



# HIV/AIDS Today

Vol. 1, Issue 17: May 9, 2008

## Drug Adherence and Resistance

This week's HIV/AIDS Today factsheet discusses the role of drug adherence and drug resistance for individual patients and the epidemic overall.

### ADHERENCE

Adherence, sometimes referred to as compliance, is broadly defined as the extent to which a patient's behavior corresponds to medical advice.<sup>i</sup> This behavior includes "taking medication regularly, returning to a doctor's office for follow-up appointments, and observing preventive and healthful lifestyle changes."<sup>ii</sup>

Many factors can influence how consistently people take their medicine. For example, lack of health insurance or prescription drug coverage, employment constraints, active drug or alcohol abuse, and active mental illness have all been linked to poor adherence.<sup>iii</sup> Additionally, experiencing stigma related to HIV/AIDS, such as social rejection or disapproval, has been shown to make individuals less likely to adhere to medication and more apt to miss clinic appointments.<sup>iv</sup>

For patients with HIV/AIDS who are on highly active antiretroviral therapy (HAART), proper adherence to a medication regimen is critically important. As discussed in more detail below, research shows that if patients are not highly adherent, the medicines stop working and the virus becomes resistant. As a consequence, it may become difficult to treat either the patient or any others to whom the virus might be transmitted with existing drugs. For both individual patients and the epidemic overall, therefore, it is extremely important to promote effective adherence, continuity of care, and follow up for patients on HAART.

### RESISTANCE

#### *Creation of a drug-resistant strain*

The high risk of resistance in HIV stems in large part from the virus's ability to mutate frequently. A muta-

tion is a change to the DNA sequence which can affect the behavior of a virus or its susceptibility to a drug.

When the amount of a drug in a patient's body falls below therapeutic levels, as in cases of non-adherence, the drug will not be able to adequately suppress HIV replication.<sup>v</sup> It may still inhibit replication of the original, or "wild-type" strain, the person was infected with, but not affect HIV with a mutation allowing it

to be resistant to that drug. Thus, the resistant strain is able to reproduce while the wild-type is suppressed.<sup>vi</sup>

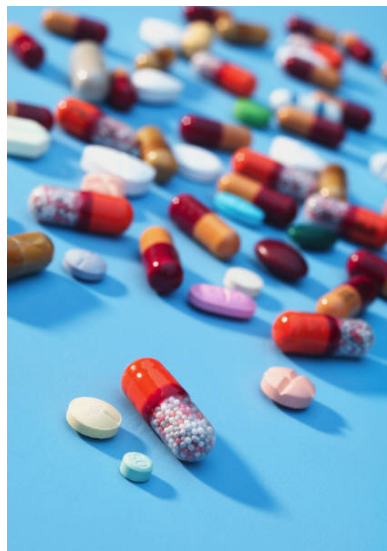
The need to fully suppress HIV led to the need for combination treatment involving several drugs, or highly active antiretroviral therapy.<sup>vii</sup> The use of three drugs in combination significantly decreases viral load and reduces the development of resistant strains.

Drug resistance can result from several different mutations. Depending on the mutation, if HIV develops resistance to one drug it may also develop resistance to other drugs in the same

class, regardless of whether a patient has ever taken those drugs. Resistance can be partial or complete; if a patient has become partially resistant, the drug may still function, but it will not be as effective as it once was.<sup>viii</sup>

#### *Testing for drug-resistant strains*

By testing a patient's CD4 T-cell count and viral load on a regular basis, it is easier to tell if the patient has developed a resistant strain of HIV. For most patients on therapy, an adequate therapeutic response would be an increased CD4 cell count and a decreased viral load within a few months of beginning treatment. Non-adherence, altered pharmacology, or other drug interactions may impact the degree to which a patient



on treatment demonstrates these indicators, but failing to increase the CD4 cell count or to decrease the viral load may indicate the presence of a resistant strain.<sup>ix</sup> In addition, a decrease in CD4 count or increase in viral load after a previous good response may indicate the development of viral resistance.

Two types of resistance tests are used to determine the mutations present and aid in selecting treatment strategies. Genotypic testing looks for specific mutations in the patient's relevant viral genes. Phenotypic testing measures the sensitivity of a patient's HIV to various antiretroviral drugs.<sup>x</sup>

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## ENDNOTES

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<sup>i</sup> *HIV Treatment: The Importance of Adherence* (Apr/May 1998) (online at <http://www.thebody.com/bp/aprmay98/terms.html>).

<sup>ii</sup> *Adherence or Compliance Behavior* (accessed on Oct. 23, 2006) (online at <http://www.enotes.com/public-health-encyclopedia/adherence-compliance-behavior>).

<sup>iii</sup> HRSA Care Action, *Adherence and HIV/AIDS* (May 2005) (online at <http://hab.hrsa.gov/publications/may2005/#a1>); Ian Frank, *Once-Daily HAART: Toward a New Treatment Paradigm*, *Journal of Acquired Immune Deficiency Syndromes* (2002) (online at [http://www.natap.org/2002/september/091302\\_5.htm](http://www.natap.org/2002/september/091302_5.htm)).

<sup>iv</sup> UCSF Center for AIDS Prevention Studies, *How Does Stigma Affect HIV Prevention and Treatment?* (May 2006) (online at <http://www.caps.ucsf.edu/pubs/FS/stigma.php#10>).

<sup>v</sup> WHO, *Drug Resistance: HIV/AIDS* (accessed Jan. 2008) (online at <http://www.who.int/drugresistance/hivaids/en/index.html>).

<sup>vi</sup> *Why HIV Drug Resistance Matters: An Overview* (Sept./Oct. 2005) (online at [http://www.thebody.com/tpan/septoct\\_05/drug\\_resistance.html](http://www.thebody.com/tpan/septoct_05/drug_resistance.html)).

<sup>vii</sup> National Institute of Allergy and Infectious Diseases, NIH, and U.S. Department of Health and Human Services, *HIV Infection and AIDS: An Overview* (Mar. 2005) (online at <http://www3.niaid.nih.gov/healthscience/healthtopics/HIVAIDS/default.htm>).

<sup>viii</sup> *Why HIV Drug Resistance Matters: An Overview* (Sept./Oct. 2005) (online at <http://www.thebody.com/content/art890.html>).

<sup>ix</sup> Panel on Antiretroviral Guidelines for Adults and Adolescents. *Guidelines for the Use of Antiretroviral Agents in HIV-1-Infected Adults and Adolescents*. Department of Health and Human Services (Jan. 29, 2008) (online at <http://www.aidsinfo.nih.gov/ContentFiles/AdultandAdolescentGL.pdf>).

<sup>x</sup> *Id.*