



Viral Load Testing

Viral load tests measure what's known as HIV RNA. HIV RNA is a measurement of the amount of HIV virus there is in the blood. The most widely used viral load tests are the Amplicor HIV-1 Monitor test (better known as the PCR test) and the Bayer bDNA test. The Viral load is a marker for checking the immune system of people with HIV, to see if they may be at risk of getting HIV related illnesses or AIDS. It is therefore an indicator of disease progression.

A reduction in Viral load monitors the effects of anti-HIV drugs, to see if they are working against the virus.

How do the tests work?

Scientists have a good idea how the HIV RNA is put together. The PCR test works by making many copies of any HIV RNA found in the patients blood sample. When sufficient copies are made, these can be detected and the amount of HIV RNA measured, this makes it easier to calculate the amount of HIV RNA that was originally in the blood sample. The bDNA test works in a different way. It doesn't make copies of the HIV RNA but it sets off a chemical reaction with the HIV RNA so it gives out light. Then the amount of light is measured in order to show how much RNA was found.

The results of these tests are usually given as the number of HIV RNA copies per millilitre of blood, like the CD4 cell count. (The PCR test may give the number of HIV RNA copies per 0.05ml, so you need to multiply the number by 20 to get the standard result. Results are also sometimes given as a number $\times 10^3$, which means you have to add three zeros to the number – e.g. 40×10^3 is 40,000. This can get really confusing, so make sure you and your doctor are certain you are reading a viral load test result correctly before making any treatment decisions).

What do the numbers mean?

In studies people who began with a viral load of less than 20,000 had only a 1% chance of experiencing any disease progression during the approximately 60 weeks during which information was collected. People who started with a viral load of between 20,000 and 200,000 had a slightly higher chance of disease progression. People who started with a viral load of over 200,000 had a 24% chance of disease progression in the same time.

Treatment that significantly reduces viral load is linked to improved health and less chance of becoming ill.

Recent studies of triple combinations of anti-HIV drugs have shown that it is possible to reduce the levels of HIV in the blood to levels too low for the PCR and bDNA tests to measure. The current viral load tests cannot find less than 50 copies of HIV RNA in a blood sample. This kind of reduction of viral load may not be possible for everyone, but is the goal of every anti-HIV treatment.

There is still concern that there is a lot of virus in other places in the body, not just the blood. Only 2% of HIV is circulating in the blood. The rest is in the lymph system and other body tissues. Early results indicate that changes in viral load in the blood are mirrored in the lymph system, but research is ongoing.

'Undetectable' Viral Load

At present the most commonly used viral load test is the Bayer bDNA which has a lower detection limit of 50 copies/ml. There are other tests available manufactured by Roche and Organon-Teknika. An ultra-sensitive test has been developed which has a lower limit detection of 5- copies/ml, and is used by some clinics, although not routinely.

For each test there is a lower limit, below which it is unable to measure the amount of HIV in the sample. Samples with very low levels of HIV will be described as having a viral load that is 'undetectable'. This doesn't mean there is no HIV in the blood sample, it is just that it is below the level that the test can measure.

The higher a person's viral load is before starting treatment, the greater is the reduction required to bring it down to undetectable levels. With successful treatment, the viral load should be undetectable within 6 months of treatment.

One of the most important reasons to suppress viral load as far as possible may be to minimise the risk of HIV developing resistance to the drugs that you are taking. HIV develops resistance to a drug if it replicates in the presence of that drug. Keeping viral replication as low as possible reduces the chance of resistant virus emerging. This prolongs the effectiveness of the treatment, and reduces the risk of illness.

Viral Load and transmission

If there are high levels of HIV virus in the blood, there maybe high levels in semen or vaginal fluid and people with high viral loads are likely to be more infectious. It is still possible to pass HIV to a sexual partner through exposure to semen or vaginal fluid despite having undetectable viral loads.

This information was produced by the Information Exchange of the HIV/GU Medicine Directorate of the Chelsea and Westminster Hospital. For more information please call 020 8746 5929

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