Appendix B, Table 10. Antiretroviral Dosing Recommendations in Persons with Renal or Hepatic Insufficiency (Last updated December 18, 2019; last reviewed December 18, 2019)

The older ARV drugs ddI, d4T, FPV, IDV, NFV, SQV, and TPV are no longer commonly used in clinical practice and have been removed from this table. Please refer to the July 10, 2019, guidelines in the Guidelines Archive section of AIDS*info* or to the FDA product labels for these drugs for recommendations on dosing in persons with renal or hepatic insufficiency.

See the reference section at the end of this table for CrCl calculation formulas and criteria for Child-Pugh classification.

<table>
<tr><th>Generic Name
(Abbreviations)
Trade Name</th><th>Usual Daily Dose[a]</th><th>Dosing in Persons with Renal Insufficiency</th><th>Dosing in Persons with Hepatic Impairment</th></tr>
<tr><td colspan="4">Some FDC products are not recommended in persons with different degrees of renal insufficiency. The recommendations for individual FDCs based on CrCl level are outlined below.
• CrCl <70 mL/min: Initiation of Stribild is not recommended.
• CrCl <50 mL/min: FDCs not recommended: Atripla, Combivir, Complera, Delstrigo, Dovato, Epzicom, Triumeq, or Trizivir.
• CrCl <30 mL/min: FDCs not recommended: Biktarvy and Truvada.
• CrCl <30 mL/min and not on HD: FDCs not recommended: Descovy, Genvoya, Odefsey, and Symtuza.
The component drugs in some of the FDC products listed above may be prescribed as individual formulations with dose adjustment based on CrCl level as indicated below in this table.</td></tr>
<tr><td colspan="4">NRTIs</td></tr>
<tr><td>Abacavir
(ABC)
Ziagen</td><td>ABC 300 mg PO twice daily
or
ABC 600 mg PO once daily</td><td>No dose adjustment necessary.</td><td>Child-Pugh Class A: ABC 200 mg PO twice daily (use oral solution)
Child-Pugh Class B or C: Contraindicated</td></tr>
<tr><td>Emtricitabine
(FTC)
Emtriva</td><td>FTC 200 mg oral capsule once daily
or
FTC 240 mg (24 mL) oral solution once daily</td><td><table><tr><th colspan="3">Dose by Formulation</th></tr><tr><th>CrCl (mL/min)</th><th>Capsule</th><th>Solution</th></tr><tr><td>30–49</td><td>200 mg every 48 hours</td><td>120 mg every 24 hours</td></tr><tr><td>15–29</td><td>200 mg every 72 hours</td><td>80 mg every 24 hours</td></tr><tr><td><15</td><td>200 mg every 96 hours</td><td>60 mg every 24 hours</td></tr><tr><td>On HD[b]</td><td>200 mg every 24 hours</td><td>240 mg every 24 hours</td></tr></table></td><td>No dose recommendation.</td></tr>
<tr><td>Lamivudine
(3TC)
Epivir</td><td>3TC 300 mg PO once daily
or
3TC 150 mg PO twice daily</td><td><table><tr><th>CrCl (mL/min)</th><th>Dose</th></tr><tr><td>30–49</td><td>150 mg every 24 hours</td></tr><tr><td>15–29</td><td>1 x 150 mg, then 100 mg every 24 hours</td></tr><tr><td>5–14</td><td>1 x 150 mg, then 50 mg every 24 hours</td></tr><tr><td><5 or on HD[b]</td><td>1 x 50 mg, then 25 mg every 24 hours</td></tr></table></td><td>No dose adjustment necessary.</td></tr>
<tr><td>Tenofovir Alafenamide
(TAF)
Vemlidy</td><td>Vemlidy is available as a 25-mg tablet for the treatment of HBV.</td><td><table><tr><th>CrCl (mL/min)</th><th>Dose</th></tr><tr><td><15 and not on HD</td><td>Not recommended</td></tr><tr><td>On HD[b]</td><td>One tablet once daily.</td></tr></table></td><td>Child-Pugh Class B or C: Not recommended</td></tr>
</table>

Appendix B, Table 10. Antiretroviral Dosing Recommendations in Persons with Renal or Hepatic Insufficiency (Last updated December 18, 2019; last reviewed December 18, 2019)

<table>
<tr><th>Generic Name
(Abbreviations)
Trade Name</th><th>Usual Daily Dose[a]</th><th>Dosing in Persons with Renal Insufficiency</th><th>Dosing in Persons with Hepatic Impairment</th></tr>
<tr><td colspan="4">NRTIs, continued</td></tr>
<tr><td>Tenofovir Alafenamide/ Emtricitabine
(TAF/FTC)
Descovy</td><td>TAF for HIV treatment is only available as a component of FDC tablets (i.e., in Descovy, Genvoya, Odefsey, Biktarvy, and Symtuza).
TAF 10 mg PO daily with EVG/c (Genvoya) or DRV/c (Symtuza)
TAF 25 mg PO daily in other FDC tablets</td><td><table><tr><th>CrCl (mL/min)</th><th>Dose</th></tr><tr><td><30 and not on HD</td><td>Not recommended</td></tr><tr><td><30 and on HD[b]</td><td>One tablet once daily.</td></tr></table></td><td>Child-Pugh Class A or B: No dose adjustment
Child-Pugh Class C: No dose recommendation</td></tr>
<tr><td>Tenofovir Disoproxil Fumarate
(TDF)
Viread</td><td>TDF 300 mg PO once daily</td><td><table><tr><th>CrCl (mL/min)</th><th>Dose</th></tr><tr><td>30–49</td><td>300 mg every 48 hours</td></tr><tr><td>10–29</td><td>300 mg twice weekly (every 72–96 hours)</td></tr><tr><td><10 and not on HD</td><td>No recommendation</td></tr><tr><td>On HD[b]</td><td>300 mg every 7 days</td></tr></table></td><td>No dose adjustment necessary.</td></tr>
<tr><td>Tenofovir Disoproxil Fumarate/ Emtricitabine
(TDF/FTC)
Truvada</td><td>One tablet PO once daily</td><td><table><tr><th>CrCl (mL/min)</th><th>Dose</th></tr><tr><td>30–49</td><td>One tablet every 48 hours</td></tr><tr><td><30 or on HD</td><td>Not recommended</td></tr></table></td><td>No dose recommendation.</td></tr>
<tr><td>Tenofovir Disoproxil Fumarate/Lamivudine
(TDF/3TC)
Cimduo</td><td>One tablet PO once daily</td><td><table><tr><th>CrCl (mL/min)</th><th>Dose</th></tr><tr><td><50 or on HD</td><td>Not recommended</td></tr></table></td><td>No dose recommendation.</td></tr>
<tr><td>Zidovudine
(ZDV)
Retrovir</td><td>ZDV 300 mg PO twice daily</td><td><table><tr><th>CrCl (mL/min)</th><th>Dose</th></tr><tr><td><15 or on HD[b]</td><td>100 mg three times a day or 300 mg once daily</td></tr></table></td><td>No dose recommendation.</td></tr>
<tr><td colspan="4">NNRTIs</td></tr>
<tr><td>Doravirine
(DOR)
Pifeltro</td><td>One tablet PO once daily</td><td>No dose adjustment required in mild, moderate, or severe renal impairment. Has not been studied in individuals with ESRD or on HD.</td><td>Child-Pugh Class A or B: No dose adjustment
Child-Pugh Class C: Not studied</td></tr>
<tr><td>Doravirine/Tenofovir Disoproxil Fumarate/ Lamivudine
(DOR/TDF/3TC)
Delstrigo</td><td>One tablet PO once daily</td><td>Not recommended if CrCl <50 mL/min.</td><td>Child-Pugh Class A or B: No dose adjustment
Child-Pugh Class C: Not studied</td></tr>
</table>

Appendix B, Table 10. Antiretroviral Dosing Recommendations in Persons with Renal or Hepatic Insufficiency (Last updated December 18, 2019; last reviewed December 18, 2019) (page 3 of 6)

Generic Name (Abbreviations) *Trade Name*	**Usual Daily Dose**[a]	**Dosing in Persons with Renal Insufficiency**	**Dosing in Persons with Hepatic Impairment**
NNRTIs, continued			
Efavirenz (EFV) *Sustiva*	EFV 600 mg PO once daily on an empty stomach, preferably at bedtime	No dose adjustment necessary.	No dose recommendation; use with caution in patients with hepatic impairment.
Efavirenz/Tenofovir Disoproxil Fumarate/ Emtricitabine (EFV/TDF/FTC) *Atripla*	One tablet PO once daily on an empty stomach, preferably at bedtime	**Not recommended** if CrCl <50 mL/min. Instead, use the individual component ARVs and adjust TDF and FTC doses according to CrCl level.	No dose recommendation; use with caution in patients with hepatic impairment.
Efavirenz 600 mg/ Tenofovir Disoproxil Fumarate/Lamivudine (EFV/TDF/3TC) *Symfi*	One tablet once daily on an empty stomach, preferably at bedtime	**Not recommended** if CrCl <50 mL/min or if patient is on HD. Instead, use the individual component ARVs and adjust TDF and 3TC doses according to CrCl level.	**Not recommended** for patients with moderate or severe hepatic impairment. Use with caution in patients with mild hepatic impairment.
Efavirenz 400 mg/ Tenofovir Disoproxil Fumarate/Lamivudine (EFV/TDF/3TC) *Symfi Lo*	One tablet once daily on an empty stomach, preferably at bedtime	**Not recommended** if CrCl <50 mL/min or if patient is on HD. Instead, use the individual component ARVs and adjust TDF and 3TC doses according to CrCl level.	**Not recommended** for patients with moderate or severe hepatic impairment. Use with caution in patients with mild hepatic impairment.
Etravirine (ETR) *Intelence*	ETR 200 mg PO twice daily	No dose adjustment necessary.	*Child-Pugh Class A or B:* No dose adjustment *Child-Pugh Class C:* No dose recommendation
Nevirapine (NVP) *Viramune* or *Viramune XR*	NVP 200 mg PO twice daily *or* NVP 400 mg PO once daily (using Viramune XR formulation)	No dose adjustment for patients with renal impairment. Patients on HD should receive an additional dose of NVP 200 mg following each dialysis treatment.	*Child-Pugh Class A:* No dose adjustment *Child-Pugh Class B or C:* **Contraindicated**
Rilpivirine (RPV) *Edurant*	RPV 25 mg PO once daily	No dose adjustment necessary.	*Child-Pugh Class A or B:* No dose adjustment *Child-Pugh Class C:* No dose recommendation
Rilpivirine/Tenofovir Alafenamide/ Emtricitabine (RPV/TAF/FTC) *Odefsey*	One tablet PO once daily	**In Patients on Chronic HD:** • One tablet once daily. On HD days, administer after dialysis. **Not recommended** in patients with CrCl <30 mL/min who are not receiving chronic HD.	*Child-Pugh Class A or B:* No dose adjustment *Child-Pugh Class C:* No dose recommendation
Rilpivirine/Tenofovir Disoproxil Fumarate/ Emtricitabine (RPV/TDF/FTC) *Complera*	One tablet PO once daily	**Not recommended** if CrCl <50 mL/min. Instead, use the individual component ARVs and adjust TDF and FTC doses according to CrCl level.	*Child-Pugh Class A or B:* No dose adjustment *Child-Pugh Class C:* No dose recommendation

Appendix B, Table 10. Antiretroviral Dosing Recommendations in Persons with Renal or Hepatic Insufficiency (Last updated December 18, 2019; last reviewed December 18, 2019) (page 4 of 6)

Generic Name (Abbreviations) *Trade Name*	**Usual Daily Dose[a]**	**Dosing in Persons with Renal Insufficiency**	**Dosing in Persons with Hepatic Impairment**
NNRTIs, continued			
Rilpivirine/ Dolutegravir (RPV/DTG) *Juluca*	One tablet PO once daily with food	No dose adjustment necessary. In patients with CrCl <30 mL/min, monitor closely for adverse effects.	*Child-Pugh Class A or B:* No dose adjustment *Child-Pugh Class C:* No dose recommendation
PIs			
Atazanavir (ATV) *Reyataz*	ATV 400 mg PO once daily *or* (ATV 300 mg plus RTV 100 mg) PO once daily	No dose adjustment for patients with renal dysfunction who do not require HD. **In ARV-Naive Patients on HD:** • (ATV 300 mg plus RTV 100 mg) once daily **In ARV-Experienced Patients on HD:** • ATV and ATV/r **are not recommended**	*Child-Pugh Class A:* No dose adjustment *Child-Pugh Class B:* ATV 300 mg once daily (unboosted) for ARV-naive patients only *Child-Pugh Class C:* **Not recommended** RTV boosting **is not recommended** in patients with hepatic impairment.
Atazanavir/Cobicistat (ATV/c) *Evotaz*	One tablet PO once daily	**If Used with TDF:** • **Not recommended** if CrCl <70 mL/min	**Not recommended** in patients with hepatic impairment.
Darunavir (DRV) *Prezista*	**In ARV-Naive Patients and ARV-Experienced Patients with No DRV Resistance Mutations:** • (DRV 800 mg plus RTV 100 mg) PO once daily with food **In ARV-Experienced Patients with at Least One DRV Resistance Mutation:** • (DRV 600 mg plus RTV 100 mg) PO twice daily	No dose adjustment necessary.	*In Patients with Mild-to-Moderate Hepatic Impairment:* No dose adjustment *In Patients with Severe Hepatic Impairment:* **Not recommended**
Darunavir/Cobicistat (DRV/c) *Prezcobix*	One tablet PO once daily	**If Used with TDF:** • **Not recommended** if CrCl <70 mL/min	*Child-Pugh Class A or B:* No dose adjustment *Child-Pugh Class C:* **Not recommended**
Darunavir/ Cobicistat/Tenofovir Alafenamide/ Emtricitabine (DRV/c/TAF/FTC) *Symtuza*	One tablet PO once daily	**In Patients on Chronic HD:** • One tablet once daily. On HD days, administer after dialysis. **Not recommended** in patients with CrCl <30 mL/min who are not receiving chronic HD.	**Not recommended** for patients with severe hepatic impairment.

Appendix B, Table 10. Antiretroviral Dosing Recommendations in Persons with Renal or Hepatic Insufficiency (Last updated December 18, 2019; last reviewed December 18, 2019) (page 5 of 6)

Generic Name (Abbreviations) *Trade Name*	**Usual Daily Dose[a]**	**Dosing in Persons with Renal Insufficiency**	**Dosing in Persons with Hepatic Impairment**
PIs, continued			
Lopinavir/Ritonavir (LPV/r) *Kaletra*	(LPV/r 400 mg/100 mg) PO twice daily *or* (LPV/r 800 mg/200 mg) PO once daily	Avoid once-daily dosing in patients on HD.	No dose recommendation; use with caution in patients with hepatic impairment.
Ritonavir (RTV) *Norvir*	**As a PI-Boosting Agent:** • RTV 100–400 mg per day	No dose adjustment necessary.	Refer to recommendations for the primary (i.e., boosted) PI.
INSTIs			
Bictegravir/Tenofovir Alafenamide/ Emtricitabine (BIC/TAF/FTC) *Biktarvy*	One tablet once daily	**Not recommended** for use in patients with CrCl <30 mL/min.	*Child-Pugh Class A or B:* No dose adjustment *Child-Pugh Class C:* **Not recommended**
Dolutegravir (DTG) *Tivicay*	DTG 50 mg once daily *or* DTG 50 mg twice daily	No dose adjustment necessary.	*Child-Pugh Class A or B:* No dose adjustment *Child-Pugh Class C:* **Not recommended**
Dolutegravir/ Abacavir/Lamivudine (DTG/ABC/3TC) *Triumeq*	One tablet once daily	**Not recommended** if CrCl <50 mL/min. Instead, use the individual component drugs and adjust 3TC dose according to CrCl.	*Child-Pugh Class A:* Patients with mild hepatic impairment require a dose reduction of ABC. Use the individual drugs instead of the FDC tablet in these patients. *Child-Pugh Class B or C:* **Contraindicated** due to the ABC component
Dolutegravir/ Rilpivirine (DTG/RPV) *Juluca*	One tablet PO once daily with food	No dose adjustment necessary. In patients with CrCl <30 mL/min, monitor closely for adverse effects.	*Child-Pugh Class A or B:* No dose adjustment *Child-Pugh Class C:* No dose recommendation
Elvitegravir/ Cobicistat/Tenofovir Alafenamide/ Emtricitabine (EVG/c/TAF/FTC) *Genvoya*	One tablet once daily	**In Patients on Chronic HD:** • One tablet once daily. On HD days, administer after dialysis. **Not recommended** in patients with CrCl <30 mL/min who are not receiving chronic HD.	*In Patients with Mild-to-Moderate Hepatic Insufficiency:* No dose adjustment necessary *In Patients with Severe Hepatic Insufficiency:* **Not recommended**
Elvitegravir/ Cobicistat/Tenofovir Disoproxil Fumarate/ Emtricitabine (EVG/c/TDF/FTC) *Stribild*	One tablet once daily	EVG/c/TDF/FTC **should not be initiated** in patients with CrCl <70 mL/min. Discontinue EVG/c/TDF/FTC if CrCl declines to <50 mL/min while patient is on therapy.	*In Patients with Mild-to-Moderate Hepatic Insufficiency:* No dose adjustment necessary *In Patients with Severe Hepatic Insufficiency:* **Not recommended**

Appendix B, Table 10. Antiretroviral Dosing Recommendations in Persons with Renal or Hepatic Insufficiency (Last updated December 18, 2019; last reviewed December 18, 2019) (page 6 of 6)

Generic Name (Abbreviations) *Trade Name*	Usual Daily Dose[a]	Dosing in Persons with Renal Insufficiency	Dosing in Persons with Hepatic Impairment
INSTIs, continued			
Raltegravir (RAL) *Isentress* *Isentress HD*	RAL 400 mg twice daily (using Isentress formulation) *or* RAL 1,200 mg once daily (using Isentress HD formulation only)	No dose adjustment necessary.	*In Patients with Mild-to-Moderate Hepatic Insufficiency:* No dose adjustment necessary *In Patients with Severe Hepatic Insufficiency:* No recommendation
Fusion Inhibitor			
Enfuvirtide (T-20) *Fuzeon*	T-20 90 mg SQ twice daily	No dose adjustment necessary.	No dose 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 8 for detailed dosing information.	**In Patients with CrCl <30 mL/min or Patients Who Are on HD** *Without Potent CYP3A Inhibitors or Inducers:* • MVC 300 mg twice daily; if postural hypotension occurs, reduce to MVC 150 mg twice daily *With Potent CYP3A Inducers or Inhibitors:* • **Not recommended**	No dose recommendations. MVC concentrations will likely be increased in patients with hepatic impairment.
CD4 Post-Attachment Inhibitor			
Ibalizumab (IBA) *Trogarzo*	Loading dose: IBA 2,000 mg IV Maintenance dose: IBA 800 mg IV every 2 weeks	No dose adjustment recommended.	No recommendation.

[a] Refer to Appendix B, Tables 1–9 for additional dosing information.

[b] On dialysis days, the patient should take the dose after the HD session.

Key: 3TC = lamivudine; ABC = abacavir; ARV = antiretroviral; ATV = atazanavir; ATV/c = atazanavir/cobicistat; ATV/r = atazanavir/ritonavir; BIC = bictegravir; CAPD = chronic ambulatory peritoneal dialysis; COBI = cobicistat; CrCl = creatinine clearance; CYP = cytochrome P; d4T = stavudine; ddI = didanosine; DOR = doravirine; DRV = darunavir; DRV/c = darunavir/cobicistat; DTG = dolutegravir; EC = enteric coated; EFV = efavirenz; ESRD = end stage renal disease; ETR = etravirine; EVG = elvitegravir; EVG/c = elvitegravir/cobicistat; FDA = Food and Drug Administration; FDC = fixed-dose combination; FPV = fosamprenavir; FTC = emtricitabine; HBV = hepatitis B virus; HD = hemodialysis; IBA = ibalizumab; IDV = indinavir; INSTI = integrase strand transfer inhibitor; IV = intravenous; LPV = lopinavir; 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; SQ = subcutaneous; SQV = saquinavir; T-20 = enfuvirtide; TAF = tenofovir alafenamide; TDF = tenofovir disoproxil fumarate; TPV = tipranavir; XR = extended release; ZDV = 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 (34–50 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[a]
Class A	5–6 points
Class B	7–9 points
Class C	>9 points

[a] Sum of points for each component of the Child-Pugh Score.