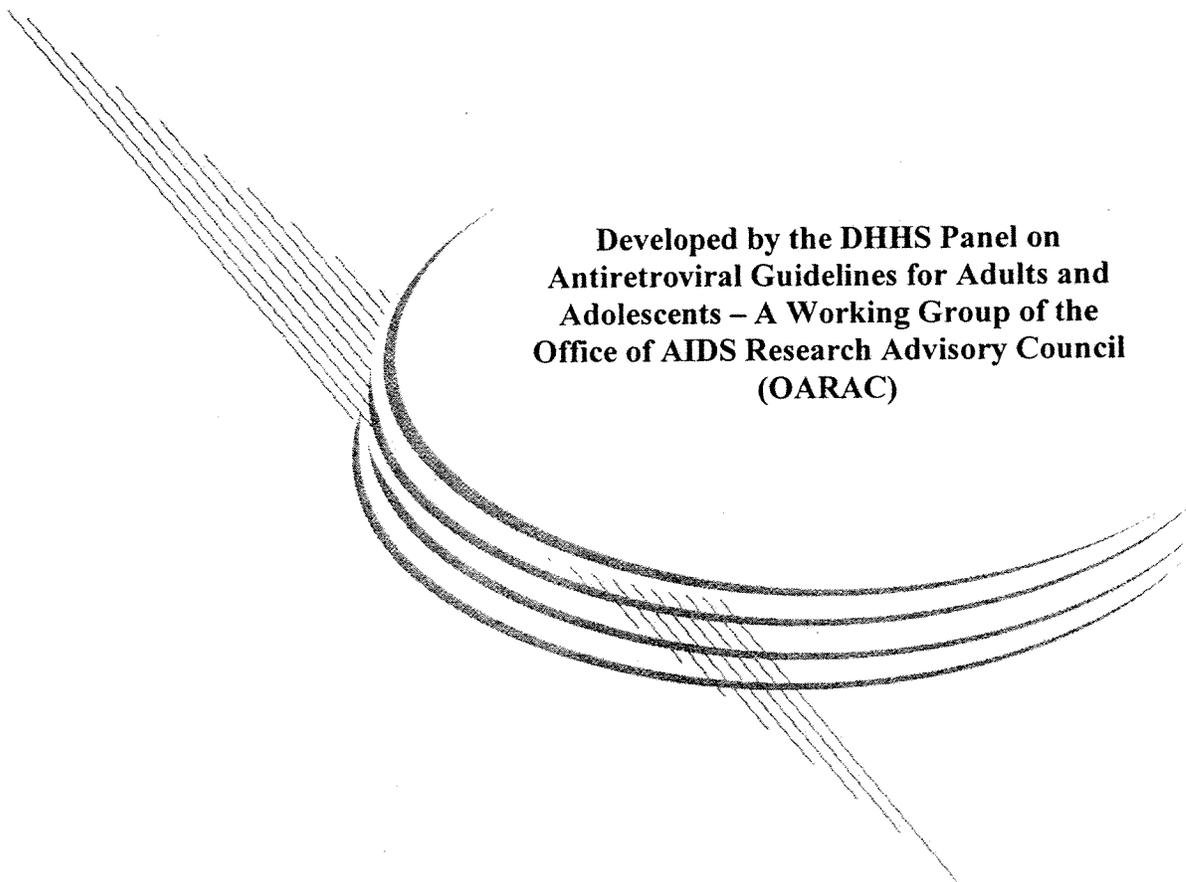


# Exhibit 16

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

*October 10, 2006*



**Developed by the DHHS Panel on  
Antiretroviral Guidelines for Adults and  
Adolescents – A Working Group of the  
Office of AIDS Research Advisory Council  
(OARAC)**

It is emphasized that concepts relevant to HIV management evolve rapidly. The Panel has a mechanism to update recommendations on a regular basis, and the most recent information is available on the *AIDSinfo* Web site (<http://AIDSinfo.nih.gov>).

October 10, 2006

**Viral Load.** Plasma HIV RNA (viral load) may be a consideration in the decision to initiate therapy. In addition, viral load is critical for evaluating response to therapy (AI). Three HIV viral load assays have been approved by the Food and Drug Administration (FDA) for clinical use:

- HIV-1 reverse transcriptase polymerase chain reaction assay (Amplicor HIV-1 Monitor Test, version 1.5, Roche Diagnostic);
- Nucleic acid amplification test for HIV RNA (NucliSens HIV-1 QT, bioMerieux); and
- Signal amplification nucleic acid probe assay (VERSANT HIV-1RNA 3.0 assay, Bayer).

Analysis of 18 trials with over 5,000 participants with viral load monitoring showed a significant association between a decrease in plasma viremia and improved clinical outcome. Thus, viral load testing serves as a surrogate marker for treatment response and may be useful in predicting clinical progression. The minimal change in viral load considered to be statistically significant (2 standard deviations) is a threefold or a 0.5 log<sub>10</sub> copies/mL change. One key goal of therapy is a viral load below the limits of detection (at <50 copies/mL for the Amplicor assay, <75 copies/mL for the VERSANT assay, and <80 copies/mL for the NucliSens assay). This goal should be achieved by 16-24 weeks (AI). Recommendations for the frequency of viral load monitoring are summarized below and in [Table 2](#).

- **At Initiation or Change in Therapy.** Plasma viral load should be measured immediately before treatment and at 2-8 weeks after treatment initiation or treatment changes because of suboptimal viral suppression. In the latter measure, there should be a decrease of at least a 1.0 log<sub>10</sub> copies/mL (BI).
- **In Patients With Viral Suppression Where Changes are Motivated by Drug Toxicity or Regimen Simplification.** Some experts also recommend repeating viral load measurement within 2-8 weeks after changing therapy. The purpose of viral load monitoring at this point is to confirm potency of the new regimen (BII).
- **In Patients on a Stable Antiretroviral Regimen** The viral load testing should be repeated every 3-4 months thereafter or if clinically indicated (BII). The testing should be repeated every 3-4 months thereafter or if clinically indicated. ([Table 2](#))

**Monitoring in Patients With Suboptimal Response.** In addition to viral load monitoring, a number of additional factors should be assessed, such as non-adherence, altered pharmacology, or drug interactions. Resistance testing may be helpful in identifying the presence of resistance mutations that may necessitate a change in therapy (AII).

## UTILIZATION OF DRUG RESISTANCE TESTING IN CLINICAL PRACTICE

### *Panel's Recommendations:*

- *HIV drug resistance testing is recommended for persons with acute HIV infection if the decision is made to initiate therapy at this time (BIII). If therapy is deferred, resistance testing at this time should still be considered (CIII).*
- *Drug resistance testing is also recommended for persons with chronic HIV infection prior to initiation of therapy (BIII). Earlier testing may be considered (CIII).*
- *A genotypic assay is generally preferred for antiretroviral-naïve persons (BIII).*
- *HIV drug resistance testing should be performed to assist in selecting active drugs when changing antiretroviral regimens in cases of virologic failure (BII).*
- *Drug resistance testing should also be considered when managing suboptimal viral load reduction (BIII).*
- *Drug resistance testing in the setting of virologic failure should be performed while the patient is taking his/her antiretroviral drugs, or immediately (i.e., within 4 weeks) after discontinuing therapy (BII).*
- *Drug resistance testing is not advised for persons with viral load <1,000 copies/mL, because amplification of the virus is unreliable (DIII).*

### Genotypic and Phenotypic Resistance Assays

Two types of resistance assays are used to assess viral strains and select treatment strategies: genotypic and phenotypic assays.

**Genotypic Assays.** Genotypic assays detect drug resistance mutations present in the relevant viral genes. Certain genotypic assays involve sequencing of the entire reverse transcriptase and protease genes, whereas others use probes to detect selected mutations that are known to confer drug resistance. Genotypic assays can be performed rapidly, and results can be reported within 1-2 weeks of sample collection. Interpretation of test results requires knowledge of the mutations that are selected for by different antiretroviral drugs and of the potential for cross resistance to other drugs conferred by certain mutations. The International AIDS Society-USA (IAS-USA) maintains a list of significant resistance-associated mutations in the reverse transcriptase,

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