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

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Appendix B, Table 7. Antiretroviral Dosing Recommendations in Patients with Renal or Hepatic Insufficiency (Last updated February 12, 2013; last reviewed February 12, 2013) (page 1 of 5)

See the reference section following Table 7 for creatinine clearance (CrCl) calculation formulas and criteria for Child-Pugh classification.

Antiretrovirals Generic Name (Abbreviation)/ Trade Name	Usual Daily Dose (Refer to Appendix B, Tables 1–6 for additional dosing information.)	Dosing in Renal Insufficiency (Including with chronic ambulatory peritoneal dialysis and hemodialysis)	Dosing in Hepatic Impairment
Nucleoside Reverse Transcriptase Inhibitors **Stribild should not be initiated in patients with CrCl <70 mL/min. Use of the following fixed-dose combinations is not recommended in patients with CrCl <50 mL/min: Atripla, Combivir, Stribild, Trizivir, or Epzicom. Use of Truvada is not recommended in patients with CrCl <30 mL/min.**			
Abacavir (ABC)/ Ziagen	300 mg PO BID	No dosage adjustment necessary	**Child-Pugh Score** — **Dose** 5–6: 200 mg PO BID (use oral solution) >6: Contraindicated
Didanosine EC (ddI)/ Videx EC	**Body weight ≥60 kg:** 400 mg PO once daily **Body weight <60 kg:** 250 mg PO once daily	**Dose (once daily)** **CrCl (mL/min)** — **≥60 kg** — **<60 kg** 30–59 — 200 mg — 125 mg 10–29 — 125 mg — 125 mg <10, HD, CAPD — 125 mg — use ddI oral solution	No dosage adjustment necessary
Didanosine oral solution (ddI)/ Videx	**Body weight ≥60 kg:** 200 mg PO BID or 400 mg PO once daily **Body weight <60 kg:** 250 mg PO once daily or 125 mg PO BID	**Dose (once daily)** **CrCl (mL/min)** — **≥60 kg** — **<60 kg** 30–59 — 200 mg — 150 mg 10–29 — 150 mg — 100 mg <10, HD, CAPD — 100 mg — 75 mg	No dosage adjustment necessary
Emtricitabine (FTC)/ Emtriva	200 mg oral capsule once daily or 240 mg (24 mL) oral solution once daily	**Dose** **CrCl (mL/min)** — **Capsule** — **Solution** 30–49 — 200 mg q48h — 120 mg q24h 15–29 — 200 mg q72h — 80 mg q24h <15 or on HD* — 200 mg q96h — 60 mg q24h *On dialysis days, take dose after HD session.	No dosage recommendation
Lamivudine (3TC)/ Epivir	300 mg PO once daily or 150 mg PO BID	**CrCl (mL/min)** — **Dose** 30–49 — 150 mg q24h 15–29 — 1 x 150 mg, then 100 mg q24h 5–14 — 1 x 150 mg, then 50 mg q24h <5 or on HD* — 1 x 50 mg, then 25 mg q24h *On dialysis days, take dose after HD session.	No dosage adjustment necessary

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See the reference section following Table 7 for creatinine clearance (CrCl) calculation formulas and criteria for Child-Pugh classification.

Antiretrovirals Generic Name (Abbreviation)/ Trade Name	Usual Daily Dose (Refer to Appendix B, Tables 1–6 for additional dosing information.)	Dosing in Renal Insufficiency (Including with chronic ambulatory peritoneal dialysis and hemodialysis)	Dosing in Hepatic Impairment
Stavudine (d4T)/ Zerit	**Body weight ≥60 kg:** 40 mg PO BID **Body weight <60 kg:** 30 mg PO BID	**Dose** **CrCl (mL/min)** **≥60 kg** **<60 kg** 26–50 20 mg q12h 15 mg q12h 10–25 or on HD* 20 mg q24h 15 mg q24h *On dialysis days, take dose after HD session.	No dosage recommendation
Tenofovir (TDF)/ Viread	300 mg PO once daily	**CrCl (mL/min)** **Dose** 30–49 300 mg q48h 10–29 300 mg twice weekly (every 72–96 hours) <10 and not on HD Not recommended On HD* 300 mg q7d *On dialysis days, take dose after HD session.	No dosage adjustment necessary
Emtricitabine (FTC) + **Tenofovir** (TDF)/ Truvada	1 tablet PO once daily	**CrCl (mL/min)** **Dose** 30–49 1 tablet q48h <30 or on HD Not recommended	No dosage recommendation
Zidovudine (AZT, ZDV)/ Retrovir	300 mg PO BID	**CrCl (mL/min)** **Dose** <15 or HD* 100 mg TID or 300 mg once daily *On dialysis days, take dose after HD session.	No dosage recommendation
Non-Nucleoside Reverse Transcriptase Inhibitors			
Delavirdine (DLV)/ Rescriptor	400 mg PO TID	No dosage adjustment necessary	No dosage recommendation; use with caution in patients with hepatic impairment.
Efavirenz (EFV)/ Sustiva	600 mg PO once daily, at or before bedtime	No dosage adjustment necessary	No dosage recommendation; use with caution in patients with hepatic impairment.
Efavirenz (EFV) + **Tenofovir** (TDF) + **Emtricitabine** (FTC)/ Atripla	1 tablet PO once daily	Not recommended for use in patients with CrCl <50 mL/min. Instead use the individual drugs of the fixed-dose combination and adjust TDF and FTC doses according to CrCl level.	
Etravirine (ETR)/ Intelence	200 mg PO BID	No dosage adjustment necessary	Child-Pugh Class A or B: No dosage adjustment Child-Pugh Class C: No dosage recommendation

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See the reference section following Table 7 for creatinine clearance (CrCl) calculation formulas and criteria for Child-Pugh classification.

Antiretrovirals Generic Name (Abbreviation)/ Trade Name	Daily Dose (Refer to Appendix B, Tables 1–6 for additional dosing information.)	Dosing in Renal Insufficiency (Including with chronic ambulatory peritoneal dialysis and hemodialysis)	Dosing in Hepatic Impairment
Non-Nucleoside Reverse Transcriptase Inhibitors, continued			
Nevirapine (NVP)/ Viramune or Viramune XR	200 mg PO BID or 400 mg PO once daily (using Viramune XR formulation)	Patients on HD: limited data; no dosage recommendation	Child-Pugh Class A: No dosage adjustment Child-Pugh Class B or C: Contraindicated
Rilpivirine (RPV)/ Edurant	25 mg PO once daily	No dosage adjustment necessary	Child-Pugh Class A or B: No dosage adjustment Child-Pugh Class C: No dosage recommendation
Rilpivirine (RPV) + **Tenofovir** (TDF) + **Emtricitabine** (FTC)/ Complera	1 tablet PO once daily	Not recommended for use in patients with CrCl <50 mL/min. Instead use the individual drugs of the fixed-dose combination and adjust TDF and FTC doses levels according to CrCl level.	Child-Pugh Class A or B: No dosage adjustment Child-Pugh Class C: No dosage recommendation
Protease Inhibitors			
Atazanavir (ATV)/ Reyataz	400 mg PO once daily or (ATV 300 mg + RTV 100 mg) PO once daily	No dosage adjustment for patients with renal dysfunction not requiring HD ARV-naive patients on HD: (ATV 300 mg + RTV 100 mg) once daily ARV-experienced patients on HD: ATV or RTV-boosted ATV not recommended	**Child-Pugh Class** — **Dose** B — 300 mg once daily C — Not recommended RTV boosting is **not** recommended in patients with hepatic impairment (Child-Pugh Class B or C).
Darunavir (DRV)/ Prezista	(DRV 800 mg + RTV 100 mg) PO once daily (ARV-naive patients only) or (DRV 600 mg + RTV 100 mg) PO BID	No dosage adjustment necessary	Mild-to-moderate hepatic impairment: No dosage adjustment Severe hepatic impairment: Not recommended
Fosamprenavir (FPV)/ Lexiva	1400 mg PO BID or (FPV 1400 mg + RTV 100–200 mg) PO once daily or (FPV 700 mg + RTV 100 mg) PO BID	No dosage adjustment necessary	PI-naive patients only: **Child-Pugh Score** — **Dose** 5–9 — 700 mg BID 10–15 — 350 mg BID PI-naive or PI-experienced patients: **Child-Pugh Score** — **Dose** 5–6 — 700 mg BID + RTV 100 mg once daily 7–9 — 450 mg BID + RTV 100 mg once daily 10–15 — 300 mg BID + RTV 100 mg once daily

Appendix B, Table 7. Antiretroviral Dosing Recommendations in Patients with Renal or Hepatic Insufficiency (Last updated February 12, 2013; last reviewed February 12, 2013) (page 4 of 5)

See the reference section following Table 7 for creatinine clearance (CrCl) calculation formulas and criteria for Child-Pugh classification.

Antiretrovirals Generic Name (Abbreviation)/ Trade Name	Daily Dose (Refer to Appendix B, Tables 1–6 for additional dosing information.)	Dosing in Renal Insufficiency (Including with chronic ambulatory peritoneal dialysis and hemodialysis)	Dosing in Hepatic Impairment
Protease Inhibitors, continued			
Indinavir (IDV)/ Crixivan	800 mg PO q8h	No dosage adjustment necessary	Mild-to-moderate hepatic insufficiency because of cirrhosis: 600 mg q8h
Lopinavir/ritonavir (LPV/r) Kaletra	400/100 mg PO BID or 800/200 mg PO once daily	Avoid once-daily dosing in patients on HD	No dosage recommendation; use with caution in patients with hepatic impairment.
Nelfinavir (NFV)/ Viracept	1250 mg PO BID	No dosage adjustment necessary	Mild hepatic impairment: No dosage adjustment Moderate-to-severe hepatic impairment: Do not use
Ritonavir (RTV)/ Norvir	As a PI-boosting agent: 100–400 mg per day	No dosage adjustment necessary	Refer to recommendations for the primary PI.
Saquinavir (SQV)/ Invirase	(SQV 1000 mg + RTV 100 mg) PO BID	No dosage adjustment necessary	Mild-to-moderate hepatic impairment: Use with caution Severe hepatic impairment: Contraindicated
Tipranavir (TPV)/ Aptivus	(TPV 500 mg + RTV 200 mg) PO BID	No dosage adjustment necessary	Child-Pugh Class A: Use with caution Child-Pugh Class B or C: Contraindicated
Integrase Inhibitors			
Raltegravir (RAL)/ Isentress	400 mg BID	No dosage adjustment necessary	Mild-to-moderate hepatic insufficiency: No dosage adjustment necessary Severe hepatic insufficiency: No recommendation
Elvitegravir (EVG)/ **Cobicistat** (COBI)/ **Tenofovir** (TDF)/ **Emtricitabine** (FTC)/ Stribild (only available as a co-formulated product)	1 tablet once daily	EVG/COBI/TDF/FTC **should not be initiated** in patients with CrCl <70 mL/min. Discontinue EVG/COBI/TDF/FTC if CrCl declines to <50 mL/min while patient is on therapy.	Mild-to-moderate hepatic insufficiency: No dosage adjustment necessary Severe hepatic insufficiency: Not recommended

Appendix B, Table 7. Antiretroviral Dosing Recommendations in Patients with Renal or Hepatic Insufficiency (Last updated February 12, 2013; last reviewed February 12, 2013) (page 5 of 5)

See the reference section following Table 7 for creatinine clearance (CrCl) calculation formulas and criteria for Child-Pugh classification.

Antiretrovirals Generic Name (Abbreviation)/ Trade Name	Daily Dose (Refer to Appendix B, Tables 1–6 for additional dosing information.)	Dosing in Renal Insufficiency (Including with chronic ambulatory peritoneal dialysis and hemodialysis)	Dosing in Hepatic Impairment
Fusion Inhibitor			
Enfuvirtide (T20)/ Fuzeon	90 mg subcutaneous BID	No dosage adjustment necessary	No dosage adjustment necessary
CCR5 Antagonist			
Maraviroc (MVC)/ Selzentry	The recommended dose differs based on concomitant medications and potential for drug-drug interactions. See Appendix B, Table 6 for detailed dosing information.	**CrCl <30 mL/min or on HD** Without potent CYP3A inhibitors or inducers: 300 mg BID; reduce to 150 mg BID if postural hypotension occurs With potent CYP3A inducers or inhibitors: Not recommended	No dosage recommendations. Concentrations will likely be increased in patients with hepatic impairment.

Key to Abbreviations: 3TC = lamivudine, ABC = abacavir, ARV = antiretroviral, ATV = atazanavir, AZT = zidovudine, BID = twice daily, CAPD = chronic ambulatory peritoneal dialysis, COBI = cobicistat, CrCl = creatinine clearance, CYP = cytochrome P, d4T = stavudine, ddI = didanosine, DLV = delavirdine, DRV = darunavir, EC = enteric coated, EFV = efavirenz, ETR = etravirine, EVG= elvitegravir, FPV = fosamprenavir, FTC = emtricitabine, HD = hemodialysis, IDV = indinavir, LPV/r = lopinavir/ritonavir, MVC = maraviroc, NFV = nelfinavir, NNRTI = non-nucleoside reverse transcriptase inhibitor, NRTI = nucleoside reverse transcriptase inhibitor, NVP = nevirapine, PI = protease inhibitor, PO = orally, RAL = raltegravir, RPV = rilpivirine, RTV = ritonavir, SQV = saquinavir, T20 = enfuvirtide, TDF = tenofovir, TID = three times daily, TPV = tipranavir, XR = extended release, ZVD = zidovudine

Creatinine Clearance Calculation	
Male: $\frac{(140 - \text{age in years}) \times (\text{weight in kg})}{72 \times (\text{serum creatinine})}$	Female: $\frac{(140 - \text{age in years}) \times (\text{weight in kg}) \times (0.85)}{72 \times (\text{serum creatinine})}$

Child-Pugh Score			
Component	**Points Scored**		
	1	**2**	**3**
Encephalopathy[a]	None	Grade 1–2	Grade 3–4
Ascites	None	Mild or controlled by diuretics	Moderate or refractory despite diuretics
Albumin	>3.5 g/dL	2.8–3.5 g/dL	<2.8 g/dL
Total bilirubin or	<2 mg/dL (<34 µmol/L)	2–3 mg/dL (34 µmol/L to 50 µmol/L)	>3 mg/dL (>50 µmol/L)
Modified total bilirubin[b]	<4 mg/dL	4–7 mg/dL	>7 mg/dL
Prothrombin time (seconds prolonged) or	<4	4–6	>6
International normalized ratio (INR)	<1.7	1.7–2.3	>2.3

[a] Encephalopathy Grades

Grade 1: Mild confusion, anxiety, restlessness, fine tremor, slowed coordination

Grade 2: Drowsiness, disorientation, asterixis

Grade 3: Somnolent but rousable, marked confusion, incomprehensible speech, incontinence, hyperventilation

Grade 4: Coma, decerebrate posturing, flaccidity

[b] Modified total bilirubin used for patients who have Gilbert's syndrome or who are taking indinavir or atazanavir

Child-Pugh Classification	Total Child-Pugh Score[c]
Class A	5–6 points
Class B	7–9 points
Class C	>9 points

[c] Sum of points for each component