

Viral load monitoring in resource-limited settings: a medical and public health priority

Nathan Ford^{a,b}, Teri Roberts^a and Alexandra Calmy^{a,c}

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When antiretroviral therapy (ART) scale up began in Africa a decade ago, there was concern that lack of laboratory monitoring for patients receiving antiretroviral drugs would be an obstacle to providing treatment. To address this concern, the first set of World Health Organization (WHO) guidelines for ART in resource-limited settings rightly recommended that programmes should primarily use clinical criteria for monitoring treatment efficacy [1].

Within a year, the need to improve access to viral load was recognized by WHO. The second set of ART guidelines, released in 2003, expressed hope that increasingly affordable methods of determining viral load would become available to support treatment monitoring [2]. The third revision, in 2006, explicitly advocated for wider access to virological testing in tertiary centres and simpler assays. Current recommendations go further still, recommending ‘a phased-in approach’ to viral load testing, both to improve accuracy of diagnosing treatment failure and allow for targeted and early adherence interventions [3].

Viral load currently remains poorly available in most high HIV burden settings (with the exception of South Africa), and donors and governments have been unwilling to prioritize viral load due to cost concerns. A study published by Hamers *et al.* [4] in the current edition of *AIDS* provides a potential solution by modelling the cost benefits of using viral load as a replacement of, rather than an addition to, CD4 for monitoring of ART.

The evolution of the WHO recommendations reflect the historical challenges of ART scale up in low-income and middle-income countries. In the early years, amid

overwhelming need and considerable political skepticism about the feasibility of providing ART in Africa, speed and simplicity were paramount. Short-term outcomes from early treatment programmes were critical to demystifying the perceived complexity of ART [5]. But within just a few years these programmes began to confront the challenge of treatment failure. In programmes in which viral load was available, around one in 10 patients were found to be failing virologically and had switched to second-line regimens within 2 years after starting treatment [6].

We have now reached the halfway point in progressing towards universal access to ART. With treatment coverage in low-income and middle-income countries at around 47% of the total need, there remains considerable concern about getting more people on treatment earlier in their disease progression. At the same time, there is increasing recognition of the need to sustain the effectiveness of ART for the more than six million people that have already been initiated on treatment in these settings. For these patients, access to viral load is an essential tool for both assessing treatment efficacy and preventing unnecessary switches to second-line regimens.

Viral load has a cost, but so does undetected treatment failure. The main driver of the cost of viral load is the increased need for second-line drugs associated with early and enhanced detection of treatment failure [7]. The cost of not detecting treatment failure is increased mortality, as patients are left on failing regimens [8]. In South Africa, where routine viral load is available, the rate of switching to second line is higher, and mortality lower, compared to neighbouring Zambia and Malawi where viral load is not routinely available [9].

^aMédecins Sans Frontières, Geneva, Switzerland, ^bCentre for Infectious Disease Epidemiology and Research, University of Cape Town, South Africa, and ^cHIV/AIDS Unit, Infectious Disease Service, Geneva University Hospital, Geneva, Switzerland.

Correspondence to Dr Nathan Ford, Médecins Sans Frontières, 78 rue de Lausanne, Geneva 1211, Switzerland.

E-mail: Nathan.ford@msf.org

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Viral load is also cost saving. Operational research has shown that for the majority of patients, early viraemia can be successfully reversed following an intensified adherence intervention in the majority of patients [10,11]. Discrimination between poor adherence and drug resistance is critical for patients on second-line failure, as options beyond second-line are expensive and limited [12].

There is little debate about the value of viral load in guiding clinical decisions for people on ART. However, the relative importance of viral load in resource-limited settings continues to be contested. Costing studies have concluded that viral-load monitoring is not cost-effective compared with CD4 monitoring [13] or clinical monitoring alone [14]. To date, however, these studies have only considered the value of adding viral load to clinical and immunological monitoring.

The study by Hamers *et al.* [4] offers an important alternative perspective by assessing the cost effectiveness of viral load as an alternative to CD4 monitoring following ART initiation. The study found that viral load monitoring could save costs in two ways; first, by identifying the right people to switch onto more expensive second-line regimens, and second, by switching patients to second-line treatment more quickly before they were at higher risk of clinical disease progression and death. The proposal to abandon CD4 following treatment initiation deserves careful operational evaluation. A less radical alternative could be to invert the current paradigm of routine CD4 and targeted viral load such that viral load becomes the standard monitoring tool and CD4 is targeted at patients failing treatment to help guide clinical management decisions. Such strategies add to a growing number of options to support the phased introduction of viral load, including pooling samples [15], reducing the frequency of testing [16], using dried blood spot technology to facilitate sample transfer from peripheral sites [17] and point-of-care technologies [18].

In an era when millions of people are now on ART, the need to prevent and detect treatment failure has become a public health priority and the rationale that programmes can do without viral load becomes increasingly untenable. Rather than continuing to debate the relative cost effectiveness of viral load, efforts should shift towards implementing and evaluating the numerous options that exist to support increased access such that patients in resource-limited settings can benefit from the same minimum standards of care that are taken for granted in the west.

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Conflicts of interest

There are no conflicts of interest.

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