**Table 15b. Antiretroviral Therapy-Associated Adverse Effects and Management Recommendations—Dyslipidemia**

*Last updated April 16, 2019; last reviewed April 16, 2019*  (page 1 of 2)

<table>
<thead>
<tr>
<th>Adverse Effects</th>
<th>Associated ARVs</th>
<th>Onset/Clinical Manifestations</th>
<th>Estimated Frequency</th>
<th>Risk Factors</th>
<th>Prevention/Monitoring</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dyslipidemia</td>
<td>PIs:</td>
<td>Onset:</td>
<td></td>
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<td></td>
<td>• All PIs, especially RTV-boosted PIs; lower incidence reported with DRV/r and ATV with or without RTV.</td>
<td>• As early as 2 weeks to months after beginning therapy</td>
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<td></td>
<td>NRTIs:</td>
<td>Presentation PIs:</td>
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<td></td>
<td>• Lower incidence with TDF than with TAF</td>
<td>• ↑ LDL-C, TC, and TG</td>
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<td></td>
<td>NNRTIs:</td>
<td>Presentation NNRTIs:</td>
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<tr>
<td></td>
<td>• Lower incidence reported with NVP, RPV, and ETR than with EFV</td>
<td>• ↑ LDL-C, TC, and HDL-C</td>
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<td></td>
<td></td>
<td>Presentation NRTIs:</td>
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<td></td>
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<td>• ↑ LDL-C, TC, and TG</td>
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<td>Reported frequency varies with specific ARV regimen, duration of ART, and the specific laboratory parameters used to diagnose lipid abnormalities.</td>
<td>10% to 20% in young children receiving LPV/r.</td>
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<td>40% to 75% of older children and adolescents with prolonged ART history will have lipid abnormalities. Higher abnormal fasting serum lipids have been observed in ART-naive adults who received EVG/COBI/FTC/TAF than in those who received EVG/COBI/FTC/TDF.</td>
<td>Increase in serum lipids from baseline has also been noted in adolescents receiving EVG/COBI/FTC/TAF.</td>
<td>Advanced-stage HIV disease</td>
<td>Prevention:</td>
<td>Assess all patients for additional CVD risk factors. Patients living with HIV are considered to be at moderate risk of CVD.³ ART regimen changes should be considered, especially when the patient is receiving older PIs (e.g., LPV/r) and/or ritonavir boosting. Substituting a PI-sparing regimen, a PI-based regimen with a more favorable lipid profile, or COBI boosting causes a decline in LDL-C or TG values. However, the lipid-lowering effect for LDL-C is less pronounced than treatment results with statin therapy.</td>
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*Guidelines for the Use of Antiretroviral Agents in Pediatric HIV Infection*  

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### Table 15b. Antiretroviral Therapy-Associated Adverse Effects and Management Recommendations—Dyslipidemia

(Last updated April 16, 2019; last reviewed April 16, 2019)  (page 2 of 2)

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</tr>
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</table>
| Dyslipidemia, continued | | | | • If there are minimal alterations in AST, ALT, and CK, monitor every 3 months–4 months during the first year and every 6 months thereafter (or as clinically indicated).  
• Repeat FLP 4 weeks after increasing doses of antihyperlipidemic agents.  
• Statin therapy should be considered for patients with elevated LDL-C levels. NHLBI provides recommendations for statin therapy in patients with specific LDL-C levels and risk factors.  
• Drug therapy can be considered in cases of severe hypertriglyceridemia (TG ≥ 500 mg/dL). Fibrates (gemfibrozil and fenofibrate) and N-3 PUFAs derived from fish oils may be used.  
| | | | | | | |

*Given the burden of collecting fasting blood samples, some practitioners routinely measure cholesterol and triglycerides from nonfasting blood samples and follow up abnormal values with a test done in the fasted state.*

*Refer to the NHLBI guidelines: Expert Panel on Integrated Guidelines for Cardiovascular Health and Risk Reduction in Children and Adolescents.*

**Key to Acronyms:**
- ALT = alanine aminotransferase; ART = antiretroviral therapy; ARV = antiretroviral; AST = aspartate aminotransferase; ATV = atazanavir; CK = creatine kinase; COBI = cobicistat; CVD = cardiovascular disease; DRV = darunavir; DRV/r = darunavir/ritonavir; EFV = efavirenz; ETR = etravirine; EVG = elvitegravir; FLP = fasting lipid profile; FTC = emtricitabine; HDL-C = high-density lipoprotein cholesterol; INSTI = integrase strand transfer inhibitor; LDL-C = low-density lipoprotein cholesterol; LFT = liver function test; LPV/r = lopinavir/ritonavir; NHLBI = National Heart, Lung, and Blood Institute; NNRTI = non-nucleoside reverse transcriptase inhibitor; NRTI = nucleoside reverse transcriptase inhibitor; NVP = nevirapine; PI = protease inhibitor; PUFA = polyunsaturated fatty acid; RPV = rilpivirine; RTV = ritonavir; TAF = tenofovir alafenamide; TC = total cholesterol; TDF = tenofovir disoproxil fumarate; TG = triglyceride

**References**


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