



Guidelines for the Use of Antiretroviral Agents in HIV-1-Infected Adults and Adolescents

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Plasma HIV-1 RNA Testing (Last updated February 12, 2013; last reviewed February 12, 2013)

Plasma HIV-1 RNA (viral load) should be measured in all HIV-1-infected patients at baseline and on a regular basis thereafter, especially in patients who are on treatment, because viral load is the most important indicator of response to antiretroviral therapy (ART) (AI). Commercially available HIV-1 RNA assays do not detect HIV-2 viral load. For further discussion on HIV-2 RNA monitoring in patients with HIV-1/HIV-2 co-infection or HIV-2 mono-infection, see [HIV-2 Infection](#). Analysis of 18 trials that included more than 5,000 participants with viral load monitoring showed a significant association between a decrease in plasma viremia and improved clinical outcome.¹ Thus, viral load testing serves as a surrogate marker for treatment response² and can be useful in predicting clinical progression.^{3,4} The minimal change in viral load considered to be statistically significant (2 standard deviations) is a threefold, or a 0.5 log₁₀ copies/mL change.

Optimal viral suppression is generally defined as a viral load persistently below the level of detection (<20 to 75 copies/mL, depending on the assay used). However, isolated blips (viral loads transiently detectable at low levels, typically <400 copies/mL) are not uncommon in successfully treated patients and are not thought to represent viral replication or to predict virologic failure.⁵ In addition, low-level positive viral load results (typically <200 copies/mL) appear to be more common with some viral load assays than with others. Furthermore, there is no definitive evidence that patients with viral loads quantified as <200 copies/mL using these assays are at increased risk for virologic failure.⁶⁻⁸ For the purposes of clinical trials, the AIDS Clinical Trials Group (ACTG) currently defines virologic failure as a confirmed viral load >200 copies/mL, which eliminates most cases of apparent viremia caused by blips or assay variability.⁹ This definition also may be useful in clinical practice (see [Virologic and Immunologic Failure](#)).

For most individuals who are adherent to their antiretroviral (ARV) regimens and who do not harbor resistance mutations to the prescribed drugs, viral suppression is generally achieved in 12 to 24 weeks, although it may take longer in some patients. Recommendations for the frequency of viral load monitoring are summarized below.

- **At initiation or change in therapy.** Plasma viral load should be measured before initiation of therapy and preferably within 2 to 4 weeks, and not more than 8 weeks, after treatment initiation or after treatment modification (BI). Repeat viral load measurement should be performed at 4- to 8-week intervals until the level falls below the assay's limit of detection (BIII).
- **In virologically suppressed patients in whom therapy was modified because of drug toxicity or for regimen simplification.** Viral load measurement should be performed within 2 to 8 weeks after changing therapy. The purpose of viral load monitoring at this point is to confirm potency of the new regimen (BIII).
- **In patients on a stable ARV regimen.** Viral load should be repeated every 3 to 4 months or as clinically indicated (BII). Clinicians may extend the interval to every 6 months for adherent patients who have suppressed viral loads for more than 2 to 3 years and whose clinical and immunologic status is stable (BIII).

Monitoring in patients with suboptimal response. In addition to viral load monitoring, a number of additional factors should be assessed, such as adherence to prescribed medications, altered pharmacology, or drug interactions. Patients who fail to achieve viral suppression should undergo resistance testing to aid in the selection of an alternative regimen, as discussed in [Drug-Resistance Testing](#) and [Virologic and Immunologic Failure \(AI\)](#).

References

1. Murray JS, Elashoff MR, Iacono-Connors LC, Cvetkovich TA, Struble KA. The use of plasma HIV RNA as a study endpoint in efficacy trials of antiretroviral drugs. *AIDS*. May 7 1999;13(7):797-804. Available at http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=10357378.

2. Hughes MD, Johnson VA, Hirsch MS, et al. Monitoring plasma HIV-1 RNA levels in addition to CD4+ lymphocyte count improves assessment of antiretroviral therapeutic response. ACTG 241 Protocol Virology Substudy Team. *Ann Intern Med.* Jun 15 1997;126(12):929-938. Available at http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=9182469.
3. Marschner IC, Collier AC, Coombs RW, et al. Use of changes in plasma levels of human immunodeficiency virus type 1 RNA to assess the clinical benefit of antiretroviral therapy. *J Infect Dis.* Jan 1998;177(1):40-47. Available at http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=9419168.
4. Thiebaut R, Morlat P, Jacqmin-Gadda H, et al. Clinical progression of HIV-1 infection according to the viral response during the first year of antiretroviral treatment. Groupe d'Epidemiologie du SIDA en Aquitaine (GECSA). *AIDS.* May 26 2000;14(8):971-978. Available at http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=10853978.
5. Havlir DV, Bassett R, Levitan D, et al. Prevalence and predictive value of intermittent viremia with combination hiv therapy. *JAMA.* Jul 11 2001;286(2):171-179. Available at http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=11448280.
6. Damond F, Roquebert B, Benard A, et al. Human immunodeficiency virus type 1 (HIV 1) plasma load discrepancies between the Roche COBAS AMPLICOR HIV-1 MONITOR Version 1.5 and the Roche COBAS AmpliPrep/COBAS TaqMan HIV-1 assays. *J Clin Microbiol.* Oct 2007;45(10):3436-3438. Available at http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=17715371.
7. Gatanaga H, Tsukada K, Honda H, et al. Detection of HIV type 1 load by the Roche Cobas TaqMan assay in patients with viral loads previously undetectable by the Roche Cobas Amplicor Monitor. *Clin Infect Dis.* Jan 15 2009;48(2):260-262. Available at http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=19113986.
8. Willig JH, Nevin CR, Raper JL, et al. Cost ramifications of increased reporting of detectable plasma HIV-1 RNA levels by the Roche COBAS AmpliPrep/COBAS TaqMan HIV-1 version 1.0 viral load test. *J Acquir Immune Defic Syndr.* Aug 1 2010;54(4):442-444. Available at http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=20611035.
9. Ribaud H, Lennox J, Currier J, al e. Virologic failure endpoint definition in clinical trials: Is using HIV-1 RNA threshold <200 copies/mL better than <50 copies/mL? An analysis of ACTG studies. Paper presented at: *16th Conference on Retroviruses and Opportunistic Infections.* Montreal, Canada, 2009.