



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

Downloaded from <https://aidsinfo.nih.gov/guidelines> on 10/22/2018

Visit the *AIDSinfo* website to access the most up-to-date guideline.

Register for e-mail notification of guideline updates at <https://aidsinfo.nih.gov/e-news>.

## Cost Considerations and Antiretroviral Therapy (Last updated July 14, 2016; last reviewed July 14, 2016)

Although antiretroviral therapy (ART) is expensive (see Table 16 below), the cost-effectiveness of ART has been demonstrated in analyses of older<sup>1</sup> and newer regimens,<sup>2,3</sup> as well as for treatment-experienced patients with drug-resistant HIV.<sup>4</sup> Given the recommendations for immediate initiation of lifelong treatment and the increasing number of patients taking ART, the Panel now introduces cost-related issues pertaining to medication adherence and cost-containment strategies, as discussed below.

### *Costs as They Relate to Adherence from a Patient Perspective*

**Cost sharing:** Cost sharing is where the patient is responsible for some of the medication cost burden (usually accomplished via copayments, coinsurance, or deductibles); these costs are often higher for branded medications than for generic medications. In one comprehensive review, increased patient cost sharing resulted in decreased medical adherence and more frequent drug discontinuation; for patients with chronic diseases, increased cost sharing was also associated with increased use of the medical system.<sup>5</sup> Conversely, copayment reductions, such as those that might be used to incentivize prescribing of generic drugs, have been associated with improved adherence in patients with chronic diseases.<sup>6</sup> Whereas cost sharing disproportionately affects low-income patients, resources (e.g., the Ryan White AIDS Drug Assistance Program [ADAP]) are available to assist eligible patients with copays and deductibles. Given the clear association between out-of-pocket costs for patients with chronic diseases and the ability of those patients to pay for and adhere to medications, clinicians should minimize patients' out-of-pocket drug-related expenses whenever possible.

**Prior authorizations:** As a cost-containment strategy, some programs require that clinicians obtain prior authorizations or permission before prescribing newer or more costly treatments rather than older or less expensive drugs. Although there are data demonstrating that prior authorizations do reduce spending, several studies have also shown that prior authorizations result in fewer prescriptions filled and increased nonadherence.<sup>7-9</sup> Prior authorizations in HIV care specifically have been reported to cost over \$40 each in provider personnel time (a hidden cost) and have substantially reduced timely access to medications.<sup>10</sup>

**Generic ART:** The impact of the availability of generic antiretroviral (ARV) drugs on selection of ART in the United States is unknown. Because U.S. patent laws currently limit the coformulation of some generic alternatives to branded drugs, generic options may result in increased pill burden. To the extent that pill burden, rather than drug frequency, results in reduced adherence, generic ART could lead to decreased costs but at the potential expense of worsening virologic suppression rates and poorer clinical outcomes.<sup>11,12</sup> Furthermore, prescribing the individual, less-expensive generic components of a branded coformulated product rather than the branded product itself could, under some insurance plans, lead to higher copays—an out-of-pocket cost increase that may reduce medication adherence.

### *Potential Cost Containment Strategies from a Societal Perspective*

Given resource constraints, it is important to maximize the use of resources without sacrificing clinical outcomes. Evidence-based revisions to these guidelines recommend tailored laboratory monitoring for patients with long-term virologic suppression on ART as one possible way to provide overall cost savings. Data suggest that continued CD4 monitoring yields no clinical benefit for patients whose viral loads are suppressed and whose CD4 counts exceed 200 cells/mm<sup>3</sup> after 48 weeks of therapy.<sup>13</sup> A reduction in laboratory use from biannual to annual CD4 monitoring could save ~\$10 million per year in the United States<sup>14</sup> (see [Laboratory Monitoring](#)). Although this is a small proportion of the overall costs associated with HIV care, such a strategy could reduce patients' personal expenses if they have deductibles for laboratory tests. The present and future availability of generic formulations of certain ARV drugs, despite the potential caveats of increased pill burden and reduced adherence, offers other money-saving possibilities on a much

greater scale. One analysis suggests the possibility of saving approximately \$900 million nationally in the first year of switching from a branded fixed-dose combination product to a three-pill regimen containing generic efavirenz.<sup>3</sup>

In summary, understanding HIV and ART related-costs in the United States is complicated because of the wide variability in medical coverage, accessibility, and expenses across regions, insurance plans, and pharmacies. In an effort to retain excellent clinical outcomes in an environment of cost-containment strategies, providers should remain informed of current insurance and payment structures, ART costs (see Table 16 below for estimates of drugs' average wholesale prices), discounts among preferred pharmacies, and available generic ART options. Providers should work with patients and their case managers and social workers to understand their patients' particular pharmacy benefit plans and potential financial barriers to filling their prescriptions. Additionally, providers should familiarize themselves with ARV affordability resources (such as ADAP and pharmaceutical company patient assistance programs for patients who qualify) and refer patients to such assistance if needed.

**Table 16. Monthly Average Wholesale Price<sup>a</sup> of Commonly Used<sup>b</sup> Antiretroviral Drugs (Last updated October 17, 2017; last reviewed October 17, 2017) (page 1 of 3)**

ARV Drug (Generic and Brand Names)	Strength, Formulation	Dosing	Tablets, Capsules, or mLs per Month <sup>c</sup>	AWP <sup>a</sup> (Monthly)
<b>Nucleoside Reverse Transcriptase Inhibitors (NRTIs)</b>				
<b>Abacavir</b>				
• Generic	300 mg tablet	2 tablets daily	60 tablets	\$502.22–\$603.33
• Ziagen	300 mg tablet	2 tablets daily	60 tablets	\$670.37
• Ziagen	20 mg/mL solution	30 mL daily	900 mL	\$660.86
<b>Emtricitabine</b>				
• Emtriva	200 mg capsules	1 cap daily	30 capsules	\$643.82
• Emtriva	10 mg/mL solution	24 mL daily	680 mL (28-day supply)	\$608.16
<b>Lamivudine</b>				
• Generic	300 mg tablet	1 tablet daily	30 tablets	\$324.33–\$429.66
• Epivir	300 mg tablet	1 tablet daily	30 tablets	\$498.89
• Epivir	10 mg/mL solution	30 mL daily	900 mL	\$498.90
<b>Tenofovir Disoproxil Fumarate</b>	300 mg tablet	1 tablet daily	30 tablets	\$1,279.94
• Viread				
<b>Zidovudine</b>	300 mg tablet	1 tablet twice daily	60 tablets	\$54.00–\$365.44
• Generic				
<b>NRTI Combination Products</b>				
<b>Abacavir/Lamivudine</b>				
• Generic	600/300 mg tablets	1 tablet daily	30 tablets	\$1,395.00
• Epzicom	600/300 mg tablets	1 tablet daily	30 tablets	\$1,550.05
<b>Tenofovir Alafenamide/Emtricitabine</b>	25/200 mg tablet	1 tablet daily	30 tablets	\$1,881.14
• Descovy				
<b>Tenofovir Disoproxil Fumarate/ Emtricitabine</b>				
• Truvada	300/200 mg tablet	1 tablet daily	30 tablets	\$1,881.14
<b>Zidovudine/Lamivudine</b>				
• Generic	300/150 mg tablet	1 tablet twice daily	60 tablets	\$877.85–\$931.61
• Combivir	300/150 mg tablet	1 tablet twice daily	60 tablets	\$1,081.70
<b>Abacavir Sulfate/Zidovudine/Lamivudine</b>				
• Generic	300/300/150 mg tablet	1 tablet twice daily	60 tablets	\$1,738.46
• Trizivir	300/300/150 mg tablet	1 tablet twice daily	60 tablets	\$1,931.64

**Table 16. Monthly Average Wholesale Price<sup>a</sup> of Commonly Used<sup>b</sup> Antiretroviral Drugs (Last updated October 17, 2017; last reviewed October 17, 2017) (page 2 of 3)**

ARV Drug (Generic and Brand Names)	Strength, Formulation	Dosing	Tablets, Capsules, or mLs per Month <sup>c</sup>	AWP <sup>a</sup> (Monthly)
<b>Non-Nucleoside Reverse Transcriptase Inhibitors (NNRTIs)</b>				
<b>Efavirenz</b> • Sustiva	600 mg tablet	1 tablet daily	30 tablets	\$1,176.74
<b>Etravirine</b> • Intelence	200 mg tablet	1 tablet twice daily	60 tablets	\$1,411.42
<b>Nevirapine</b> • Generic	200 mg tablet	1 tablet twice daily	60 tablets	\$648.19–\$650.70
• Viramune	200 mg tablet	1 tablet twice daily	60 tablets	\$967.63
• Viramune XR	400 mg tablet	1 tablet daily	30 tablets	\$897.46
<b>Rilpivirine</b> • Edurant	25 mg tablet	1 tablet daily	30 tablets	\$1,160.10
<b>Protease Inhibitors (PIs)</b>				
<b>Atazanavir</b> • Reyataz	200 mg capsule	2 capsules daily	60 capsule	\$1,755.91
• Reyataz	300 mg capsule <sup>d</sup>	1 capsule daily	30 capsule	\$1,739.50
<b>Atazanavir/Cobicistat</b> • Evotaz	300/150 mg tablet	1 tablet daily	30 tablets	\$1,926.56
<b>Darunavir</b> • Prezista	600 mg tablet <sup>e</sup>	1 tablet twice daily	60 tablets	\$1,757.77
• Prezista	800 mg tablet <sup>d</sup>	1 tablet daily	30 tablets	\$1,757.77
• Prezista	100 mg/mL suspension <sup>e</sup>	8 mL daily 6 mL twice daily	240 mL 360 mL	\$1,171.85 \$1,757.77
<b>Darunavir/Cobicistat</b> • Prezcofix	800/150 mg tablet	1 tablet daily	30 tabs	\$2,009.23
<b>Lopinavir/Ritonavir</b> • Kaletra	200/50 mg tablet	2 tablets twice daily or 4 tablets once daily	120 tablets	\$1,160.50
• Kaletra	80/20 mg per mL solution	5 mL twice daily	300 mL	\$1,087.97
<b>Tipranavir</b> • Aptivus	250 mg capsule <sup>e</sup>	2 capsules twice daily	120 capsules	\$1,786.73
<b>Integrase Strand Transfer Inhibitors (INSTIs)</b>				
<b>Dolutegravir</b> • Tivicay	50 mg tablet	1 tablet once daily	30 tablets	\$1,842.82
• Tivicay	50 mg tablet	1 tablet twice daily	60 tablets	\$3,685.64
<b>Raltegravir</b> • Isentress	400 mg tablet	1 tablet twice daily	60 tablets	\$1,667.52
• Isentress HD	600 mg tablet	2 tablets once daily	60 tablets	\$1,667.52
<b>Fusion Inhibitor</b>				
<b>Enfuvirtide</b> • Fuzeon	90 mg injection kit	1 injection twice daily	60 doses (1 kit)	\$4,302.67
<b>CCR5 Antagonist</b>				
<b>Maraviroc</b> • Selzentry	150 mg tablet	1 tablet twice daily	60 tablets	\$1,679.68
• Selzentry	300 mg tablet	1 tablet twice daily	60 tablets	\$1,679.68
• Selzentry	300 mg tablet	2 tablets twice daily	120 tablets	\$3,359.36

**Table 16. Monthly Average Wholesale Price<sup>a</sup> of Commonly Used<sup>b</sup> Antiretroviral Drugs (Last updated October 17, 2017; last reviewed October 17, 2017) (page 3 of 3)**

ARV Drug (Generic and Brand Names)	Strength, Formulation	Dosing	Tablets, Capsules, or mLs per Month <sup>c</sup>	AWP <sup>a</sup> (Monthly)
<b>Coformulated Combination Products as Single Tablet Regimens</b>				
<b>Dolutegravir/Abacavir/Lamivudine</b> • Triumeq	50/600/300 mg tablet	1 tablet daily	30 tablets	\$3,118.62
<b>Efavirenz/Tenofovir Disoproxil Fumarate/Emtricitabine</b> • Atripla	600/300/200 mg tablet	1 tablet daily	30 tablets	\$3,057.89
<b>Elvitegravir/Cobicistat/Tenofovir Alafenamide/Emtricitabine</b> • Genvoya	150/150/10/200 mg tablet	1 tablet daily	30 tablets	\$3,306.92
<b>Elvitegravir/Cobicistat/Tenofovir Disoproxil Fumarate/Emtricitabine</b> • Stribild	150/150/300/200 mg tablet	1 tablet daily	30 tablets	\$3,707.99
<b>Rilpivirine/Tenofovir Alafenamide/Emtricitabine</b> • Odefsey	25/25/200 mg tablet	1 tablet daily	30 tablets	\$3,009.29
<b>Rilpivirine/Tenofovir Disoproxil Fumarate/Emtricitabine</b> • Complera	25/300/200 mg tablet	1 tablet daily	30 tablets	\$3,216.92
<b>Pharmacokinetic Enhancers (Boosters)</b>				
<b>Cobicistat</b> • Tybost	150 mg tablet	1 tablet daily	30 tablets	\$246.84
<b>Ritonavir:</b> Total daily dose depends on the dose of the concomitant PI (100 mg once or twice daily, or 200 mg twice daily)				
• Norvir	100 mg tablet	1 tablet once daily	30 tablets	\$308.60
• Norvir	80 mg/mL solution	100 mg daily	37.5 mL (of a 240 mL bottle)	\$270.04

<sup>a</sup> AWP = average wholesale price. Note that the AWP may not represent the pharmacy acquisition price or the price paid by public and private payors or consumers. Source: <http://www.micromedexsolutions.com>. Accessed September 2017.

<sup>b</sup> The following less commonly used ARV drugs are not included in this table: delavirdine, didanosine, fosamprenavir, indinavir, nelfinavir, saquinavir, and stavudine.

<sup>c</sup> Represents 30 days or as specified.

<sup>d</sup> Should be used in combination with ritonavir or cobicistat. Please refer to [Appendix B, Table 3](#) for ritonavir doses.

<sup>e</sup> Should be used in combination with ritonavir. Please refer to [Appendix B, Table 3](#) for ritonavir doses.

**Key to Acronyms:** ARV = antiretroviral; XR = extended release

## References

1. Freedberg KA, Losina E, Weinstein MC, et al. The cost effectiveness of combination antiretroviral therapy for HIV disease. *N Engl J Med*. Mar 15 2001;344(11):824-831. Available at <https://www.ncbi.nlm.nih.gov/pubmed/11248160>.
2. Mauskopf J, Brogan AJ, Talbird SE, Martin S. Cost-effectiveness of combination therapy with etravirine in treatment-experienced adults with HIV-1 infection. *AIDS*. Jan 28 2012;26(3):355-364. Available at <http://www.ncbi.nlm.nih.gov/pubmed/22089378>.
3. Walensky RP, Sax PE, Nakamura YM, et al. Economic savings versus health losses: the cost-effectiveness of generic antiretroviral therapy in the United States. *Ann Intern Med*. Jan 15 2013;158(2):84-92. Available at <http://www.ncbi.nlm.nih.gov/pubmed/23318310>.
4. Bayoumi AM, Barnett PG, Joyce VR, et al. Cost-effectiveness of newer antiretroviral drugs in treatment-experienced patients with multidrug-resistant HIV disease. *J Acquir Immune Defic Syndr*. Dec 1 2013;64(4):382-391. Available at <http://www.ncbi.nlm.nih.gov/pubmed/24129369>.
5. Goldman DP, Joyce GF, Zheng Y. Prescription drug cost sharing: associations with medication and medical utilization and spending and health. *JAMA*. Jul 4 2007;298(1):61-69. Available at <http://www.ncbi.nlm.nih.gov/pubmed/17609491>.
6. Maciejewski ML, Farley JF, Parker J, Wansink D. Copayment reductions generate greater medication adherence in targeted patients. *Health Aff*. Nov 2010;29(11):2002-2008. Available at <http://www.ncbi.nlm.nih.gov/pubmed/21041739>.
7. Abdelgawad T, Egbuonu-Davis L. Preferred drug lists and Medicaid prescriptions. *Pharmacoeconomics*. 2006;24 Suppl 3:55-63. Available at <http://www.ncbi.nlm.nih.gov/pubmed/17266388>.
8. Ridley DB, Axelsen KJ. Impact of Medicaid preferred drug lists on therapeutic adherence. *Pharmacoeconomics*. 2006;24 Suppl 3:65-78. Available at <http://www.ncbi.nlm.nih.gov/pubmed/17266389>.
9. Wilson J, Axelsen K, Tang S. Medicaid prescription drug access restrictions: exploring the effect on patient persistence with hypertension medications. *Am J Manag Care*. Jan 2005;11 Spec No:SP27-34. Available at <http://www.ncbi.nlm.nih.gov/pubmed/15700907>.
10. Raper JL, Willig JH, Lin HY, et al. Uncompensated medical provider costs associated with prior authorization for prescription medications in an HIV clinic. *Clin Infect Dis*. Sep 15 2010;51(6):718-724. Available at <http://www.ncbi.nlm.nih.gov/pubmed/20695800>.
11. Hanna DB, Hessol NA, Golub ET, et al. Increase in Single-Tablet Regimen Use and Associated Improvements in Adherence-Related Outcomes in Hiv-Infected Women. *J Acquir Immune Defic Syndr*. Dec 8 2013. Available at <http://www.ncbi.nlm.nih.gov/pubmed/24326606>.
12. Nachega JB, Parienti JJ, Uthman OA, et al. Lower pill burden and once-daily antiretroviral treatment regimens for HIV infection: A meta-analysis of randomized controlled trials. *Clin Infect Dis*. May 2014;58(9):1297-1307. Available at <https://www.ncbi.nlm.nih.gov/pubmed/24457345>.
13. Girard PM, Nelson M, Mohammed P, Hill A, van Delft Y, Moecklinghoff C. Can we stop CD4+ testing in patients with HIV-1 RNA suppression on antiretroviral treatment? *AIDS*. Nov 13 2013;27(17):2759-2763. Available at <http://www.ncbi.nlm.nih.gov/pubmed/23842127>.
14. Hyle EP, Sax PE, Walensky RP. Potential savings by reduced CD4 monitoring in stable patients with HIV receiving antiretroviral therapy. *JAMA Intern Med*. Oct 14 2013;173(18):1746-1748. Available at <http://www.ncbi.nlm.nih.gov/pubmed/23978894>.