

Material from Lancet SA Newsletter - Compiled by: Dr Allison Glass

An individual's response to antiretroviral therapy (ART) is assessed by monitoring 3 parameters:

- HIV-1 viral load: the virological response
- CD4+ count: the immunological response
- Patient: the clinical response

## HIV-1 viral load

HIV viral load (VL) monitoring is essential in order to:

- Ensure that patients are responding adequately to treatment.
- Detect early treatment failure i.e. failure to suppress the virus to undetectable levels, prior to the development of immunological or clinical evidence of treatment failure.
- Prevent the loss of antiretrovirals to resistance through poor adherence.

A number of studies have demonstrated that clinical assessment with/without CD4+ count monitoring in the absence of VL monitoring leads to the misclassification of treatment failure in up to 45% of patients [1, 2, 3, 4]. >50% of those who develop treatment failure in the absence of VL monitoring will have multiple treatment-limiting mutations [5,

6, 7].

The VL detects and quantifies HIV-1 RNA in plasma. The VL is reported as copies/ml and a log value. The log value expresses the VL value as a power of 10. This provides a more manageable number to work with and more clearly represents clinically significant changes in the VL. A log change of >0.5 log is considered to be clinically significant [8]. The assay currently in use at Lancet is able to accurately quantify a VL  $\geq 20$  copies/ml. If virus is present at levels lower than this, the VL will be reported as <20 copies/ml. If no virus is detected, the VL will be reported as undetectable. NOTE: an undetectable VL does not mean an individual is HIV negative.

An undetectable VL on a specimen from someone who is not on treatment may indicate that:

- The individual is HIV negative – repeat diagnostic testing should be done if the diagnosis of HIV has never been confirmed.
- There is minimal viral replication as seen in long-term non-progressors (LTNP) and elite controllers: LTNP are individuals who maintain a high CD4+ count and remain AIDS free for many years without the use of antiretrovirals; elite controllers are LTNP who have undetectable viral loads.

- The individual is infected with HIV-2 or a viral variant not detected with the assay in use – please contact the laboratory to discuss testing options if this is suspected.

HIV viral load testing:

A dedicated specimen is required for HIV viral load testing. Please submit a PINK top tube. If a pink top tube is not available, a purple top tube may be used, but must be a separate tube to that sent for CD4+ counts or other Hematological tests.



VL testing is recommended:

- At baseline (prior to initiation of ART)
- At 6-8 weeks after initiation of ART

– An early VL is essential for detecting a poor drug response prior to the development of significant drug resistance. This allows issues of adherence to be addressed before first line drug regimens are lost.

– >1 log reduction from the baseline value represents an acceptable response to ART.

- Every 4-6 months while on ART

– Fully suppressive ART should result in a VL <20 copies/ml by 12-24 weeks. [9]

suppression. Poor drug compliance is the most common cause of treatment failure and should be addressed as early as possible.

A viral blip refers to an increase in the VL to <1000 copies/ml in an individual whose VL was previously suppressed.

This may be due to a recent illness, vaccination, sub-therapeutic drug concentration or drug resistance.

Adherence counselling is recommended and the VL should be repeated after 3 months to ensure viral suppression. A sustained VL >500 copies/ml increases the likelihood of drug resistance [9].

repeat VL after 3 months

If the VL is > 1000 copies/ml: Exclude recent illness or vaccination, provide adherence counselling and repeat VL after 1 month

Consider HIV resistance testing (a VL is routinely performed on specimens sent for resistance testing to confirm VL >1000 copies/ml)

Consider therapeutic drug monitoring if concerned about sub-therapeutic levels due to poor absorption or increased metabolism

**Primary treatment failure** refers to a VL that does not decrease appropriately on treatment. Secondary treatment failure refers to an increase in the viral load following initial adequate viral

#### Response to virological failure:

If the VL is < 1000 copies/ml: Exclude recent illness or vaccination, provide adherence counselling and

All the HIV Monitoring Tests mentioned are done at Lancet Kenya and these are SANAS Accredited.

## References:

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