

# The need for routine viral load testing

Questions and answers





# Contents

Introduction	<b>2</b>
Questions and answers	<b>3</b>
References	<b>8</b>

# Introduction

Greatly expanded access to routine viral load testing will be a game-changer in the global response to AIDS. Routine viral load tests improve treatment quality and individual health outcomes for people living with HIV, contribute to prevention, and potentially reduce resource needs for costly second- and third-line HIV medicines.

The 90–90–90 treatment target sets the goal of, by 2020, 90% of people living with HIV knowing their HIV status, 90% of people who know their HIV-positive status accessing treatment and 90% of people on treatment having suppressed viral loads. Attaining this target would mean that, by 2020, 73% of all people living with HIV will have suppressed viral loads. In sub-Saharan Africa in 2014, approximately 51% of adults living with HIV knew their HIV status, 43% of adults living with HIV were receiving antiretroviral therapy and 32% of adults living with HIV had suppressed viral loads (1).

Improvements in treatment delivery are needed at several stages along the treatment cascade, including significantly expanding the availability and use of routine viral load testing. Community-based advocacy will be essential to reduce costs and ensure widespread access to point-of-care viral load testing technologies that are simpler to use.

# Questions and answers

*“If we run the test and find a patient with a detectable viral load, **we know something is wrong**. It can mean one of two things: either the patient is not taking their drugs, or there is drug resistance, which means the medicines are not working.”*

*Médecins Sans Frontières physician*

## **What is viral load?**

A viral load test measures the number of HIV viral particles per millilitre of blood. A low viral load indicates that treatment is effective. A high viral load in a person on treatment indicates either that the medication is not being taken properly or that the virus is becoming resistant to the medication.

The goal of antiretroviral therapy is viral suppression—viral load that is so low that it cannot be detected by viral load tests.<sup>1</sup> Unfortunately, the availability of viral load testing is very limited in low- and middle-income countries, where the majority of people living with HIV reside. A recent survey among 54 low- and middle-income countries showed that although 47 recommended routine viral load testing for people on antiretroviral therapy, it is not widely available in the great majority of countries (2).

## **How can routine viral load monitoring improve HIV care?**

Viral load testing is the gold standard for HIV treatment monitoring. Periodic viral load tests are the most accurate way of determining whether antiretroviral therapy is working to suppress replication of the virus. Achieving viral suppression protects the body's immune system, helps people living with HIV stay healthy and prevents transmission of HIV to other people. An elevated viral load suggests treatment provision needs attention, including offering adherence support,

<sup>1</sup> Generally, fewer than 50 copies of HIV-1 RNA per millilitre of plasma.

such as community-based adherence support services.

Although viral load testing can signal adherence problems so that adherence support can be offered, or drug resistance where medications need to be changed, it cannot distinguish between the two. Repeatedly high viral loads despite adherence support can be an indication to change the treatment medication.

### **Viral load testing and CD4 counts**

CD4 testing has a role to play in the context of diagnosing opportunistic infections and managing some aspects of treatment; however, people living with HIV on antiretroviral therapy with routine viral load monitoring have better health outcomes than people monitored with CD4 testing alone, including lower rates of loss to follow-up and death (3). Viral load monitoring can promote motivation to stay in care and adhere to treatment.

Treatment failure traditionally has been diagnosed through observation of clinical symptoms or monitoring immunological markers, such as CD4 counts. Because clinical symptoms and low CD4 counts are the eventual results of treatment failure, however, their detection often comes after drug resistance has already developed, necessitating a switch to more expensive second- or third-line regimens.

*“When a person is tested several months after they start treatment and their viral load is undetectable, it’s one of the biggest motivators for a patient to keep taking their medicines.”*

*Médecins Sans Frontières physician*

Viral load testing is far more sensitive than CD4 tests: it is more likely to detect treatment failure early, providing an opportunity to undergo enhanced adherence support and conserve first-line regimens, or, if adherence problems are ruled out, to ensure prompt and correct switching to second- and third-line treatment regimens.

Viral load testing is superior in diagnosing treatment failure, preventing unnecessary switching to more expensive second- or third-line treatments. A study conducted in six African countries found that almost half of patients who changed to a second-line regimen on the basis of only clinical or CD4 monitoring were switched unnecessarily (4). A multi-country study conducted by Medicines Sans Frontières found that only 30% of people suspected of treatment failure had an elevated viral load, meaning that 70% might have been switched to second-line treatment unnecessarily if viral load was not used to confirm treatment failure (5).

*“Ensuring ready access to viral load testing for every person receiving antiretroviral therapy is vital to achieving the 90-90-90 target ... viral load testing ... helps health care workers identify adherence challenges early, permitting timely adherence support intervention and potentially delaying the need to switch patients to more costly second- and third-line medicines.”*  
(15)

In 2015 the World Health Organization (WHO) issued guidelines on when to start antiretroviral therapy, noting that “Given the recommendations ... to initiate ART [antiretroviral therapy] at any CD4 count, it may be reasonable to reduce or stop CD4 cell count for monitoring in settings where viral load monitoring can be assured” (6).

### **What are the public health benefits of routine viral load monitoring?**

HIV transmission by people living with HIV with undetectable viral loads is rare (7). Ensuring that people living with HIV on suboptimal antiretroviral therapy with high viral loads are identified early can therefore help prevent HIV transmission to infants (in utero and breastfeeding) and sexual and drug-injecting partners.

### **How should routine viral load monitoring be used?**

In 2013, WHO recommended viral load testing as the preferred monitoring tool for diagnosing and confirming antiretroviral therapy failure (8). WHO recommends viral load monitoring 6 and 12 months after initiating antiretroviral therapy and annually thereafter for people who are stable. In people for whom viral load tests suggest treatment failure,<sup>2</sup> WHO recommends enhanced adherence counselling, followed by an additional viral load test to establish resuppression or to confirm treatment failure and a switch to an alternative regimen (8).

For people living with HIV who are stable on antiretroviral therapy, WHO no longer recommends routine CD4 monitoring, for several reasons: it is a variable and unstable measure that does not determine care outcomes; it is not applicable to infants or breastfed children; and CD4 counts typically remain stable in people with sustained

2 Defined as a viral load above 1000 copies per millilitre of plasma.

**“Viral load tests prevent patients being unnecessarily switched to more expensive medicines or left to continue on ineffective therapy that can lead to drug resistance and ultimately death.”**

*Médecins Sans Frontières physician*

undetectable viral loads (8). Some resource-limited countries have drastically reduced CD4 monitoring in favour of increased viral load testing.

For example, South Africa discontinued routine CD4 monitoring for people living with HIV who achieve viral suppression,<sup>3</sup> a shift that is expected to save US\$ 68 million between 2013 and 2017 (9). Cameroon, Kenya, Malawi, Namibia, Swaziland, Thailand and Uganda also no longer recommend routine CD4 testing, unless viral load testing is unavailable.

#### **Using viral load testing for early infant diagnosis**

Even though prevention of mother-to-child transmission services have averted 1.2 million HIV infections among infants since the mid-1990s, 220 000 children acquired HIV in 2014. Because HIV-related infant mortality peaks at two to three months of age, early diagnosis and immediate

treatment are imperative to prevent illness and death. For infants born to mothers living with HIV, WHO currently recommends early infant diagnosis with a viral load test four to six weeks after birth (8).<sup>4</sup>

#### **How available is routine viral load testing in low- and middle-income countries?**

Although the vast majority of low- and middle-income countries recommend routine viral load testing in line with WHO recommendations,<sup>5</sup> implementation lags far behind and overall availability remains very low (2). One estimate found that as of 2013 only 23% of the need for routine viral load testing was met, with availability expected to increase to only 47% by 2019 (10). In many cases, systems and clinical capacity to get viral load test results and act promptly on results (such as switching to second- or third-line regimens) are lacking.

#### **Is viral load testing feasible in resource-poor settings?**

Although routine viral load testing is the standard of care for people living with HIV on antiretroviral therapy in wealthy countries, the cost and complexity of currently available technologies limit availability in resource-poor settings. Many low- and middle-income countries conduct viral load tests in only a small number of central laboratories. Blood samples must be collected at local clinics and hospitals and sent to these central laboratories for

3 People living with HIV who become viraemic receive routine CD4 monitoring until viral suppression and immune reconstitution are achieved again.

4 Owing to the presence of maternal antibodies, standard HIV antibody tests are not effective for diagnosing infants under 18 months of age.

5 The other six countries recommend viral load testing only upon suspected treatment failure.



analysis, which can cause lengthy delays in receiving results and disruptions in the treatment cascade.

Viral load testing systems are rapidly becoming cheaper, more robust and simpler to use, however. Newer point-of-care testing technologies, currently undergoing field testing, may greatly simplify and decentralize testing, allowing the rapid return of test results in remote locations.

In 2014, WHO issued guidelines for implementing, scaling up and sustaining HIV viral load testing, outlining strategies for managing multiple challenges (11).

### **Can routine viral load testing be affordable in developing countries?**

Although costs continue to decrease, viral load testing is still more expensive than CD4 testing. The price varies widely (12), and sample collection, transport and other costs can add to the total.

The UNAIDS Diagnostics Access Initiative<sup>6</sup> announced in 2014 an agreement with Roche Pharmaceuticals to establish a price ceiling of less than US\$ 10 for viral load tests in 83 low- and middle-income countries (13). In 2015, the Global Fund to Fight AIDS, Tuberculosis and Malaria announced framework agreements with seven manufacturers that were expected to lower all-inclusive prices (including equipment, consumables, maintenance and shipping) for viral load tests (14). The roll-out of point-of-care viral

load testing technologies is expected to lower costs further.

Unit costs are also expected to decrease as volume increases, and widespread implementation of routine viral load testing has the potential to realize overall cost savings for HIV programmes because people may be able to stay on first-line therapy longer.

### **How can communities advocate effectively for routine viral load testing?**

Viral load testing is already the standard of care for people living with HIV in wealthy countries. Greater political will and funding are needed to scale up capacity in low- and middle-income countries. At the 2014 International AIDS Conference in Melbourne, Australia, more than 30 HIV organizations from around the world joined in a consensus statement urging widespread implementation of viral load monitoring.

Civil society can increase advocacy for scale-up of viral load testing, call on manufacturers of viral load testing systems to make them more affordable for people in low- and middle-income countries, and push for expanded research and development of viral load technology that is easier and cheaper and enables point-of-care testing.

<sup>6</sup> The UNAIDS Diagnostics Access Initiative is a partnership with the Clinton Health Access Initiative, the Global Fund to Fight AIDS, Tuberculosis and Malaria, and the United States President's Emergency Plan for AIDS Relief.

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