

## 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 antiretroviral treatment;
- if the current antiretroviral 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.

## GLOSSARY

### Antiretroviral

A substance that acts against retroviruses such as HIV.

### CD4

A molecule on the surface of some cells onto which HIV can bind. The CD4 cell count roughly reflects the state of the immune system

### Disease progression

The worsening of a disease.

### Opportunistic Infections

Illnesses caused by various organisms, some of which usually do not cause disease in people with healthy immune systems.

### Prophylaxis

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.

### Regimen

A drug treatment combination and the way it is taken.

### Resistance

HIV drug resistance occurs when the virus develops genetic mutations that make it less sensitive to the effects of one or more antiretroviral drugs.



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INFORMATION  
ON VIRAL LOAD  
TESTING AND  
WHAT THE  
RESULTS MEAN

UNDERSTANDING 'VIRAL LOAD'

## INTRODUCTION TO VIRAL LOAD

For HIV-infected people who have never been on treatment, viral load is a very good predictor of their chance of developing AIDS in the future. In the normal course of HIV infection, a viral load increase is followed by a CD4 cell count decrease and subsequent illness. Consequently, tracing changes in viral load provides the clearest idea of how quickly the infection is progressing.

In 2008 a scientific article known as the Swiss Consensus Statement was published in a respected medical journal, asserting that HIV-positive people on effective antiretroviral therapy and without sexually transmitted infections (STIs) are sexually non-infectious. 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.**

## VIRAL LOAD TESTS AND YOU!

### 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 that 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).
- 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.

## CD4 COUNT AND VIRAL LOAD

### 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.**

In the past, CD4 counts were the only way to understand how HIV was affecting your immune system. A general guide to CD4 test results is:

- 500 to 1,350 CD4 cells is the 'normal' range for adults.
- More than 500 CD4 cells 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.
- Less than 250 CD4 cells 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 CD4 count of 350 at 23% could indicate more stability and less chance of disease progression than a CD4 count of 500 at 15%.

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

## UNDERSTANDING 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 of copies per millilitre.

### 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.

Undetectable viral load does not mean the virus has been eradicated from your body—it just means that the level of virus in your blood cannot be measured by current commercial tests. 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', which to date has not been achievable.

### b) Detectable viral load

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 in the near future. 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.

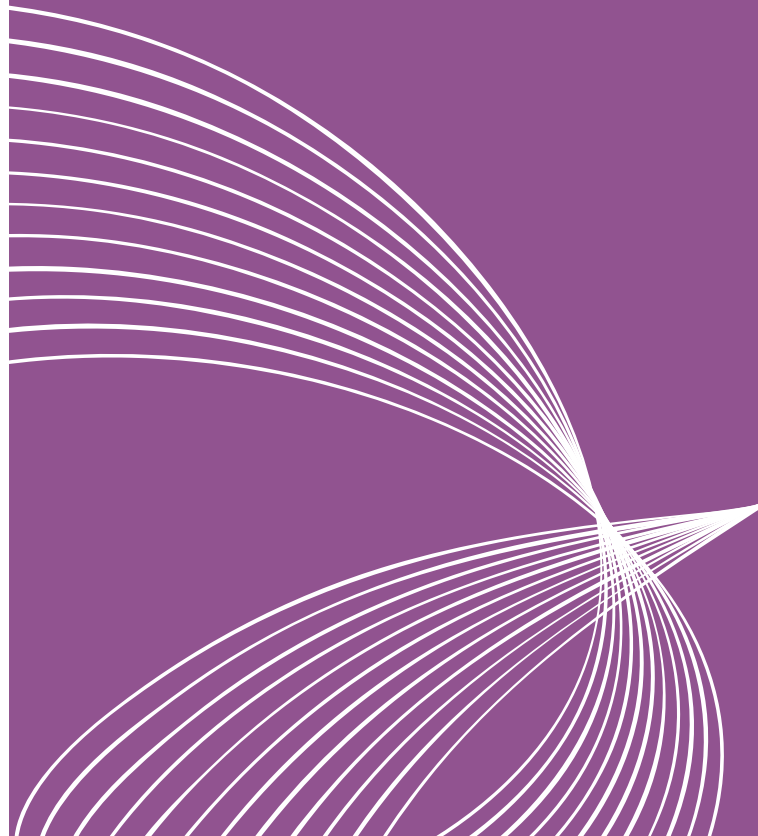
In order to make decisions about treatments, the viral load has to be read in conjunction with the CD4 cell count.

## WHAT IS VIRAL LOAD?

'Viral load' is the term used to describe the amount of 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.

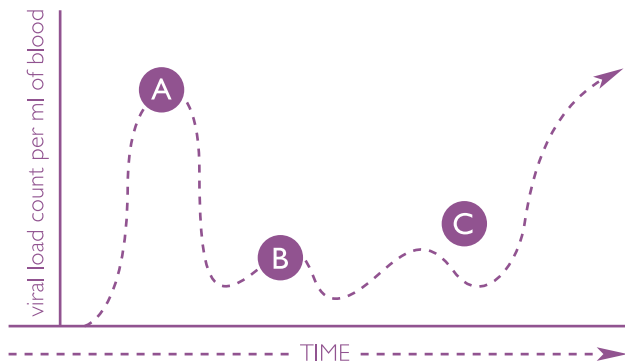
The amount of virus in your blood may range from a very small number of copies in your blood (below 50 copies per millilitre of blood) to numbers in the thousands, hundreds of thousands, or even millions. In some Australian states and territories the tests can measure down to 40 copies per millilitre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



## 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, including having a sexually transmitted disease, a cold, or other infections. **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.**



- 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

## VIRAL LOAD OVER TIME WITHOUT TREATMENT

The typical picture of blood viral load over time is given on this page. 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, you will usually have two tests a few 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.

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.