BODY POSITIVE
NEW ZEALAND
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Information and advice to help you make decisions

2019 Edition

HIV Tests & Treatments

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HIV treatments offer most people with HIV a long and healthy life

HIV Treatment is a lifesaver. While there is no cure for HIV the current medications will allow you to keep the virus under control, stay healthy and live a long and full life. If left untreated HIV will weaken your immune system and leave you vulnerable to infections and cancers.

Recent science has also shown that by taking HIV medications every day and maintaining control of the virus so that it is undetectable you cannot pass HIV onto your sexual partners.

This book describes the treatment and management of HIV infection. What medications are used? How do they work? What has changed? It also describes some common tests used to monitor the health of people with HIV, and how these tests can be used to make decisions about starting or changing antiviral treatments.

HIV treatments have radically improved and now offer most people with HIV a long and healthy life

The information on this book is designed to help you:

- understand how HIV treatments work, and what drugs are currently available
- understand the different tests which might be suggested by your doctor to help monitor your health
- work with your doctor to come up with the most appropriate HIV treatment and management strategy for you

It also contains some information about:

- drug side-effects and how they might be managed
- tips for getting the most out of your treatment

What this book does not do

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 **bodypositive.org.nz**.

The information contained in this book is general. It is not intended to direct you towards or promote any particular drugs, drug combinations, tests or treatments. 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 HIV is a personal decision. This site aims to take you through some of the options, but in the end they are your choices to make.

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Our approach to HIV continues to improve

Over the past thirty years, there have been significant advances in the way HIV infection is understood and managed. Several very effective HIV medications that are easy to take and have few side effects are fully funded for all people with HIV in New Zealand.

We now know that there are huge benefits to starting HIV treatment early, before the virus has had a chance to damage your immune system. The earlier you are diagnosed with HIV after infection and the earlier you start treatment, the better. This is true whether your CD4 count is high or low. Research confirms that the benefits of starting treatment early clearly outweigh the possible risks. Treatment guidelines now recommend that HIV treatment be offered immediately to all people diagnosed with HIV. Starting treatment as soon as possible is good for your long term health and lifespan.

We've also learned that continuous care and HIV treatment that keeps your viral load undetectable prevents the sexual transmission of HIV. In other words, if you see your doctor regularly and keep taking your HIV treatment so that your viral load stays undetectable (HIV is still in your blood but at levels too low to be detected by routine tests), you do not pass on HIV to partners during sex.

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

- we have a clearer understanding of how HIV works inside the body
- Viral load tests measure the amount of HIV circulating in your blood. The results of this test can inform treatment decisions and show how well the treatments you are taking are working to control HIV
- we have a clearer idea of the short and long-term side-effects of HIV treatments and how to manage most of them
- the drugs currently available are simpler to take, more effective and better tolerated than ever

As good as current HIV treatments are they are not a cure. Research and treatments continue to advance and improve and it's wise to keep informed and be aware of your treatment options. As new options become available you may find treatments that work better for you.

Chapter 1
How HIV works

HIV stands 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.

If you have been told that you are HIV positive, this means that you have been infected with HIV, your immune system will create antibodies to HIV, but HIV antibodies do not protect from further infection nor do they 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 reproduces, the greater the number of new cells likely to become infected and destroyed by the virus. If your immune system is weakened, this is 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. Opportunistic infections are a class of rare conditions that are not usually seen in healthy individuals but can occur in immunocompromised individuals. AIDS stands for acquired immune deficiency syndrome – the most advanced stage of HIV disease.

HIV treatments are drugs which stop the virus from reproducing, and so dramatically inhibit its ability to infect and destroy new cells. HIV treatments will prevent ongoing immune system damage, reduce your viral load and allow the immune system to partially restore itself.

Natural history or progression of HIV without HIV antiviral treatment

The following is a description of what is called the 'natural history' of HIV or what happens in HIV disease without 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 illness or AIDS, and improving health and survival — including for people who have previously had opportunistic infections.

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 a small but significant number of people, called "long-term non-progressors" or "elite controllers", are able to live with HIV for a long time.

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 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. Some people have no symptoms at all. Also known as acute HIV infection, it is the time at which HIV tests can detect the virus and return a positive result rather than a negative result.

Stage 2

Asymptomatic Infection

For a number of years following infection, many people with HIV will feel well and be symptom-free. Despite feeling well, the virus is usually starting to damage the immune system.

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. For some people in this phase, an illness may be more severe than it would be in an uninfected individual. For example, shingles might involve more than one nerve and the rash be more extensive and more painful.

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 at this stage experience severe symptoms, and are at risk of opportunistic illnesses. AIDS defining events are not the only illnesses which occur in advanced immunosuppression; there are serious non-AIDS conditions which can threaten life. Thus the term AIDS is used less frequently these days.

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 the immune system to the point where these infections can emerge. Alternatively, 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 that may prevent the illness from occurring. This is called prophylaxis. In particular, if your CD4 count is under 250, 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

HIV treatments have dramatically changed the experience of living with HIV. A person recently diagnosed who is in the early stages of HIV infection can anticipate a life expectancy similar to their HIV-negative peers. However, every person is different so your experience of living with HIV will be based on the interaction of factors including:

- how advanced your HIV infection is when you are diagnosed
- how well you look after yourself emotionally and physically
- decisions about HIV treatments
- how well treatments work for you
- factors based on your own physiology and genetics
- co-infection with other illnesses such as sexually transmissible infections and hepatitis

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, and whether you should consider starting or changing treatments.

A viral load test is a blood test, the result of which 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 20 copies per millilitre of blood) to levels in the thousands, hundreds of thousands, or even millions.

Understanding Your Viral Load results

Viral load is simply a count of the virus expressed in number per millilitre.

When you first have your viral load tested, this gives a result known as your 'baseline', which can be used to compare changes over time. Another concept you Doctor might discuss is viral 'set point'. This is the viral load six months after infection once you immune system has had a chance to respond.

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 amounts so small they cannot be detected by current commercial tests. The current limit of detectability is 20 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. This lower limit changes as the lab tests improve. Research uses <200 copies/ml as the standard definition for undetectable.

Undetectable viral load does not mean the virus has been eradicated from your body. HIV infects a variety of different cells in the body and remains 'latent' in resting T cells even when treatment is working effectively. A current focus of HIV cure research is figuring out how to treat this latent virus.

b) Detectable viral load results

You may 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, detectable viral load results are no cause for alarm. For example, a high viral load result does not mean you are going to get sick immediately; or a low result, after having been undetectable for some time, does not necessarily mean your drugs have suddenly failed. Viral load "blips" are not uncommon. Usually this means a previously undetectable viral load has risen to detectable at a low level e.g. 80 copies/ml and that the viral load will return to undetectable next test. It is unclear what blips mean. It may mean that resting T-cells in HIV reservoir sites have been activated for some reason, for example by a vaccination. If the viral load returns to being undetectable, there is no need to consider a resistance test

and a change in treatment.

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.

Viral load and the pattern over time is important

You may be asked to have viral load tests fairly frequently initially 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 better 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.

Log (or logarithmic) scale

Changes in viral load are sometimes 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.

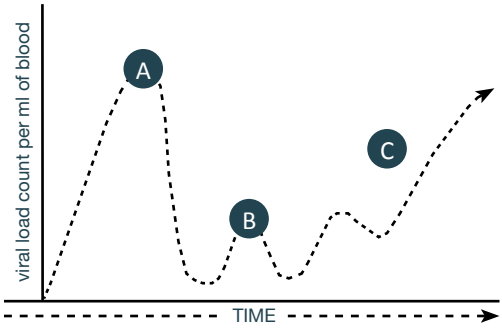
Other factors can affect viral load

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

- another infection (e.g. the 'flu, hepatitis, or another sexually transmissible infection such as gonorrhoea or syphilis)
- recent vaccination (e.g. 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

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

This is a typical picture of viral load over time. 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.

When you first have your viral load tested, this gives a result known as your “baseline”, and which can be used to compare changes over time. These results can be a useful guide for monitoring treatment. The level to which the viral load settles six months after infection is called the set point. For some people, this set point is low, say <10,000 copies/ml (Elite controllers mentioned above). A set point of >log 5 that is >100,000 copies/ml, would mean that you doctor would suggest more frequent monitoring.

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 scale to measure the significance of any changes. It is only changes of a significant magnitude that are considered important.

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 CSF (cerebrospinal fluid) — the fluid which protects your brain — and semen and vaginal fluids. The level of virus in your blood can be different to the amounts in other body fluids. Nonetheless, recent research suggests that HIV viral load is a good guide to infectiousness. If you have maintained an undetectable viral load for six months or more, take your medication as prescribed and have a regular doctor's check-up you can be confident you will not pass on HIV through sexual intercourse. Of course using condoms is an added protection and will reduce the risk of other STIs and pregnancy. If you have a detectable viral load, sexually transmissible infections may cause genital tissue to activate HIV so, if you are at risk, frequent STI screening is needed.

Undetectable ≠ Cure

An undetectable viral load (viral load is the amount of HIV measured in a person's blood) does not mean that the virus is completely gone. Soon after a person becomes infected with HIV, the virus finds its way inside cells deep in the immune system and in certain organs such as the brain.

Current HIV treatments have difficulty penetrating the brain and other organs, as well as the immune system, and HIV can remain dormant or replicate there at very low levels. However, early diagnosis of HIV followed by immediate treatment means that HIV has less opportunity to penetrate deep into the immune system and establish these reservoirs.

Despite scientists' best efforts, they have not yet found a way to eliminate HIV from deep within the immune system and from certain organs. Much research toward a cure for HIV focuses on this challenge. But, for now, HIV is a lifelong infection and HIV treatment is a lifelong commitment.

The CD4 count

The other test that is critical in managing and understanding HIV is the CD4 or T-cell count.

CD4 cells are a critical part of your immune system that are infected and destroyed by HIV. Sometimes, they can be depleted to such levels that they are unable to play their part in the immune system. If this happens, you could be at risk of developing opportunistic infections 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. 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.

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

CD4 percentages measure the proportion of CD4 cells against another type of white blood cell called CD8. Many doctors believe that the percentage is a more accurate indication of the stability of CD4 over time, rather than the actual CD4 count. This is because the total number of white blood cells can vary over time. For example, a person with a CD4 count of 350 at 30% could indicate more stability and less chance of disease progression than a person with a CD4 count of 500 at 20%. A normal percentage of CD4 in an HIV uninfected person is 30-50%.

Along with viral load and the CD4 count, CD4 percentage is another result that is used by your doctor to determine your optimal treatment strategies.

Putting it all together: Using viral load and CD4 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 blood stream
- the level of damage to your immune system
- if the current treatments are working, and whether it may be necessary to change treatments
- when to take preventive medicines (prophylaxis) to decrease the chances of getting an opportunistic illness

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

Common tests to monitor for side-effects

People with HIV typically have blood tests every 3 to 6 months. In addition to CD4 and viral load a range of other tests may be done to monitor your general health and look for drug side-effects. The results of these tests may also influence decisions to commence or change your HIV treatments or add other medications to manage the side-effects. When people are stable on treatment, monitoring blood tests are needed less often, such as 6 to 9 monthly.

Monitoring involves more than CD4 and viral load. The standard is to check the full blood count, liver and kidney function and glucose every time and to check on lipids (cholesterol and triglycerides) at least annually.

Some of the common tests include:

Glucose, triglyceride and cholesterol levels: The two major types of fat (lipids) in the blood are triglycerides and cholesterol. Glucose, triglyceride, and cholesterol levels are most reliably measured while fasting: in the morning before eating breakfast. 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 measured by the 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. Kidney function is checked in two ways: in a blood test and in a urine test. Kidneys that are not functioning well may allow protein from the blood stream to filter into urine. Your doctor may request a urine test for protein/creatinine ratio.

Platelet count: Platelets are important in helping your blood clot in response to a cut or wound. HIV itself and some HIV antiviral drugs 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 haematocrit can be an indicator of anaemia: a known side-effect of some of the older HIV antiviral drugs.

Other tests that may help inform treatments decisions

Resistance testing

Resistance testing can be done using a number of different tests which aim to establish whether the virus being tested has evolved in response to antiviral treatment, meaning that if HIV has been exposed to insufficient drug to stop it reproducing, it may have mutated so that it can overcome the level of drug to which it is exposed. If it has, this information will help determine which treatments are likely to be most effective. This test can only be performed if you have a detectable viral load.

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
- within 4 weeks after discontinuing or stopping treatments

Abacavir Hypersensitivity

This test is a genetic test used to determine the likelihood of a serious, possibly fatal reaction to the drug Abacavir (Ziagen, ABC, also found in Kivexa, Trizivir and Triumeq). It is requested by your doctor prior to commencing Abacavir.

Chapter 3
Antiviral treatments

Combination therapy

Combination therapy means taking a combination of HIV treatments otherwise called antiretroviral drugs. There are five 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.

It is standard practice to commence and maintain people on a combination of at least three drugs from at least two of the five following classes:

- nucleoside and nucleotide reverse transcriptase inhibitors (or 'nukes' or NRTI/NtRTI)
- non-nucleoside reverse transcriptase inhibitors ('non-nukes' or NNRTIs)
- protease inhibitors (or PIs)
- integrase inhibitors
- entry inhibitors

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

A number of companies have co-formulated some of their drugs into one pill. So sometimes you may be on one or two different pills containing multiple different drugs

Resistance

Every time HIV reproduces itself there's a chance that it may 'mutate' slightly. These mutations may make the virus more resistant to an individual drug or potentially a class of drugs. The more the virus is reproducing (i.e. the higher the viral load) the more chances 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 small.

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 chance of 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 increases in viral load can mean you need to change treatments.

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.

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

When to start?

Treatment is now recommended for all people with HIV, regardless of disease stage so the question of 'when to start' primarily depends on your readiness and may include a wish to reduce your infectiousness. The WHO recommends starting treatment on the same day as diagnosis or within 7 days for the best long term health outcomes.

a. For people with early HIV infection

If you currently have or recently had a seroconversion illness (within the last 6 months) some scientists and doctors believe that starting treatment at this point may have benefits in preserving the health of the immune system over the long term. The symptoms of seroconversion, which are similar to 'flu, and are sometimes severe, may be alleviated by starting treatment immediately.

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

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

Previous treatment guidelines and the associated funding allowed HIV treatments to be prescribed if the CD4 count was below 500, the viral load about 10,000 copies/ml or if the patient had symptoms or signs of HIV illness. Current treatment guidelines allow treatment at any stage of HIV infection, including for CD4 counts >500 and recommend that treatment be offered immediately regardless of CD4 cell count.

This shift to recommending treatment for all people with HIV comes as a result of findings from a large clinical trial in 2015 that found a benefit of treatment for people even with high CD4 counts.

The viral load is less important in determining when to start medication, but if the viral load is greater than 100,000 copies 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.

A wish to reduce infectiousness is also a valid reason to commence treatment at any disease stage.

c. For people with a history of an AIDS defining illness, a CD4 count below 350 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 a current or past opportunistic infection. The goal of treatment is both improvement in health and the prevention of further damage to the immune system or re-occurrence of opportunistic infections.

Starting treatment on the same day as diagnosis or within 7 days, is best for long term health outcomes

Treatment readiness

Starting antiretroviral therapy is a serious commitment because it means taking treatments for the rest of your life (treatment breaks are no longer recommended). However, there is now evidence that commencing ARV treatment upon diagnosis yields immediate, lasting benefits and is the best thing you can do for your health.

Modern treatments are much better tolerated than they used to be. While side-effects may still affect your quality of life, this is not common and for many people side effects are minimal or non-existent. Many side effects occur in the first few weeks but then pass as your body gets used to the drugs. Many people experience improvements in health and energy levels after starting antiviral therapy. Similarly, treatment regimes are no longer as burdensome as they once were. Several ARV treatment options consist of a single tablet per day.

If you aren't ready to start combination therapy, it's important to think about how you will become ready in future. Any treatment decision needs to be discussed fully with your doctor taking into account viral load, CD4 and how you plan 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 here. Further, people will respond differently to the same combinations, for a variety of reasons.

Some drugs can't be used in combination for clinical reasons (e.g. they compete with each other to get absorbed into the body), or other reasons (e.g. they have the same side-effect). 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?
- Do you have other health conditions and/or take other medications?
- How easy will it be to take the particular combination?
- What are the possible side-effects?
- If the tablets must be taken with food, consider whether your eating habits are amenable (e.g. do you skip meals regularly?).
- Are there confidentiality issues around taking tablets in some contexts?

New Zealand HIV treatment guidelines reference international guidelines and are updated regularly. These may contain recommendations about which drugs or combination of drugs to take in particular circumstances based on the latest evidence.

Adherence

Adherence (also called compliance) means the extent to which you take the right dose of the drugs at the right time. Skipping doses can mean that the drug becomes less effective against the virus and allows resistance to develop. Taking a drug on a full stomach when it's meant to be taken on an empty stomach can make it less effective because it is less well absorbed and the level in the blood stream will be lower. Make sure you know how each drug should be taken to ensure it is as effective as possible. Your treatment will only work if you take it as prescribed.

Are you having trouble with your dosing schedule?

There are many ways to 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).
- Keep a backup dose in a portable pill container in your bag in case you forget to take a dose at home, but be aware that medications expire so swap over your spares from time to time.
- Use your phone or calendar to set an alarm or reminder notice.
- 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. Camping supply shops also sell small plastic jars that can be useful for storing backup doses.
- Ask your pharmacist to provide your pills in a Blister Pack – this may come at a charge.
- Use 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.
- Make sure you don't run out of your medications.
- When travelling, plan to adjust your schedule for different time zones you might be going to.
- Prepare for travel or holidays by getting a stock of drugs in advance — always take extra in case you experience travel delays. If flying, always pack your medicine in your carry-on hand luggage — if the airline loses your checked bag you still have your drugs. Other travel tips can be found at www.bodypositive.org.nz
- Get tips from other people with HIV about how they remember their pills.

Adherence can be challenging! Missing an occasional dose is not the end of the world, so don't panic. Do the best you can to get back on track. If you are having trouble taking your drugs as prescribed, don't be afraid to ask for help. Talk to your doctor, nurse or pharmacist and to people at your local HIV organization to figure out how they can support you.

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 severe side-effects due to a particular drug or class of drugs there may be other combinations 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 one is working. During these times, you will probably need more frequent viral load tests.

Treatment breaks

In the past, when side-effects were more severe, some people would take treatment breaks or 'structured treatment interruptions'. This is no longer recommended as people who do this are at higher risk of developing opportunistic infections and have a higher risk of cardiovascular disease (mostly heart attacks and strokes) and reduced life expectancy in the long term.

Sometimes, people stop treatments for just one or two days, either deliberately such as during a party weekend or accidentally because they forget. Modern treatments are more forgiving than their predecessors; however, such breaks should be avoided if possible, as they present a risk of developing resistance. Many of the medications in the newer combination single tablet regimens have different half-lives, meaning that some medications take longer to leave the blood stream than others. A low level of a medication and a rapidly reproducing virus means that more mutations resistant to the medication may be able to flourish.

Nevertheless, 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.

If you do want to stop your drugs for whatever reason, it is important to discuss this with your doctor and develop a plan. If a person is having major life difficulties that disrupt adherence, it may be more sensible to stop all the drugs and work through these problems before trying again.

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

Side effects

Any drug can cause side-effects, or unwanted effects. These can be divided into different types:

- allergic reactions
- initiation side effects (when you start the drug) which will settle with time
- ongoing side-effects
- 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; however diarrhoea, headaches, nausea and gastrointestinal upset to some degree are not uncommon with many HIV treatments. In the vast majority of cases these side-effects are manageable and often decrease after the first month or so.

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 in the product information sheet or packaging included with the drug. Your doctor will also advise you about it, and what to do if something like a hypersensitivity rash occurs when taking abacavir.

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. These are powerful drugs and therefore some side effects are to be expected. However most people are side effect free.

Your doctor may prescribe other medicines (like anti-diarrhoea or nausea medications) to help deal with some of these. Many people report that some complementary therapies or dietary changes are useful in controlling side-effects; talking to an HIV-experienced dietician may be beneficial. Referrals will be available through your doctor.

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 advise 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)
- mouth ulcers.
- some effect on mood, though this can be hard to tease out from other things going on in life

The earlier you detect any side effects, 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.

Your doctor should inform you of possible side effects - If not, ask!

Management of multi-drug resistant HIV

Some people who have taken a wide range of antiviral drugs over many years, may have virus which is resistant to some classes of drugs. Treatment of multi-drug resistant HIV has sometimes been referred to as '**salvage therapy**'.

This may include:

- using newer drugs that are active against resistant strains of HIV
- 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 more than three antiviral drugs. These regimens, of course, may pose side-effect problems
- 'treatment intensification' — adding one or two drugs to an existing regimen.

Most people with multi-drug resistant virus can be offered effective alternatives these days.

Other medicines

At some times, you may need to take other medicines, like antibiotics, for specific infections or symptoms. It is important to find out from your GP, pharmacist or specialist whether these are likely to interact with the HIV treatments you are on.

Some complementary medicines can interact negatively with HIV treatments. It is important to let your doctor know if you are taking any herbs, vitamins, traditional Chinese medicines or other complementary medicines.

The Liverpool Drug Interaction Checker (www.hiv-druginteractions.org) can identify potential side effects and drug interactions. This site considers illicit and recreational drugs as well.

Illicit and recreational drugs

There's not a lot known about the interaction between HIV treatments and illicit or recreational drugs, though this is changing. However, if you do take recreational drugs, there are some harm reduction measures you should consider.

- 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.
- 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.

Ongoing 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 checking the Body Positive website - bodypositive.org.nz.

The Institute of Many (theinstituteofmany.org) is an online forum for people with HIV. Discussions about treatments are common and it is possible to share experiences with other members on many aspects of HIV treatments.

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
People Living with HIV Groups

Body Positive New Zealand
www.bodypositive.org.nz
Free Call: 0800 HIVLINE (0800 448 5463)
Tel (09) 309 3989

Positive Women Inc.
www.positivewomen.org.nz
Free Call: 0800 POZTIV (0800 769 848)
Tel: (09) 309 1858

INA Foundation
(Maori, Indigenous and Pacific Island Support)
www.ina.maori.nz
Tel: (07) 883 9084

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 coordinate 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.

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, nonnucleoside reverse transcriptase inhibitors and protease inhibitors.
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 (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 organ, 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	Viral load results are often reported as logarithmic or “log changes.” Viral load results between 10 and 99 copies/ml will be reported as log 1.0 - 1.9, between 100 and 999 will be reported as log 2.0 - 2.9, between 1000 and 9999 will be reported as log 3.0 - 3.9 etc.
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; tuberculosis; cryptosporidiosis; toxoplasmosis; other parasitic, viral, and fungal infections; Opportunistic cancers such as Kaposis Sareoma 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. 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 made by viruses known as retroviruses, which includes HIV. The enzyme activates the process by which HIV changes its genetic information from RNA into DNA, 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	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.

Drug Chart of HIV Antiviral Drugs currently available in New Zealand under Pharmac subsidy

Generic Name	Trade Name	Formulation	Standard Adult Dose	Daily Pill Dose	Possible Side Effects	Food Restrictions
Non-nucleoside reverse transcriptase inhibitors (NNRTIs)						
Nevirapine *(or generic version)*	**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	
Efavirenz *(or generic version)*	**Stocrin**	600mg tablet and 200mg 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
Etravirine *(or generic version)*	**Intelence**	200mg tablet	200mg twice a day	2	Diarrhoea, rash, nausea, headache, fatigue	Take with food

Generic Name	Trade Name	Formulation	Standard Adult Dose	Daily Pill Dose	Possible Side Effects	Food Restrictions
Combination Agents						
Tenofovir disoproxil fumerate, Emtricitabine, Efavirenz *(or generic version)*	**Atripla**	300mg / 200mg / 600mg tablet	1100mg once a day	1	See Viread, Emtriva and Stocrin	Take on empty stomach at Bedtime
Nucleoside / Nucleotide Reverse Transcriptase Inhibitors (NRTIs / NtRTIs)						
Lamivudine, Zidovudine *(or generic version)*	**Combivir**	150 / 300mg tablet	One tablet twice a day	2	See Epivir and Retrovir	
Abacavir, Lamivudine *(or generic version)*	**Kivexa**	150 / 300mg tablet	One tablet twice a day	1	See Epivir and Ziagen	
AZT, Zidovudine *(or generic version)*	**Retrovir**	250mg and 300mg capsules	250-300mg twice a day	2	Nausea, fatigue, headache, dizziness, vomiting, weakness and muscle pain, possible lipodystrophy Blood disorders, muscle damage	

Nucleoside / Nucleotide Reverse Transcriptase Inhibitors (NRTIs / NtRTIs)						
3TC, Lamivudine (*or generic version*)	**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 (*or generic version*)	**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	
FTC, Emtricitabine (*or generic version*)	**Emtriva**	200mg capsule	200mg once a day	1	Headache, diarrhoea, nausea, rash	

Generic Name	Trade Name	Formulation	Standard Adult Dose	Daily Pill Dose	Possible Side Effects	Food Restrictions
Nucleoside / Nucleotide Reverse Transcriptase Inhibitors (NRTIs / NtRTIs)						
Tenofovir *(or generic version)*	**Viread**	300mg tablet	300mg once a day	1	Dizziness, diarrhoea, nausea, vomiting, flatulence, low blood phosphate levels, Kidney Impairment	
FTC, Tenofovir *(or generic version)*	**Truvada**	300mg tablet	One tablet once a day	1	See Emtriva and Viread	
Integrase inhibitor						
Raltegravir	**Isentress**	400 / 600mg tablets	400mg twice a day or 600mg once a day	1 or 2	Diarrhoea, nausea, fatigue, headache, itching, Constipation, flatulence and sweating	
Dolutegravir	**Tivicay**	50mg tablet	One tablet once or twice a day	1 *(or 2 in case of INI resistance)*	Diarrhoea, headache, trouble sleeping and changes in liver test	

Protease inhibitors (PI's)						
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	
Atazanavir (*or generic version*)	**Reyataz**	300mg and 200mg capsule and 100mg capsule	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 (*or generic version*)	**Prezista**	600mg tablet	600mg with 100mg Ritonavir twice a day	4*	Nausea, headache, diarrhoea Rash	Take with food
Ritonavir (*or generic version*)	**Norvir**	100mg capsule	To 'boost' other PI's: 100 - 200mg once or twice Daily	1-4	Abdominal pain, headache, nausea, diarrhoea, vomiting, weakness, numbness around the mouth, muscle pain, lipodystrophy	Take with food to avoid nausea

Generic Name	Trade Name	Formulation	Standard Adult Dose	Daily Pill Dose	Possible Side Effects	Food Restrictions
Entry Inhibitors						
T-20, Enfuvirtide	**Fuzeon**	Powder reconstituted in water	Injection of 90mg under the skin twice a day	-	Injection site reaction, respiratory tract infections	

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**

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