# Table 17h. Antiretroviral Therapy–Associated Adverse Effects and Management Recommendations—Lipodystrophies and Weight Gain

**Updated:** June 25, 2026
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| Adverse Effects | Associated ARVs | Onset/Clinical Manifestations | Estimated Frequency | Risk Factors | Prevention/ Monitoring | Management |
|---|---|---|---|---|---|---|
| **Lipodystrophy (Fat Maldistribution)**<br>**General Information** | See below for specific associations. | **Onset**<br>• Increase in trunk and limb fat is the first sign; peripheral fat wasting may not appear for 12–24 months after ART initiation. | Frequency is low (<5%) with current regimens. | • Genetic predisposition<br>• Puberty<br>• HIV-associated inflammation<br>• Older age<br>• Longer duration of ART<br>• Body habitus | **Prevention**<br>• Initiate a calorically appropriate low-fat diet and an exercise regimen.<br>**Monitoring**<br>• BMI measurement<br>• Waist circumference and waist–hip ratio | • Physicians should perform a regimen review and consider changing the regimen when lipodystrophy occurs.<br>• Improvement in fat maldistribution can vary following a regimen change. Improvement may occur after several months or years, or it may not occur at all. |
| **Central Lipohypertrophy or Lipo-accumulation** | Can occur in the absence of ART, but these conditions most often are associated with the use of PIs and EFV. | **Presentation**<br>• Central fat accumulation with increased abdominal girth, which may include a dorsocervical fat pad (buffalo hump). Gynecomastia may occur in males, or breast hypertrophy may occur in females, particularly with the use of EFV. | Frequency is low (<5%) with current regimens. | • Obesity before initiation of therapy<br>• Sedentary lifestyle | **Prevention**<br>• Initiate a calorically appropriate low-fat diet and an exercise regimen.<br>**Monitoring**<br>• BMI measurement<br>• Waist circumference and waist–hip ratio measurements | • Counsel patient on lifestyle modification and dietary interventions (e.g., maintaining a calorically appropriate diet that is low in saturated fats and simple carbohydrates and starting an exercise regimen, especially strength training). |

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| | | | | | | • Recommend smoking cessation (if applicable) to decrease future CVD risk.<br>• Consider using an INSTI instead of a PI or EFV, although some INSTIs may be associated with generalized weight gain (see below).<br>**Data Are Insufficient to Allow the Panel to Safely Recommend Use of Any of the Following Modalities in Children**<br>• Recombinant human growth hormone<br>• Growth hormone–releasing hormone<br>• Metformin<br>• Thiazolidinediones<br>• Recombinant human leptin<br>• Anabolic steroids<br>• Liposuction<br>• GLP-1 receptor agonist |

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| **Facial/Peripheral Lipoatrophy** | Most cases are associated with the use of ZDV, a thymidine analogue NRTI. | **Presentation**<br>• Thinning of subcutaneous fat in the face, buttocks, and extremities, measured as a decrease in trunk/limb fat by DXA or triceps skinfold thickness. Preservation of lean body mass distinguishes lipoatrophy from HIV-associated wasting. | Frequency is low (<5%) with current regimens. | Underweight before ART initiation | **Prevention**<br>• Limit the use of ZDV.<br>**Monitoring**<br>• Patient self-report and physical examination are the most sensitive methods of monitoring lipoatrophy. | • Replace ZDV with another NRTI when possible.<br>**Data Are Insufficient to Allow the Panel to Safely Recommend Use of Any of the Following Modalities in Children**<br>• Injections of poly-L-lactic acid<br>• Recombinant human leptin<br>• Autologous fat transplantation<br>• Thiazolidinediones |
| **Weight Gain** | Significant weight gain may occur with all ARV regimens, but it appears to be more pronounced with INSTIs (DTG, BIC, EVG, RAL), TAF and PIs. Regimens with EFV and TDF have weight suppressive properties. | **Onset**<br>• Gradual weight gain after initiating ARV drugs is common with all currently used regimens. The mechanism for weight gain is unclear and under investigation. | Rate of development of obesity is unclear. | **In Infants and Children**<br>• Limited evaluation has demonstrated weight gain, but such observations have not been consistently attributable to specific ARVs<br>**In Adolescents**<br>• Female sex<br>• Pre-treatment obesity | **Prevention**<br>• Initiate a calorically appropriate low-fat diet and an exercise regimen.<br>**Monitoring**<br>• BMI measurement<br>• Waist circumference and waist–hip ratio measurements | Counsel patient on lifestyle modifications and dietary interventions (e.g., maintaining a calorically appropriate healthy diet that is low in saturated fats and simple carbohydrates and starting an exercise regimen, especially strength training).<br>Children with HIV and significant weight gain should be managed according to standard AAP recommendations for weight management. |

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| | | | | **In Adults**<br>• Low pre-treatment BMI<br>• Pre-treatment advanced HIV disease<br>• Older age<br>• Female sex<br>• Black race<br>• Possible genetic polymorphisms | | |

**Key:** AAP = American Academy of Pediatrics; ART = antiretroviral therapy; ARV = antiretroviral; BIC = bictegravir; BMI = body mass index; CVD = cardiovascular disease; DTG = dolutegravir; DXA = dual energy X-ray absorptiometry; EFV = efavirenz; EVG = elvitegravir; INSTI = integrase strand transfer inhibitor; NRTI = nucleoside reverse transcriptase inhibitor; PI = protease inhibitor; RAL = raltegravir; TAF = tenofovir alafenamide; ZDV = zidovudine

See the archived version of Supplement III, February 23, 2009, Pediatric Guidelines on the Clinicalinfo website for a more complete discussion and reference list

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