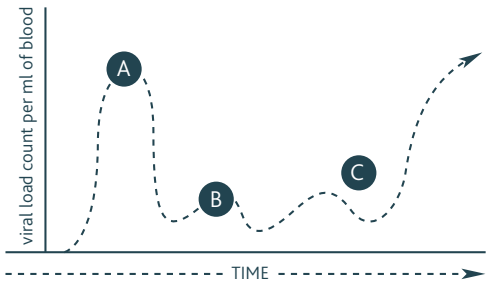
Viral load and "infectiousness"

Viral load tests tell you how much virus is in your blood. But HIV is also present in other body fluids, including semen, vaginal fluids and CSF (cerebrospinal fluid)—the fluid which protects your brain. The level of virus in your blood is often different to the amounts in other body fluids. This difference can be caused by a number of factors. **For this reason, blood viral load tests should not be used to judge the likelihood of HIV transmission.** It is possible to have low or undetectable blood viral load, but higher levels in semen or vaginal fluids.

While research suggests an undetectable viral load reduces the risk of HIV transmission, an undetectable viral load has not yet been proven to completely eliminate the risk of transmitting the virus. **The use of viral load in prevention is not a substitute for safe sex.**

Make sure you understand the meaning of your viral load test results. Ask your doctor to explain their significance and what they mean for you.

Viral load over time without treatment



- **A Stage 1:** Seroconversion - Very high viral load
- **B Stage 2:** No Symptoms - Low to moderate viral load
- **C Stage 3 + 4:** Symptoms - High viral load

The typical picture of viral load over time is given above. Soon after initial infection there is a peak in viral load until the immune system responds. Then, for a period of years the immune system and the virus are engaged in a balancing act, though in nearly all cases the immune system is still being weakened. Throughout this period, the virus is still active. Eventually, the virus may overwhelm the immune system.

If you are not taking antiviral treatments, you will probably be advised to have a viral load test each time you have a CD4 or T-cell count. Comparing these results with your baseline viral load will alert you and your doctor to any changes in your immune system or your health.

Ask your doctor to explain the meaning of any changes in your viral load. It is quite common for viral load to change a bit with each test. What is important is the magnitude of the change. Doctors use a mathematical scale called a logarithmic ("log") scale to measure the significance of any changes. It is only changes of a significant magnitude that are considered important. (***Refer to Viral load and the pattern over time is important***)

To get the best picture, CD4 and viral load test results should be considered together.

The CD4 count

The other test that is critical in managing HIV and understanding how it is affecting you and your body, is the CD4 or T-cell count.

CD4 cells are a critical part of your immune system. They are infected and destroyed by HIV. Sometimes, they can be depleted to such dangerous levels that they are unable to play their part in helping your immune system work properly. If this happens, you could be at risk of developing AIDS or AIDS related illnesses.

The CD4 count is a measure of the damage already done. The viral load is a measure of the risk of future damage.

CD4 counts used to be the only way to understand how HIV was affecting your immune system. The CD4 count is a measure of the damage already done. The viral load is a measure of the risk of future damage. A general guide to CD4 test results is:

- 500 to 1,350 CD4 is the 'normal' range for adults;
- more than 500 CD4 indicates little or no immune system damage;
- between 500 and 250 CD4 cells indicates some damage but it is unlikely you will be at risk of major opportunistic infections; and
- less than 250 CD4 indicates more serious immune system damage and suggests that you could be at risk of serious opportunistic illnesses.

CD4 percentages measure the proportion of CD4 cells against other types of white blood cells. The percentage is more an indication of the stability of CD4 count over time, rather than the actual CD4 count. The percentage can indicate how stable the CD4 count is and may vary less than an actual CD4 count. For example, a person with a CD4 count of 350 at 23% could indicate more stability and less chance of disease progression than a person with a CD4 count of 500 at 15%.

Together with viral load and the CD4 count, it's another result that is used by your doctor to assist in determining your optimal treatment strategies.

Putting it all together: Using viral load, CD4 counts and CD4 percentage results to inform treatments decisions

To get the best picture, viral load test, CD4 counts and CD4 percentage results should be considered together. These results can be used to determine:

- the level of activity of the virus in your bloodstream;
- the level of damage to your immune system;
- when to start antiviral treatment;
- if the current antiviral treatments are working, and whether it may be necessary to change treatments; and
- when to take preventative medicines (prophylaxis) to decrease the chances of getting some of the more common opportunistic illnesses associated with AIDS.

Common Tests for Monitoring for side effects

Viral load and CD4 cell count results are two of the main tests used to inform treatment decisions about starting or changing treatments. Usually every time you have regular blood tests a whole range of other tests are done. Some of these are useful in monitoring for possible drug side effects and potential organ damage. The results of these tests may also influence decisions to commence or change your HIV treatments.

Some of the common tests include:

Glucose, triglyceride and cholesterol levels:
The two major fats (lipids) in the blood are triglycerides and cholesterol. Glucose, triglyceride, and cholesterol levels are most reliably measured in the fasted state, that is, in the morning before eating. Certain anti-HIV therapies can increase cholesterol, triglyceride, and glucose levels in some people, which may increase the risk of heart attack and stroke, and can be associated with lipodystrophy (the redistribution of body fat).

Liver function tests: There are a range of tests which taken together give an indication of the health of the liver. The liver can be damaged by hepatitis, alcohol and other drugs, being overweight, and by HIV antiviral drugs directly – so it is important to keep a watch on liver function.

Kidney function: Kidney function is normally measured by the blood levels of 'waste' products such as urea and creatinine. Some HIV antiviral drugs can affect the levels of these waste products because they compete with them for excretion in the kidney. Some HIV antiviral drugs may have an impact on kidney function.

Platelet count: Platelets are important in helping your blood clot in response to a cut or wound. Some HIV antiviral drugs – particularly nucleoside analogues (e.g. AZT, d4T) – can decrease the platelet count.

Haemoglobin and Haematocrit: Haemoglobin measures the levels of the key protein which transports oxygen around the body. Haematocrit is a measure of the proportion of blood that is red blood cells. Low haemoglobin levels or a low haemotocrit can be an indicator of anaemia – a known side effect of some HIV antiviral drugs.

Other tests that may help inform treatments decisions

Resistance testing

The most common test to measure possible drug resistance is known as 'Genotyping'. The purpose of this test is to detect the presence of known virus mutations associated with drug resistance. (See Resistance Page 16) This test is called a 'genotypic resistance assay' or 'GRA'. It is used to compare the genetic code of the sample of HIV virus being tested against a 'wildtype' (the most common form of HIV virus). This test can only be performed if you have a viral load over about 2000 copies per millilitre of blood.

Knowing which treatments you are potentially resistant to and which treatments are effective against your virus is useful in determining your optimal treatment strategy. The current treatment guidelines suggest that this test should be performed:

- prior to commencing treatments;
- to assist in correctly selecting treatments when considering changing treatments;
- if there is indication of viral load change during treatment; and, less often,
- within 4 weeks after discontinuing or stopping treatments.

Another test used to measure resistance is known as 'phenotyping'. This test is called a 'phenotypic assay'. It measures the virus's ability to grow in the presence of different combinations of antiretroviral treatments. This test provides a direct and quantitative measure of the likelihood of resistance developing for individual treatments and can also be used to determine the optimal dosing of treatments.

The third approach to resistance testing is the 'virtual phenotype'. This test is really a genotype test that is interpreted with the aid of a large database of samples of known genotype and phenotype data. One drawback of this particular form of resistance testing is that the results are dependant on the number of known matches, but its main strength is that for people not on new drugs, as it is a simpler method of determining the likelihood of developing resistance.

Phenotyping is still relatively expensive compared to genotyping and virtual phenotyping, and is currently not available in Australia. As all of these tests are currently not covered under Medicare, the availability and cost of these tests varies. Your doctor or treatments officer will be able to provide more information as to the cost and availability in your area and what these tests may mean for you.

Abacavir Hypersensitivity

This test is rapidly becoming widespread and is a genetic test used to determine the likelihood of a possibly fatal side effect of Abacavir (an HIV antiviral drug) known as Abacavir hypersensitivity reaction. Wherever possible, it should be performed by your doctor prior to commencing Abacavir.

Therapeutic drug monitoring (TDM)

Therapeutic drug monitoring (TDM) is used to help individualize anti-HIV therapy by measuring the amount of drug in an individual's blood (plasma) or cerebral (spinal) fluid. This is important because different people absorb, process, and eliminate drugs at different rates, and blood and cerebral fluid levels may vary considerably among individuals taking the same doses of the same medications. Ideally, the lowest plasma drug concentration between doses (the trough level, or Cmin) should still be high enough to inhibit HIV, but the highest concentration (the peak level, or Cmax) should not cause intolerable side effects.

Some, but not all, studies have shown that using TDM to guide treatment decisions increases the chance of successful viral suppression and can assist in minimising side effects; however, drug level monitoring is not appropriate for all anti-HIV drugs.

Chapter 3
Antiviral treatments

Combination therapy

Combination therapy means taking a combination of antiretroviral drugs. Often, they're just referred to as antivirals. There are currently six types or classes of these drugs, each of which work in different ways against HIV. It is now known that the most effective way to treat HIV is by combining different classes of drugs that attack the virus in different ways.

In line with the current Australian and international treatment guidelines, widely supported by existing research, it is now standard practice to commence and maintain people on a combination of at least three drugs from two of these classes, or more

A number of companies have now co-formulated, or combined some of their drugs into one pill. So sometimes you may be on only two different sorts of pills but three different drugs.

The number of different drugs that you are on can be:

- Monotherapy or one drug: this is generally considered harmful as experience shows benefits may be short lived and resistance usually develops rapidly. Resistance to one drug may limit your future treatment options;
- Two drugs: Usually two drugs is not considered sufficient when you first start treatments. Two drug combinations are usually only used because you have experienced severe side effects or sometimes as second line therapy after you have kept the virus suppressed for some time with your first treatment combination; and
- Three or more drugs: This is considered the general rule particularly when starting treatment.

Overwhelmingly, standard practice is three drugs in combination – widely supported by existing research and international guidelines. If your doctor suggests you start or remain on just one or two drugs, find out why. If you're not satisfied with the explanation, or you think your doctor may not be up-to-date, seek a second opinion. "You're doing OK so far on just one drug" (for example) might be one answer which suggests a second opinion may be useful.

The six classes of drugs are:

- nucleoside reverse transcriptase inhibitors (or 'nukes' or NRTIs) - nucleoside analogues and nucleotide reverse transcriptase inhibitors (also known as 'nukes' or NRTIs);
- non-nucleoside reverse transcriptase inhibitors ('non-nukes' or NNRTIs);
- protease inhibitors;
- fusion inhibitors;
- integrase inhibitors; and
- CCR5 entry inhibitors.

The most common combinations include two nucleoside reverse transcriptase inhibitors, in combination with either a non-nucleoside reverse transcriptase inhibitor or a protease inhibitor.

The changing face of treatments strategies

Multiple combinations of HIV antiviral treatments, referred to as Highly Active Antiretroviral Treatments or HAART, first became shown to be highly effective in combating HIV in the mid 1990's. Since that time there have been a number of different approaches to treating HIV infection. As our knowledge of how these drugs work and their side effects has grown over time, there are now a number of different strategies recommended:

These include:

- individual tailoring of drug combinations to maximise viral suppression and minimize side effects
- maximising future treatment options by getting the best combination of drugs used when initially starting treatments
- undertaking resistance testing prior to the commencement of treatment to choose the drugs that will work the best for you
- improving treatments adherence to minimise the opportunity of drug resistance from occurring in the future

Resistance

Every time HIV reproduces itself there's a high chance that it may 'mutate' slightly. A 'mutation' is a small alteration in the genetic makeup. These alterations may make the virus more resistant to an individual drug or potentially a class of drug. The more the virus is reproducing (i.e. the higher the viral load) the more chances there are of mutations occurring.

Three drug combinations are most frequently used because they stop most virus reproduction, and because the chances of a mutation becoming resistant to a number of drugs at the same time are very small. For example, if you are on one drug then the virus may only have to mutate in one place for resistance to occur. But if you are on three drugs then the virus has to mutate in three different places at the same time – and there is much less chance of this occurring.

If you miss doses regularly or stop taking the drugs for a few days, you give the virus a chance to mutate. And because small concentrations of one or more of the drugs you are on can still remain in your bloodstream, any mutations which are resistant to these drugs will multiply better and have more chances of then infecting new cells. So, each missed dose can mean slowly rising levels of resistant virus in your body. Missing doses regularly may allow the virus to escape the control of a drug.

If the virus does develop resistance, the treatments become much less effective and your choices of available drugs to use in the future may be limited. If this happens, HIV can keep multiplying in spite of the drugs, effectively behaving as untreated virus. This is why rises in viral load can mean you need to change treatments.

Missing doses regularly may allow the virus to escape the control of a drug.

A few tips to help stop the development of resistance:

- **Take the full dose of each drug as prescribed. This allows the drug always to be working at maximum capacity.**
- **If you miss a dose, don't double up on your next dose. You just risk more side effects but won't have a better result against the virus.**
- **Take all the drugs in your combination regularly. This means the drugs are always in your blood at levels that work effectively against the virus.**
- **If you are having difficulties taking a certain drug because of side effects or dose requirements, talk to your doctor about changing to a combination that suits you better and is easier to remember. It is better to change treatments than to stay on a combination which doesn't suit.**

When to start?

There is no set rule on when to start HIV treatments - if you feel generally lacking in energy, are suffering fevers, rashes or swollen glands you can consider HIV treatment at any CD4 count. However, you do not need to make any decisions straight away.

The answer to the question of 'when to start' varies according to the stage of your HIV disease or if there are special reasons for starting.

a. For people with recent HIV infection –
i.e. you had a recent seroconversion illness or you have had a recent positive HIV-test and had tested HIV negative in the previous 6 months.

A number of smaller studies have suggested that a short course (3 months) of treatment for people with recent HIV infection could help the body's immune system make a more effective response against HIV infection, stabilising the CD4 count to delay CD4 cell decline and the need to take treatments in the future. Unfortunately there are no studies that strongly suggest any long-term benefit to early treatment.

There is also evidence that people with recent HIV infection have higher levels of the HIV virus in their semen, thereby increasing the likelihood of sexual transmission of HIV. By treating people in the first few weeks of HIV infection, this could help reduce the risk of HIV transmission to sexual partners.

As there are no current guidelines for treatment of HIV for people with recent HIV infection, and treatment is not recommended outside of participation within a clinical trial, it is important that you speak with your doctor about the best options for you.

b. For people with chronic HIV infection who remain "well"

The current treatment guidelines (as of 2008) recommend treatment be offered whenever the CD4 cell count falls below 350. The pendulum is now swinging back towards earlier treatment of people who are well, and some experts would now recommend commencing treatment at CD4 counts about 350. The viral load is less important in determining when to start medication, but if the viral load is greater than 100,000 per ml, this might be another factor in starting treatment earlier rather than later. The goal of treatment is to prevent progression of HIV disease and the development of symptoms of HIV disease.

Currently, no clear long term benefits have been established for the commencement of HIV treatment for people who are well (i.e. do not have symptoms of HIV infection) and have CD4 counts above 350, although a number of studies do suggest that there may be some benefit in starting with a CD4 count between 350 and 500.

Think about whether you're ready to integrate combination therapy into the way you live.

c. For people with a history of an AIDS defining illness, a CD4 count below 200 or severe symptoms of HIV disease regardless of CD4 count

Treatment is recommended for any person with symptoms of HIV disease—including neurological HIV disease—or have experienced an AIDS defining illness (opportunistic infection) in the past. The goal of treatment is both improvement in health and the prevention of further damage to the immune system or reoccurrence of an AIDS defining illness.

d. For women who are pregnant.

Here the goal of HIV antiviral treatment is to reduce HIV viral load and therefore decrease the chances of vertical transmission from mother to baby.

Starting antiviral therapy is a serious commitment because it may mean taking treatments for the rest of your life. Taking treatments in the long term may affect your quality of life, particularly if you develop side effects or find daily pill taking burdensome. On the other hand, many people feel an improvement in their health and energy levels after starting antiviral therapy.

Any treatment decision needs to be discussed fully with your doctor, taking into account not only viral load and CD4 counts but most importantly, your ability to integrate combination therapy into the way you live.

What combinations are best?

There are lots of possible combinations of HIV drugs. It's not possible to describe them all in this booklet. Further, people will respond differently to the same combinations, for a variety of reasons. Just because something worked for a friend doesn't mean it will work for you, and vice versa. There are many factors affecting individual responses to HIV and therapy.

Some drugs can't be used in combination for scientific reasons (e.g. they compete with each other to get absorbed into the body), or they have the same side effec profile. Work with your doctor to choose the best drugs, considering some of the factors listed below:

- What stage of disease are you at (viral load, CD4 counts, symptoms)?
- What prior treatment, if any, have you had?
- What other treatments are being taken now?
- How easy will it be to take the particular combination?
- What are the possible side effects?
- Do you have a busy life and eat at different times every day?
- Are there confidentiality issues around taking drugs regularly?
- Do you travel a lot?

Australian HIV treatment guidelines are updated regularly and may contain recommendations about which drugs or combination of drugs to take in particular circumstances based on the latest evidence. These are available from the AIDS Councils and PLWHA groups listed on page 26 of this booklet.

Adherence

Adherence (also referred to as compliance) means the extent to which you take the right dose of the drugs at the right time. Taking the right dose at the right time is important. Skipping doses can mean that the drug becomes ineffective against the virus and allows resistance to develop (see resistance page 16). Taking a drug on a full stomach when it's meant to be taken before eating can make the drug less effective. Make sure you know how each drug should be taken to be as effective as possible against the virus.

Are you having trouble with your dosing schedule?

There are plenty of ways to help you remember to take your drugs on time. You could experiment with some of these:

- Take your drugs at the same time each day;
- Have supplies of your drugs at places you know you'll be (partner's house; work, if relevant);
- Take your drugs with you wherever you go;
- When travelling, be aware of the different time zones you might be crossing and adjust your dosing times accordingly (this can be done by talking to your doctor before you leave);
- Portable pill boxes, with a timer that you can set to beep each time you need to take a drug, are available from your local AIDS council or doctor;
- Get a Dosette box — this is a box which lets you set out your pills for the week in labelled sections so you can easily see what you have taken and what you need to take next. These are available from chemists or AIDS councils;
- Keep a calendar or diary in a prominent place at home and work which you can tick off each time you take your pills;
- Establish a routine which associates pill taking with meals where appropriate;
- Get an electronic diary and program it to remind you to take the drugs;
- Prepare for holidays by getting a stock of drugs in advance; and
- Find out from other people with HIV what they do to help remember their pills.

Monitoring and changing combinations

You may need to change your treatments for a number of reasons. If there are sudden unexplained changes to your viral load, it could mean that the virus has become resistant to one or more of the drugs in your combination.

You may also need to change combinations if you are unable to meet the requirements for dosing schedules, or if you are finding the side effects intolerable, even if your viral load and CD4 levels are OK.

If you have been experiencing severe side effects due to a particular drug or class of drugs there may be other combinations that do not include this drug or classes of drugs that can be recommended. It is important that you speak with your doctor before stopping any of your HIV antiviral treatments.

You will need to be monitored after each change in combination to see how the new combination is working. During these times, you will probably need more frequent viral load tests.

Treatment breaks

At the turn of the century, combinations of three or more HIV antiviral drugs were shown to be highly effective in treating HIV disease. At the time it was hoped that after long periods on these drugs it may be possible to 'eradicate' HIV from the body. In 2008 it is now known this is not possible with the current treatments. For some people there are significant toxicities associated with using the current drugs for long periods. It is not surprising then that over the past few years one possible strategy examined to minimise long term side effects while attempting to maximize the length of antiviral benefit was the possibility of taking a break from your anti-HIV treatments. These breaks are commonly known as treatment breaks or structured treatment interruptions.

Recently, a large international trial was used to compare the people who continuously took their drugs and people who took treatment breaks. The study, initially designed to last nine years, was stopped after only two years due to the high number of people who took regular treatment breaks that developed AIDS-defining illnesses

Except in very particular circumstances, as soon as you stop taking treatment HIV starts to reproduce again increasing viral load and CD4 cells decline. This is particularly so for people who have already had low CD4 counts, or have had an opportunistic illness in the past.

The results of this study clearly show that treatment breaks are associated with a rapid fall in CD4 counts, an increase in viral load, and illness, as well as the development of multiple drug resistance.

Sometimes, people stop treatments for just one or two days, e.g. during a party weekend. This is often referred to as a 'drug holiday'. Stopping treatments for just one or two days could put you at real risk of developing resistance. There is some research to suggest that stopping drugs for short periods of time, or regularly missing some doses may be more risky in terms of resistance than stopping all at once for a longer time (e.g. a month). This is because different drugs remain active in your system for different periods of time between doses. You should not stop your drugs for these very short periods.

However, some people do feel the need to take longer, planned breaks from HIV drugs. This may be because of side effects, the desire to 'have a rest', or other factors like overseas travel. You should discuss this thoroughly with your doctor. Factors like viral load and CD4 counts are very important. If you have a very low CD4 count, stopping treatments could put you at risk of developing an opportunistic illness. You should consider whether you need prophylactic treatment during this time, particularly (but not only) if you have ever had an opportunistic infection.

Do you need a rest from HIV drugs? It's important to discuss breaks and the reasons why with your doctor.

If you do want to stop your drugs for whatever reason, devise a plan with your doctor, including:

- whether you might need prophylactic treatment during this time;
- how long a break;
- at what point, if any (e.g. viral load, CD4 count) you would consider starting treatment again; and
- how you feel about monitoring, blood tests, etc. during this period.

Some doctors feel that if a person is having major trouble with adherence and missing doses or taking their drugs erratically, it may be more sensible to stop all the drugs and work through these problems over time, before trying again.

Side effects

Any drug can cause side effects, or unwanted effects. These can be divided into different types: allergic reactions and short-term side effects; ongoing side effects; and long-term toxicities or effects which can develop over a number of years. Not everyone gets side effects from their drugs and not everyone experiences the same side effects, many are quite rare.

It's hard to estimate how often people develop different side effects as estimates and studies show varying figures. Most anti-HIV treatments are known to cause diarrhoea, headaches and gastrointestinal upset to some degree, but these side effects are often easily managed and in most cases reduce over time. If you start treatment with a low CD4 count or high viral load, side effects may be more of an issue, and need pre-planning for effective management.

Allergic side effects or 'adverse reactions' to a drug are unpredictable – a few people may suffer them, but the majority won't. Adverse reactions can occur when the immune system reacts badly to a drug and the symptoms are usually a rash or fever. Often, these symptoms will resolve themselves, but if you develop a rash when beginning a drug, seek medical advice as on rare occasions some allergic reactions can be dangerous. You may be able to treat the rash with antihistamines, or by slowly increasing your dose as your body gets used to the drug.

However, wherever a drug has been shown to potentially cause adverse reactions, it will be accompanied by a warning. Your doctor will also advise you about it, and what to do if something like a hypersensitivity rash occurs.

Direct reactions to the drugs can cause a range of, sometimes ongoing, side effects which can vary from mild (headache or occasional diarrhoea) to more serious. There are also some problems which may develop over time, like numbing of the fingers and toes, abnormalities in liver function, or abnormal redistribution of fat throughout your body.

Your doctor may prescribe other medicines (like anti-diarrhoea or nausea medications) to help deal with some of these. Many people report that some simple complementary therapies are useful in controlling side effects: talk to an HIV-experienced dietician for advice. Referrals will be available through your doctor or AIDS council treatments officer.

Your doctor should inform you of possible side effects – if not, ask!

Some side effects to HIV drugs can develop over the long-term. Now that we know more about these drugs, doctors are increasingly monitoring and checking for signs of these problems, and may advice you to change drugs if you are at risk.

These include:

- Peripheral neuropathy, or nerve damage causing pain in hands or feet;
- Blood sugar changes;
- High cholesterol or blood fats;
- Body shape changes like fat wasting or developing a belly, paunch or enlarged breasts (lipodystrophy);
- Muscle inflammation;
- Anaemia;
- Hepatitis and pancreatitis (inflammation of the liver or pancreas); and
- Mouth ulcers.

The earlier you detect any changes, the easier it is to make changes to diet, exercise or the medications themselves, which can all help improve, or in some cases reverse these effects.

A detailed information booklet on the side effects of HIV & antiviral drugs (called ***Managing Side effects***) is available from your local AIDS Council or PLWHA organisation or for downloading from the AFAO website **www.afao.org.au.**

Salvage Therapy

Some people with HIV with significant immune impairment, or people who have taken a wide range of antiviral drugs over a period of many years may experience problems with their antiviral treatments because they are resistant to some classes of drugs. Treatment strategies for people who appear to have HIV that is resistant to many of the available treatments is often referred to as salvage therapy.

There are four different salvage therapy strategies that may be tried:

- recycling drugs – that is, using drugs you have previously used in conjunction with resistance testing to determine which ones may work best;
- 'mega-HAART' regimens – using combinations of up to nine antiviral drugs – these regimens, of course, may pose serious side-effect problems;
- 'treatment intensification' – adding one or two drugs to an existing regimen; and
- accessing new treatments that have not yet been approved for wide use via compassionate access, special access schemes or by participating in clinical trials. Your doctor or treatments officer can provide you with more information about accessing these types of drugs.

Sometimes none of these strategies may be suggested or you may choose not to try them because of the side effects or risks involved. Even if you are on a regimen to which you appear to be somewhat resistant, your doctor may recommend you continue on it as it still may provide protection and help to keep you healthy.

Other treatments

HIV causes different effects in different people. No two people with HIV have exactly the same experience of any side effects, illnesses or symptoms, though there are some common stories. At some times, you may need to take other drugs, like antibiotics, for specific infections or symptoms.

You will need to find out from your GP, pharmacist or specialist whether these interact with the antiviral treatments you are on.

There are some good resources around to help you understand the treatments you are on. These are listed in the back of the book.

Reinfection (superinfection) with HIV

Reinfection, or 'superinfection' as it is sometimes known, means someone contracting a new or secondary infection from a virus with which they have already been infected. In some viral diseases such as measles or mumps, reinfection does not occur because the original infection creates immunity. In other viral infections such as colds and flu, reinfection occurs frequently, due to different strains of the virus.

While rare, we now know that reinfection with HIV happens through unsafe sex or injecting with other people with HIV. One study has shown it is most likely to occur within the first three years of HIV infection in people who have not previously taken HIV treatments or who have taken structured treatment interruptions. However, recently there was a documented case where reinfection occurred between two HIV positive gay men who had been in a long term relationship practicing unsafe sex and having a history of non-adherence to HIV treatments.

We do know that adherence to treatments may impact and provide protection against the possibility of re-infection occurring (e.g. it may be less likely to occur if both HIV positive partners are currently on treatments with a low or undetectable viral load). However, we do not know whether exposure to different viral strains during early infection provides protective immunity against later reinfection.

Studies among dually infected (more than one strain of HIV virus) people have shown that having more than one HIV strain or being reinfected is likely to lead to a poorer long-term prognosis and more rapid disease progression.

The rise of sexually transmissible infections (STIs) such as syphilis among HIV positive gay men can cause serious damage to the immune system and make HIV more difficult to treat. It may increase the chance of reinfection with an STI or with a different strain of HIV. It is important to test regularly for syphilis and other STIs such as herpes, and to seek early treatment to reduce the risk of further damage to your immune system or reinfection.

Illicit and recreational drugs

There's not a lot known about how HIV treatments interact with illicit or recreational drugs, though this is changing. Although it is not recommended or advised that recreational drugs be consumed, if you do take recreational drugs, there are some common cautions you could follow:

- Avoid taking HIV drugs and other drugs at exactly the same time: wait at least a couple of hours between doses;
- Ritonavir and possibly other protease inhibitors may cause dangerous, even fatal interactions with ecstasy, crystal/ice and other types of methamphetamines;
- Drink plenty of water;
- Start with a smaller amount of any illicit drug and monitor any unusual responses;
- Seek emergency medical help if you experience dizziness, sudden drowsiness, blurred vision, heart palpitations, vomiting or any other severe or unexpected effect; and
- Methamphetamines and ecstasy can often cause loss of appetite and even make eating difficult; which can be a problem for people who need to take treatments with food.

Immune-based therapies

Most of the recent attention in HIV research has focused on treatments that attack HIV itself, or work against the virus in the body. However, there is a significant move towards looking at ways to prevent, treat or repair immune system damage caused by HIV. This makes sense, because it is not HIV itself, but the damage the virus does to the immune system, which puts people at risk of illness and death.

Approaches to managing or treating HIV immune system damage are called immune-based therapies or immune modulators. At this stage, there are no immune-based therapies licensed to treat HIV. However, a number of experimental treatments are being examined. Many people believe immune-based therapies will still need to be used in combination with antiviral drugs, but may mean that antiviral drugs need only be used infrequently or sporadically, rather than every day.

Interleukin-2 (IL-2) is the most advanced of the immune-based therapies. There are currently several clinical trials of this drug being conducted at sites all around the world, including a number of sites in Australia. IL-2 has previously been shown to increase the production of CD4 cells. The trial hopes to show that these cells function well and have a protective effect on the immune system.

Other immune-based therapy approaches include therapeutic vaccines, designed to stimulate the immune system's ability to directly fight HIV. Ongoing research in this area continues, although the results to date have not been promising.

Regular treatments information

As our understanding of HIV tests and treatments continues to expand, it can be useful to stay abreast of developments. A good way to keep up to date is by reading regular treatments publications like *Positive Living*. *Positive Living* is produced by the National Association of People Living with HIV/AIDS (NAPWA) and is available free either by post or from the NAPWA website – **www.napwa.org**. *Positive Living* is published in a number of gay & lesbian newspapers around Australia.

The following websites may also be useful:

The Body (US):
www.thebody.com

National AIDS Manual (UK):
www.aidsmap.com

Canadian AIDS Treatment Information Exchange:
www.catie.ca

Project Inform:
www.projectinform.org

Medscape has a very good HIV/AIDS section & posts out updates:
www.medscape.com

The AIDS Treatments News site has a useful list of links to other treatments sites:
www.aidsnews.org

Support Services Contact Details

AIDS Councils

Australian Capital Territory
AIDS Action Council of the ACT
Tel 02 6257 2855
www.aidsaction.org.au

New South Wales
AIDS Council of NSW (ACON)
Tel 02 9206 2000
TTY 02 9283 2088
Freecall 1800 063 060
www.acon.org.au

Positive Living Centre Sydney 02 9699 8756
Western Sydney 02 9204 2400
Hunter Newcastle 02 4927 6808
Illawarra Wollongong 02 4226 1163
Mid North Coast Port Macquarie 02 6584 0943
Northern Rivers Lismore 02 6622 1555

Northern Territory
Northern Territory AIDS and Hepatitis Council
Darwin 08 8941 1711
Freecall 1800 880 899
Alice Springs 08 8953 3172
www.ntahc.org.au

Western Australia
Western Australian AIDS Council
08 9482 0000
www.waaids.com

Queensland
Queensland Association for Healthy Communities
Brisbane and South East Qld 07 3017 1777
Men's Line Freecall 1800 155 141
North Queensland 07 4041 5451
Central Queensland 07 5451 1118
www.qahc.org.au

South Australia
AIDS Council of South Australia
Tel 08 8334 1611
Freecall 1800 888 559
www.acsa.org.au

Tasmania
Tasmanian Council on AIDS, Hepatitis and Related Diseases
Tel 03 6234 1242
Freecall 1800 005 900
www.tascahrd.org.au

Victoria
Victorian AIDS Council / Gay Men's Health Centre
Tel 03 9865 6700
Freecall 1800 134 840
TTY 03 9827 3733
www.vicaids.asn.au

Support Services Contact Details
PLWHA Groups

Australian Capital Territory
PLWHA ACT
Tel 02 6257 4985
www.aidsaction.org.au/plwha

New South Wales
Positive Life NSW
Tel 02 9361 6011
Freecall 1800 245 677
www.positivelife.org.au

Northern Territory
PLWHA NT
Tel 08 8941 1711

Queensland
Queensland Positive People Statewide Resource Centre
Brisbane 07 3013 5555
Freecall 1800 636 241
www.qpp.org.au

South Australia
PLWHA SA
Positive Living Centre
Tel 08 8293 3700
www.hivsa.org.au

Tasmania
(TasCAHRD)
Tel 03 6234 1242
www.tascahrd.org.au

Victoria
PLWHA Victoria
Tel 03 9865 6772
www.plwhavictoria.org.au

Western Australia
HAPAN
Tel 08 9482 0000

Services for Current and Past Injecting Drug Users

Australian Capital Territory
Canberra Alliance for Harm Minimisation and Advocacy (CAHMA)
Tel 02 6279 1670

New South Wales
New South Wales Users & AIDS Association (NUAA)
Tel 02 8354 7300
Freecall 1800 644 413
www.nuaa.org.au

Queensland
Queensland Injectors Health Network (QUIHN)
Brisbane 07 3620 8111
Freecall 1800 172 076 (Outside Brisbane)
www.quihn.org.au

Gold Coast 07 5520 7900
Sunshine Coast 07 5443 9576
Cairns 07 4051 4742
Rockhampton 07 4923 7443

South Australia
South Australian Voice in IV Education (SAVIVE)
Tel 08 8334 1699
www.acsa.org.au/savive.html

Users Association of South Australia (UASA)
Tel 08 8362 1611

Victoria
Harm Reduction Victoria
Tel 03 9329 1500
http://harmreductionvictoria.ca

Western Australia
Western Australia Substance Users Assocation (WASUA)
Tel (08)9321 2877
www.wasua.com.au

Services for Sex Workers

Australian Capital Territory
SWOP (Sex Workers Outreach Project)
Tel 02 6247 3443

New South Wales
SWOP (Sex Workers Outreach Project)
Tel 02 9319 4866
Freecall 1800 622 902
www.swop.org.au

Northern Territory
SWOP (Sex Workers Outreach Project)
Tel 08 8991 7711
www.ntahc.org.au/swop.htm

South Australia
SIN (Sex Industry Network)
Tel 08 8334 1666
www.sin.org.au

Victoria
RhED (Resourcing Health & Education)
Tel 03 9534 8166
www.sexworker.org.au

Western Australia
Magenta & SWOPWA (Sex Workers Outreach Project WA)
Tel 08 9328 1387
http://fpwa.org.au/services/magenta/

Glossary

Adherence	Often shorthand for 'strict adherence to therapy', meaning pills are taken exactly as prescribed – on time, every time, and observing any specific dietary requirements. Also referred to as 'compliance'; less frequently, as 'concordance'.
Antiretroviral	A more complex term for antiviral drugs, in this case, any drugs which are designed to inhibit the process by which HIV replicates. In this leaflet, the simpler term antiviral is used, and it is assumed that the virus in question is HIV. The more technical term antiretroviral refers to the fact that HIV is a retrovirus.
CD4 cells (also: T-cells or T-helper cells)	A type of blood cell involved in protecting the body against viral, fungal and protozoal infections. CD4 cells are part of the human immune response. If HIV is inside the human body, it targets, and replicates within, CD4 cells, destroying them in the process. The cells are so named because they have a particular marker, known as a CD4 receptor, on their surface. CD4 cells are sometimes called the 'conductors' of the immune system, since they orchestrate the responses of other cells.
Clinical trials	Studies which test experimental medicines in humans, in order to establish that they are safe and effective. Clinical trials are staged in 'phases', beginning with small numbers of people, then being tested more widely as data on safety and efficacy is established.
Compliance	See adherence
Complementary therapies	Non-traditional interventions used for health promotion and therapeutic treatment for chronic and acute illnesses, pain management, and palliative care. These non-traditional approaches include, but are not limited to, therapeutic touch, aromatherapy, acupressure, reflexology, visualization and imagery.
Drug holiday	Refers to "breaks" from antiviral therapy. Should be distinguished from structured interruptions to therapy under medical conditions.

Fusion Inhibitor	A class of antiretroviral agents that binds to the envelope protein and blocks the structural changes necessary for the virus to fuse with the host CD4 cell . When the virus cannot penetrate the host cell membrane and infect the cell, HIV replication within that host cell is prevented.
HAART Highly active antiretroviral therapy.	Usually means a combination of at least 3 HIV antivirals from at least two of the three classes of anti-HIV drugs available: Nucleoside analogues, non-nucleoside reverse transcriptase inhibitors and protease inhibitors.
Immune-based therapies	Anti-HIV treatment which aims to improve, maintain or extend the capacities of the body's immune system against HIV infection, or other diseases. This usually means maintaining a functional immune response in the presence of HIV or repairing/improving immune response if HIV has already caused damage. Immune-based therapies include therapeutic vaccines and IL-2.
Integrase Inhibitors	In order for HIV to successfully take over a T-cell's machinery so that it can produce new viruses, HIV's RNA is converted into DNA by the reverse transcriptase enzyme (nucleotide/nucleoside reverse transcriptase inhibitors can block this process). After the "reverse transcription" of RNA into DNA is complete, HIV's DNA must then be incorporated into the T-cell's DNA. This is known as integration. As their name implies, integrase inhibitors work by blocking this process.
Lipoatrophy	Loss of subcutaneous fat, usually in the face and limbs. Thought to be due to some nucleoside reverse transcriptase inhibitors.
Lipodystrophy	Defective metabolism of fat. Includes fat loss (Lipoatrophy) such as wasting in the face, arms, and legs, and fat redistribution, such as fat accumulation in the upper back, breasts, and/or stomach. Thought by many to be associated with the use of protease inhibitors and some nucleoside reverse transcriptase inhibitors.

Liver	A large gland, dark red in colour, situated in the right side of the upper abdomen. The liver has a number of functions, including: storing and filtering blood, secreting bile, and numerous functions to do with the processing and breaking down of food into energy.
Log	Changes in viral load are often reported as logarithmic or "log changes." This mathematical term denotes a change in value of what is being measured by a factor of 10. For example, if the baseline viral load is 40,000 copies/ml of blood, then a 1-log increase equals a 10-fold (10 times) increase, or 400,000 copies/ml of blood. A 2-log increase equals 4,000,000, or a 100-fold increase. An easy way to figure out log changes is either to drop the last "0" or add "0" to the original number.
Opportunistic Infections	Illnesses caused by various organisms, some of which usually do not cause disease in persons with normal immune systems. Persons living with advanced HIV infection suffer opportunistic infections of the lungs, brain, eyes, and other organs. Opportunistic infections common in persons diagnosed with AIDS include *Pneumocystis jiroveci* (previously known as *Pneumocystis carinii*) pneumonia; Kaposi's Sarcoma; cryptosporidiosis; toxoplasmosis; other parasitic, viral, and fungal infections; Opportunistic cancers can also occur.
Protease Inhibitor	Antiviral drugs that act by inhibiting the virus protease enzyme, thereby preventing viral replication. Specifically, these drugs block the protease enzyme from breaking apart long strands of viral proteins to make the smaller, active HIV proteins. If the larger HIV proteins are not broken apart, they cannot assemble themselves into new functional HIV particles.
Prophylaxis	Prescribing a drug which is known to prevent an infection from taking hold at a time when a person may not be infected, but is at risk of developing that infection or illness.

Resistance	The ability of a micro-organism like HIV to escape the control of the drugs used to fight it. In terms of HIV, this happens when the virus mutates during the replication process. Viruses like HIV, which have their genetic material encoded in RNA, lack critical genetic 'proofreading' mechanisms. So when new copies of HIV are created, often, minute errors in the genetic translation will occur. Over time, HIV may develop small changes to its structure which mean that anti-HIV drugs, which are designed to interfere with the virus in quite specific ways, will not be able to control it.
Resistance test	A test which looks at the genetic structure of HIV, to determine if any mutations in the virus would make it likely to be resistant to particular antiviral drugs. Sometimes referred to as resistance assays, genotypic resistance assays, or GRAs.
Reverse transcriptase	An enzyme which occurs in the family of viruses known as retroviruses, which includes HIV. The enzyme activates the process by which HIV changes its genetic information from RNA (in which it is encoded) into DNA, another form, which allows the genetic information of HIV to be integrated into the genetic material of a host cell (e.g., a CD4 cell). Once inside this cell, HIV is able to replicate.
Reverse transcriptase inhibitors	A kind of drug which works to inhibit HIV by interfering with the enzyme which allows reverse transcription, described above, to occur. If reverse transcription cannot occur, or is made difficult, HIV will not be able to replicate, or its ability to do so will be diminished. There are two kinds of HIV reverse transcriptase inhibitor: the nucleosides (sometimes called nucleoside analogues), and the non-nucleosides.
Vaccine (preventative)	An agent introduced into the body which mimics a particular bug or infection in order to trick the immune system into developing immunity against that bug.
Vaccine (therapeutic)	An agent introduced into the body which is designed to stimulate an immune response to a virus or infection that is already in the body.

Drug Chart of HIV Antiviral Drugs currently available in Australia under the PBS

Generic name	Trade name	Formulation	Standard adult dose	Daily pill burden	Possible side effects	Food restrictions
Nucleoside reverse transcriptase inhibitors (NRTIs)						
3TC, lamivudine	Epivir	150 and 300mg tablets	150mg twice a day or 300mg once a day	2 1	Nausea, vomiting, diarrhoea, headache, tiredness, abdominal pain, peripheral neuropathy and insomnia Neutropenia (low white blood cell counts), hair loss (head) and rash	
abacavir	Ziagen	300mg tablet	300mg twice a day or 600mg once a day	2 1	Nausea, vomiting, lethargy and fatigue, diarrhoea, fever, headache, diarrhoea and loss of appetite Hypersensitivity reaction in about 5% (fever, tiredness, nausea, vomiting, flu – like symptoms, possible rash) within 6 weeks of starting therapy – never take abacavir again, if hypersensitivity reaction has occurred	
AZT, zidovudine	Retrovir	100 and 250mg capsules	250mg twice a day	2	Nausea, fatigue, headache, dizziness, vomiting, weakness and muscle pain, possible lipodystrophy Blood disorders, muscle damage	
d4T, stavudine	Zerit	20, 30 and 40mg* capsules	People over 60kg: 40mg twice a day People under 60kg: 30mg twice a day	2	Diarrhoea, nausea, abdominal pain, lipoatrophy, tiredness, peripheral neuropathy, dizziness, rash Pancreatitis	
ddI, didanosine (extended release)	VidexEC	125, 200, 250 and 400mg capsules	People over 60kg: 400mg once a day People under 60kg: 250mg once a day	1	Diarrhoea, peripheral neuropathy Nausea, Vomiting, chills, fever, headache, pain, rash, dry mouth Pancreatitis	Take on an empty stomach at least one hour before or two hours after eating or drinking anything except water
FTC, emtricitabine	Emtriva	200mg capsule	200mg once a day	1	Headache, diarrhoea, nausea, rash	

Generic name	Trade name	Formulation	Standard adult dose	Daily pill burden	Possible side effects	Food restrictions
Nucleotide reverse transcriptase inhibitors (NtRTIs)						
Tenofovir	Viread	300mg tablet	300mg once a day	1	Dizziness, diarrhoea, nausea, vomiting, flatulence, low blood phosphate levels, Kidney impairment	Preferably taken with food
NRTI / NtRTI fixed dose combinations						
3TC / AZT	Combivir	150 / 300mg tablet	One tablet twice a day	2	See 3TC and AZT	
3TC / abacavir / AZT	Trizivir	150 / 300 / 300mg tablet	One tablet twice a day	2	See 3TC, abacavir and AZT	
3TC / abacavir	Kivexa	150 / 300mg tablet	One tablet twice a day	1	See 3TC and abacavir	
FTC / tenofovir	Truvada	200 / 300mg tablet	One tablet twice a day	1	See FTC and tenofovir	
Non-nucleoside reverse transcriptase inhibitors (NNRTIs)						
Efavirenz	Stocrin	600mg tablet and 200mgv tablet	600mg once a day	1	Dizziness, headache, tiredness, sleep disturbance, abnormal dreams, impaired concentration, Rash, nausea, depression, psychosis	Take on empty stomach at bedtime
Nevirapine	Viramune	200mg tablet	200mg once a day for two weeks then 400mg once a day or 200mg twice a day	2	Rash, headache, nausea, liver toxicity Stevens Johnson syndrome	
Delavirdine	Rescriptor	100mg tablet	400mg three times a day	12	Skin rash and /or itching, fever, headache, fatigue, nausea, diarrhoea	Should be taken at least 1 hr away from ddI Tablets and antacids
Etravirine (PBS licensed from 1 July 09)	Intelence	100mg tablet	2000mg twice a day	4	Diarrhoea, rash, nausea, headache, fatigue	Take with food

Generic name	Trade name	Formulation	Standard adult dose	Daily pill burden	Possible side effects	Food restrictions
Protease inhibitors (PI's)						
Atazanavir	Reyataz	300mg and 200mg capsule And 100mg capsule (licensed on PBS from 1st July 09)	300mg with 100mg ritonavir once a day, or 400mg daily without ritonavir	1* or 2	Hyperbilirubinaemia Nausea, headache, diarrhoea, abdominal pain, vomiting, Rash, Cardiac disturbances	Take with food
Darunavir	Prezista	300mg tablet	600mg with 100mg ritonavir twice a day	6*	Nausea, headache, diarrhoea Rash	Take with food
Indinavir	Crixivan	100, 200, and 400mg* capsules	800mg three times a day, or 800mg twice a day with ritonavir	6	Headache, dizziness, nausea, vomiting, diarrhoea, rash, dry skin and mouth, kidney stones, tiredness, abdominal pain, insomnia, muscle pain, liver abnormalities, lipodystrophy	Take on an empty stomach at least one hour before or two hours after food or take with a light, low-fat snack
Fosamprenavir	Telzir	700mg tablet	700mg with 100mg ritonavir twice a day	4*	Diarrhoea, nausea, vomiting, bdominal pain, headache, rash, raised liver enzymes, lipodystrophy, fatigue, weakness	

Lopinavir / ritonavir	Kaletra	200 / 50mg tablets	Two tablets twice a day	4	Diarrhoea, nausea, vomiting, abdominal pain, headache, rash, raised liver enzymes, lipodystrophy, fatigue, weakness	
Ritonavir	Norvir	100mg capsule	Full dose: 600mg twice a day To 'boost' other PIs: 100 - 200mg once or twice daily	12 1-4	Abdominal pain, headache, nausea, diarrhoea, vomiting, weakness, numbness around the mouth, muscle pain, lipodystrophy	Take with food to avoid nausea
Saquinavir (hard gel)	Invirase	200mg capsule and 500mg tablet*	1000mg with 100mg ritonavir twice a day	6*	Diarrhoea, nausea, headache, dizziness, abdominal pain, vomiting, rash, muscle pain, tiredness, fever, lipodystrophy	Take within two hours of food
Tipranavir	Aptivus	250mg capsule	500mg with 200mg ritonavir twice a day	8*	Diarrhoea, nausea, tiredness, headache, vomiting, stomach cramps, lipodystrophy Intracerebral bleeding	Take with food
Darunavir	Prezista	300mg tablet	600mg with 100mg ritonavir twice a day	6*	Nausea, headache, diarrhoea Rash	Take with food

Generic name	Trade name	Formulation	Standard adult dose	Daily pill burden	Possible side effects	Food restrictions
Fusion inhibitors						
T-20, enfuvirtide	Fuzeon	Powder reconstituted in water	Injection of 90mg under the skin twice a day	-	Injection site reaction, respiratory tract infections	
Entry Inhibitor						
Maraviroc (Not licensed in Australia. Available only on trial or as part of access scheme)	Celsentri	150mg and 300mg tablets twice a day	600mg with 100mg ritonavir	6*	Rash, abdominal pain, dizziness, cough Diarrhoea	Take with or without food
Integrase inhibitor						
Raltegravir	Isentress	400mg tablets	800mg twice a day	-	Diarrhoea, nausea, fatigue, headache, itching, Constipation, flatulence and sweating	

Important note: The lists of side effects described above are possible side effects only. Not everyone who takes the drugs will get the side effects described. Many are quite rare, or may develop over a period of months or years. Others may last only in the first few weeks of therapy. A number of the side effects described above (e.g. Stevens Johnson syndrome) are rare. Some side effects (diarrhoea, nausea), are fairly commonly reported. However, you may be able to manage, alleviate or even eliminate these side effects with some fairly simple interventions like dietary changes, or over-the-counter medications. Other side effects, like lipodystrophy, may affect people to varying degrees. It's difficult to say accurately who is at risk.

Talk with your doctor about monitoring for the possible development of these side effects as part of your routine monitoring. The earlier you detect them, the greater the options for dealing with them.

***Includes ritonavir capsules**

napwa

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