



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

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Appendix B, Table 1. Characteristics of Nucleoside Reverse Transcriptase Inhibitors (NRTIs) (Last updated May 1, 2014; last reviewed May 1, 2014) (page 1 of 5)

| Generic Name (Abbreviation) Trade Name | Formulations | Dosing Recommendations ^a | Elimination | Serum/ Intracellular Half-Lives | Adverse Events ^b |
|---|--|---|---|---------------------------------------|--|
| Abacavir (ABC) <i>Ziagen</i> Note: Generic available in tablet formulation Also available as a component of fixed-dose combinations. | <u>Ziagen:</u> <ul style="list-style-type: none"> • 300 mg tablet • 20 mg/mL oral solution | <u>Ziagen:</u> <ul style="list-style-type: none"> • 300 mg BID, or • 600 mg once daily • Take without regard to meals. | Metabolized by alcohol dehydrogenase and glucuronyl transferase Renal excretion of metabolites: 82% Dosage adjustment for ABC is recommended in patients with hepatic insufficiency (see Appendix B, Table 7). | 1.5 hours/ 12–26 hours | <ul style="list-style-type: none"> • HSRs: Patients who test positive for HLA-B*5701 are at highest risk. HLA screening should be done before initiation of ABC. Re-challenge is not recommended. • Symptoms of HSR may include fever, rash, nausea, vomiting, diarrhea, abdominal pain, malaise, or fatigue or respiratory symptoms such as sore throat, cough, or shortness of breath. • Some cohort studies suggest increased risk of MI with recent or current use of ABC, but this risk is not substantiated in other studies. |
| <i>Trizivir</i> ABC with ZDV + 3TC Note: Generic available | <u>Trizivir:</u> <ul style="list-style-type: none"> • ABC 300 mg + ZDV 300 mg + 3TC 150 mg tablet | <u>Trizivir:</u> <ul style="list-style-type: none"> • 1 tablet BID | | | |
| <i>Epzicom</i> ABC with 3TC | <u>Epzicom:</u> <ul style="list-style-type: none"> • ABC 600 mg + 3TC 300 mg tablet | <u>Epzicom:</u> <ul style="list-style-type: none"> • 1 tablet once daily | | | |
| Didanosine (ddl) <i>Videx EC</i> Note: Generic available; dose same as Videx EC | <u>Videx EC:</u> <ul style="list-style-type: none"> • 125, 200, 250, and 400 mg capsules <u>Videx:</u> <ul style="list-style-type: none"> • 10 mg/mL oral solution | <u>Body Weight ≥60 kg:</u> <ul style="list-style-type: none"> • 400 mg once daily <u>With TDF:</u> <ul style="list-style-type: none"> • 250 mg once daily <u>Body Weight <60 kg:</u> <ul style="list-style-type: none"> • 250 mg once daily <u>With TDF:</u> <ul style="list-style-type: none"> • 200 mg once daily Take 1/2 hour before or 2 hours after a meal. Note: Preferred dosing with oral solution is BID (total daily dose divided into 2 doses) | Renal excretion: 50% Dosage adjustment in patients with renal insufficiency is recommended (see Appendix B, Table 7). | 1.5 hours/ >20 hours | <ul style="list-style-type: none"> • Pancreatitis • Peripheral neuropathy • Retinal changes, optic neuritis • Lactic acidosis with hepatic steatosis +/- pancreatitis (rare but potentially life-threatening toxicity) • Nausea, vomiting • Potential association with non-cirrhotic portal hypertension; in some cases, patients presented with esophageal varices • One cohort study suggested increased risk of MI with recent or current use of ddl, but this risk is not substantiated in other studies. • Insulin resistance/diabetes mellitus |

Appendix B, Table 1. Characteristics of Nucleoside Reverse Transcriptase Inhibitors (NRTIs) (Last updated May 1, 2014; last reviewed May 1, 2014) (page 2 of 5)

| Generic Name (Abbreviation) Trade Name | Formulations | Dosing Recommendations ^a | Elimination | Serum/ Intracellular Half-Lives | Adverse Events ^b |
|---|---|---|---|---------------------------------------|--|
| Emtricitabine (FTC) <i>Emtriva</i> Also available as a component of fixed-dose combinations. | <u>Emtriva:</u> • 200 mg hard gelatin capsule • 10 mg/mL oral solution | <u>Emtriva</u> <i>Capsule:</i> • 200 mg once daily <i>Oral Solution:</i> • 240 mg (24 mL) once daily Take without regard to meals. | Renal excretion: 86% Dosage adjustment in patients with renal insufficiency is recommended (see Appendix B, Table 7). | 10 hours/ >20 hours | <ul style="list-style-type: none"> Minimal toxicity Hyperpigmentation/skin discoloration Severe acute exacerbation of hepatitis may occur in HBV-coinfected patients who discontinue FTC. |
| <i>Atripla</i> FTC with EFV + TDF | <u>Atripla:</u> • FTC 200 mg + EFV 600 mg + TDF 300 mg tablet | <u>Atripla:</u> • 1 tablet at or before bedtime • Take on an empty stomach to reduce side effects. | | | |
| <i>Complera</i> FTC with RPV + TDF | <u>Complera:</u> • FTC 200 mg + RPV 25 mg + TDF 300 mg tablet | <u>Complera:</u> • 1 tablet once daily with a meal | | | |
| <i>Stribild</i> FTC with EVG + cobinamide + TDF | <u>Stribild:</u> • FTC 200 mg + EVG 150 mg + cobinamide 150 mg + TDF 300 mg tablet | <u>Stribild:</u> • 1 tablet once daily with food | | | |
| <i>Truvada</i> FTC with TDF | <u>Truvada:</u> • FTC 200 mg + TDF 300 mg tablet | <u>Truvada:</u> • 1 tablet once daily | | | |

Appendix B, Table 1. Characteristics of Nucleoside Reverse Transcriptase Inhibitors (NRTIs) (Last updated May 1, 2014; last reviewed May 1, 2014) (page 3 of 5)

| Generic Name (Abbreviation) Trade Name | Formulations | Dosing Recommendations ^a | Elimination | Serum/ Intracellular Half-Lives | Adverse Events ^b |
|---|--|---|---|---------------------------------------|--|
| Lamivudine (3TC) <i>EpiVir</i> Note: Generic available in tablet formulation Also available as a component of fixed-dose combinations. | <u>EpiVir:</u> <ul style="list-style-type: none"> • 150 and 300 mg tablets • 10 mg/mL oral solution | <u>EpiVir:</u> <ul style="list-style-type: none"> • 150 mg BID, or • 300 mg once daily • Take without regard to meals. | Renal excretion: 70% Dosage adjustment in patients with renal insufficiency is recommended (see Appendix B, Table 7). | 5–7 hours/ 18–22 hours | <ul style="list-style-type: none"> • Minimal toxicity • Severe acute exacerbation of hepatitis may occur in HBV-coinfected patients who discontinue 3TC. |
| <i>Combivir</i> 3TC with ZDV Note: Generic available | <u>Combivir:</u> <ul style="list-style-type: none"> • 3TC 150 mg + ZDV 300 mg tablet | <u>Combivir:</u> <ul style="list-style-type: none"> • 1 tablet BID | | | |
| <i>Epzicom</i> 3TC with ABC | <u>Epzicom:</u> <ul style="list-style-type: none"> • 3TC 300 mg + ABC 600 mg tablet | <u>Epzicom:</u> <ul style="list-style-type: none"> • 1 tablet once daily | | | |
| <i>Trizivir</i> 3TC with ZDV + ABC Note: Generic available | <u>Trizivir:</u> <ul style="list-style-type: none"> • 3TC 150 mg + ZDV 300 mg + ABC 300 mg tablet | <u>Trizivir:</u> <ul style="list-style-type: none"> • 1 tablet BID | | | |
| Stavudine (d4T) <i>Zerit</i> Note: Generic available | <u>Zerit:</u> <ul style="list-style-type: none"> • 15, 20, 30, and 40 mg capsules • 1 mg/mL oral solution | <u>Body Weight ≥60 kg:</u> <ul style="list-style-type: none"> • 40 mg BID <u>Body Weight <60 kg:</u> <ul style="list-style-type: none"> • 30 mg BID Take without regard to meals. Note: WHO recommends 30 mg BID dosing regardless of body weight. | Renal excretion: 50% Dosage adjustment in patients with renal insufficiency is recommended (see Appendix B, Table 7). | 1 hour/ 7.5 hours | <ul style="list-style-type: none"> • Peripheral neuropathy • Lipoatrophy • Pancreatitis • Lactic acidosis/severe hepatomegaly with hepatic steatosis (rare but potentially life-threatening toxicity) • Hyperlipidemia • Insulin resistance/diabetes mellitus • Rapidly progressive ascending neuromuscular weakness (rare) |

Appendix B, Table 1. Characteristics of Nucleoside Reverse Transcriptase Inhibitors (NRTIS) (Last updated May 1, 2014; last reviewed May 1, 2014) (page 4 of 5)

| Generic Name (Abbreviation) Trade Name | Formulations | Dosing Recommendations ^a | Elimination | Serum/ Intracellular Half-Lives | Adverse Events ^b |
|---|--|---|---|---------------------------------------|---|
| Tenofovir Disoproxil Fumarate (TDF) <i>Viread</i> Also available as a component of fixed-dose combinations. | <u>Viread:</u> <ul style="list-style-type: none"> • 150, 200, 250, 300 mg tablets • 40 mg/g oral powder | <u>Viread:</u> <ul style="list-style-type: none"> • 300 mg once daily or • 7.5 level scoops once daily (dosing scoop dispensed with each prescription; one level scoop contains 1 g of oral powder). • Take without regard to meals. <p>Mix oral powder with 2–4 ounces of a soft food that does not require chewing (e.g., applesauce, yogurt). Do not mix oral powder with liquid.</p> | Renal excretion – primary route of elimination Dosage adjustment in patients with renal insufficiency is recommended (see Appendix B, Table 7). | 17 hours/ >60 hours | <ul style="list-style-type: none"> • Renal insufficiency, Fanconi syndrome, proximal tubulopathy • Osteomalacia, decrease in bone mineral density • Potential decrease in bone mineral density • Severe acute exacerbation of hepatitis may occur in HBV-coinfected patients who discontinue TDF. • Asthenia, headache, diarrhea, nausea, vomiting, and flatulence |
| <i>Atripla</i> TDF with EFV + FTC | <u>Atripla:</u> <ul style="list-style-type: none"> • TDF 300 mg + EFV 600 mg + FTC 200 mg tablet | <u>Atripla:</u> <ul style="list-style-type: none"> • 1 tablet at or before bedtime • Take on an empty stomach to reduce side effects. | | | |
| <i>Complera</i> TDF with RPV + FTC | <u>Complera:</u> <ul style="list-style-type: none"> • TDF 300 mg + RPV 25 mg + FTC 200 mg tablet | <u>Complera:</u> <ul style="list-style-type: none"> • 1 tablet once daily • Take with a meal. | | | |
| <i>Stribild</i> TDF with EVG + cobin + FTC | <u>Stribild:</u> <ul style="list-style-type: none"> • TDF 300 mg + EVG 150 mg + cobin 150 mg + FTC 200 mg tablet | <u>Stribild:</u> <ul style="list-style-type: none"> • 1 tablet once daily • Take with food. | | | |
| <i>Truvada</i> TDF with FTC | <u>Truvada:</u> <ul style="list-style-type: none"> • TDF 300 mg + FTC 200 mg tablet | <u>Truvada:</u> <ul style="list-style-type: none"> • 1 tablet once daily • Take without regard to meals. | | | |

Appendix B, Table 1. Characteristics of Nucleoside Reverse Transcriptase Inhibitors (NRTIS) (Last updated May 1, 2014; last reviewed May 1, 2014) (page 5 of 5)

| Generic Name (Abbreviation) Trade Name | Formulations | Dosing Recommendations ^a | Elimination | Serum/ Intracellular Half-Lives | Adverse Events ^b |
|---|--|---|---|---------------------------------------|--|
| Zidovudine (ZDV) <i>Retrovir</i> Note: Generic available Also available as a component of fixed-dose combinations. | <u>Retrovir:</u> <ul style="list-style-type: none"> • 100 mg capsule • 300 mg tablet • 10 mg/mL intravenous solution • 10 mg/mL oral solution | <u>Retrovir:</u> <ul style="list-style-type: none"> • 300 mg BID, or • 200 mg TID • Take without regard to meals. | Metabolized to GAZT Renal excretion of GAZT Dosage adjustment in patients with renal insufficiency is recommended (see Appendix B, Table 7). | 1.1 hours/ 7 hours | <ul style="list-style-type: none"> • Bone marrow suppression: macrocytic anemia or neutropenia • Nausea, vomiting, headache, insomnia, asthenia • Nail pigmentation • Lactic acidosis/severe hepatomegaly with hepatic steatosis (rare but potentially life-threatening toxicity) • Hyperlipidemia • Insulin resistance/diabetes mellitus • Lipoatrophy • Myopathy |
| <i>Combivir</i> ZDV with 3TC Note: Generic available | <u>Combivir:</u> <ul style="list-style-type: none"> • ZDV 300 mg + 3TC 150 mg tablet | <u>Combivir:</u> <ul style="list-style-type: none"> • 1 tablet BID • Take without regard to meals. | | | |
| <i>Trizivir</i> ZDV with 3TC + ABC Note: Generic available | <u>Trizivir:</u> <ul style="list-style-type: none"> • ZDV 300 mg + 3TC 150 mg + ABC 300 mg tablet | <u>Trizivir:</u> <ul style="list-style-type: none"> • 1 tablet BID • Take without regard to meals. | | | |

^a For dosage adjustment in renal or hepatic insufficiency, see [Appendix B, Table 7](#).

^b Also see [Table 14](#).

Key to Acronyms: 3TC = lamivudine; ABC = abacavir; BID = twice daily; cobv = cobicistat; d4T = stavudine; ddl = didanosine; EC = enteric coated; EFV = efavirenz; EVG = elvitegravir; FTC = emtricitabine; GAZT = azidothymidine glucuronide; HBV = hepatitis B virus; HLA = human leukocyte antigen; HSR = hypersensitivity reaction; MI = myocardial infarction; RPV = rilpivirine; TDF = tenofovir disoproxil fumarate; TID = three times a day; WHO = World Health Organization; ZDV = zidovudine

Appendix B, Table 2. Characteristics of Non-Nucleoside Reverse Transcriptase Inhibitors (NNRTIs)
(Last updated May 1, 2014; last reviewed May 1, 2014) (page 1 of 2)

Note: Delavirdine (DLV) is not included in this table. Please refer to the DLV FDA package insert for related information.

| Generic Name (Abbreviation) Trade Name | Formulations | Dosing Recommendations ^a | Elimination/ Metabolic Pathway | Serum/ Half-Life | Adverse Events ^b |
|---|---|---|---|---------------------|---|
| Efavirenz (EFV) <i>Sustiva</i> Also available as a component of fixed-dose combination. | <ul style="list-style-type: none"> • 50 and 200 mg capsules • 600 mg tablet | 600 mg once daily, at or before bedtime Take on an empty stomach to reduce side effects. | Metabolized by CYPs 2B6 and 3A4 CYP3A4 mixed inducer/inhibitor (more an inducer than an inhibitor) | 40–55 hours | <ul style="list-style-type: none"> • Rash^c • Neuropsychiatric symptoms^d • Increased transaminase levels • Hyperlipidemia • False-positive results with some cannabinoid and benzodiazepine screening assays reported. • Teratogenic in non-human primates and potentially teratogenic in humans |
| | <i>Atripla</i> EFV with TDF + FTC | Atripla: EFV 600 mg + FTC 200 mg + TDF 300 mg tablet | | | |
| Etravirine (ETR) <i>Intenceo</i> | <ul style="list-style-type: none"> • 25, 100, and 200 mg tablets | 200 mg BID Take following a meal. | CYP3A4, 2C9, and 2C19 substrate 3A4 inducer; 2C9 and 2C19 inhibitor | 41 hours | <ul style="list-style-type: none"> • Rash, including Stevens-Johnson syndrome^c • HSRs, characterized by rash, constitutional findings, and sometimes organ dysfunction, including hepatic failure, have been reported. • Nausea |
| Nevirapine (NVP) <i>Viramune</i> or <i>Viramune XR</i> Generic available for 200 mg tablets | <ul style="list-style-type: none"> • 200 mg tablet • 400 mg XR tablet • 50 mg/5 mL oral suspension | 200 mg once daily for 14 days (lead-in period); thereafter, 200 mg BID, or 400 mg (Viramune XR tablet) once daily Take without regard to meals. Repeat lead-in period if therapy is discontinued for more than 7 days. In patients who develop mild-to-moderate rash without constitutional symptoms, continue lead-in period until rash resolves but not longer than 28 days total. | CYP450 substrate, inducer of 3A4 and 2B6; 80% excreted in urine (glucuronidated metabolites, <5% unchanged); 10% in feces | 25–30 hours | <ul style="list-style-type: none"> • Rash, including Stevens-Johnson syndrome^c • Symptomatic hepatitis, including fatal hepatic necrosis, has been reported: <ul style="list-style-type: none"> ◦ Rash reported in approximately 50% of cases. ◦ Occurs at significantly higher frequency in ARV-naïve female patients with pre-NVP CD4 counts >250 cells/mm³ and in ARV-naïve male patients with pre-NVP CD4 counts >400 cells/mm³. NVP should not be initiated in these patients unless the benefit clearly outweighs the risk. |

Appendix B, Table 2. Characteristics of Non-Nucleoside Reverse Transcriptase Inhibitors (NNRTIs)
(Last updated May 1, 2014; last reviewed May 1, 2014) (page 2 of 2)

Note: Delavirdine (DLV) is not included in this table. Please refer to the DLV FDA package insert for related information.

| Generic Name (Abbreviation) Trade Name | Formulations | Dosing Recommendations ^a | Elimination/ Metabolic Pathway | Serum/ Half-Life | Adverse Events ^b |
|--|---|--|-----------------------------------|---------------------|--|
| Rilpivirine (RPV) <i>Edurant</i> Also available as a component of fixed-dose combination. | • 25 mg tablet | 25 mg once daily Take with a meal. | CYP3A4 substrate | 50 hours | • Rash ^c • Depression, insomnia, headache • Hepatotoxicity |
| <i>Complera</i> RPV with TDF + FTC | Complera: • RPV 25 mg + TDF 300 mg + FTC 200 mg tablet | 1 tablet once daily Take with a meal. | | | |

^a For dosage adjustment in renal or hepatic insufficiency, see [Appendix B, Table 7](#).

^b Also see [Table 14](#).

^c Rare cases of Stevens-Johnson syndrome have been reported with most NNRTIs; the highest incidence of rash was seen with NVP.

^d Adverse events can include dizziness, somnolence, insomnia, abnormal dreams, depression, **suicidality**, confusion, abnormal thinking, impaired concentration, amnesia, agitation, depersonalization, hallucinations, and euphoria. Approximately 50% of patients receiving EFV may experience any of these symptoms. Symptoms usually subside spontaneously after 2 to 4 weeks but may necessitate discontinuation of EFV in a small percentage of patients.

Key to Abbreviations: ARV = antiretroviral; BID = twice daily; CD4 = CD4 T lymphocyte; CYP = cytochrome P; DLV = delavirdine; EFV = efavirenz; ETR = etravirine; FDA = Food and Drug Administration; FTC = emtricitabine; HSR = hypersensitivity reaction; NNRTI = non-nucleoside reverse transcriptase inhibitor; NVP = nevirapine; RPV = rilpivirine; TDF = tenofovir disoproxil fumarate; XR = extended release

Appendix B, Table 3. Characteristics of Protease Inhibitors (PIs) (Last updated February 12, 2013; last reviewed May 1, 2014) (page 1 of 5)

| Generic Name (Abbreviation) Trade Name | Formulations | Dosing Recommendations ^a | Elimination/ Metabolic Pathway | Serum Half-Life | Storage | Adverse Events ^b |
|--|--|---|---|-----------------------------------|---|---|
| Atazanavir (ATV) <i>Reyataz</i> | 100, 150, 200, and 300 mg capsules | <p><u>ARV-Naive Patients:</u></p> <ul style="list-style-type: none"> • ATV 300 mg + RTV 100 mg once daily; or • ATV 400 mg once daily <p><u>With TDF or in ARV-Experienced Patients:</u></p> <ul style="list-style-type: none"> • ATV 300 mg + RTV 100 mg once daily <p><u>With EFV in ARV-Naive Patients:</u></p> <ul style="list-style-type: none"> • ATV 400 mg + RTV 100 mg once daily <p>Take with food.</p> <p>For recommendations on dosing with H2 antagonists and PPIs, refer to Table 18a.</p> | CYP3A4 inhibitor and substrate Dosage adjustment in patients with hepatic insufficiency is recommended (see Appendix B, Table 7). | 7 hours | Room temperature (up to 25° C or 77° F) | <ul style="list-style-type: none"> • Indirect hyperbilirubinemia • PR interval prolongation: First degree symptomatic AV block reported. Use with caution in patients with underlying conduction defects or on concomitant medications that can cause PR prolongation. • Hyperglycemia • Fat maldistribution • Cholelithiasis • Nephrolithiasis • Renal insufficiency • Serum transaminase elevations • Hyperlipidemia (especially with RTV boosting) • Skin rash |
| Darunavir (DRV) <i>Prezista</i> | 75, 150, 600, and 800 mg tablets 100 mg/mL oral suspension | <p><u>ARV-Naive Patients or ARV-Experienced Patients with no DRV Mutations:</u></p> <ul style="list-style-type: none"> • DRV 800 mg + RTV 100 mg once daily <p><u>ARV-Experienced Patients with at Least 1 DRV Mutation:</u></p> <ul style="list-style-type: none"> • (DRV 600 mg + RTV 100 mg) BID <p>Unboosted DRV is not recommended.</p> <p>Take with food.</p> | CYP3A4 inhibitor and substrate | 15 hours (when combined with RTV) | Room temperature (up to 25° C or 77° F) | <ul style="list-style-type: none"> • Skin rash (10%): DRV has a sulfonamide moiety; Stevens-Johnson syndrome, toxic epidermal necrolysis, acute generalized exanthematous pustulosis, and erythema multiforme have been reported. • Hepatotoxicity • Diarrhea, nausea • Headache • Hyperlipidemia • Serum transaminase elevation • Hyperglycemia • Fat maldistribution |

Appendix B, Table 3. Characteristics of Protease Inhibitors (PIs) (Last updated February 12, 2013; last reviewed May 1, 2014) (page 2 of 5)

| Generic Name (Abbreviation) Trade Name | Formulations | Dosing Recommendations ^a | Elimination/ Metabolic Pathway | Serum Half-Life | Storage | Adverse Events ^b |
|--|---|---|---|--------------------|---|--|
| Fosamprenavir (FPV) <i>Lexiva</i> (a prodrug of amprenavir [APV]) | 700 mg tablet 50 mg/mL oral suspension | <p>ARV-Naive Patients:</p> <ul style="list-style-type: none"> • FPV 1400 mg BID, or • FPV 1400 mg + RTV 100–200 mg once daily, or • FPV 700 mg + RTV 100 mg BID <p>PI-Experienced Patients (Once-Daily Dosing Not Recommended):</p> <ul style="list-style-type: none"> • FPV 700 mg + RTV 100 mg BID <p>With EFV:</p> <ul style="list-style-type: none"> • FPV 700 mg + RTV 100 mg BID, or • FPV 1400 mg + RTV 300 mg once daily <p>Tablet:</p> <ul style="list-style-type: none"> • Without RTV tablet: Take without regard to meals. • With RTV tablet: Take with meals. <p>Oral Suspension:</p> <ul style="list-style-type: none"> • Take without food. | <p>APV is a CYP3A4 substrate, inhibitor, and inducer.</p> <p>Dosage adjustment in patients with hepatic insufficiency is recommended (see Appendix B, Table 7).</p> | 7.7 hours (APV) | Room temperature (up to 25° C or 77° F) | <ul style="list-style-type: none"> • Skin rash (12% to 19%): FPV has a sulfonamide moiety. • Diarrhea, nausea, vomiting • Headache • Hyperlipidemia • Serum transaminase elevation • Hyperglycemia • Fat maldistribution • Possible increased bleeding episodes in patients with hemophilia • Nephrolithiasis |
| Indinavir (IDV) <i>Crixivan</i> | 100, 200, and 400 mg capsules | <p>800 mg every 8 hours</p> <p>Take 1 hour before or 2 hours after meals; may take with skim milk or a low-fat meal.</p> <p>With RTV:</p> <ul style="list-style-type: none"> • IDV 800 mg + RTV 100–200 mg BID <p>Take without regard to meals.</p> | <p>CYP3A4 inhibitor and substrate</p> <p>Dosage adjustment in patients with hepatic insufficiency is recommended (see Appendix B, Table 7).</p> | 1.5–2 hours | <p>Room temperature (15° to 30° C/59° to 86° F)</p> <p>Protect from moisture.</p> | <ul style="list-style-type: none"> • Nephrolithiasis • GI intolerance, nausea • Hepatitis • Indirect hyperbilirubinemia • Hyperlipidemia • Headache, asthenia, blurred vision, dizziness, rash, metallic taste, thrombocytopenia, alopecia, and hemolytic anemia • Hyperglycemia • Fat maldistribution • Possible increased bleeding episodes in patients with hemophilia |

Appendix B, Table 3. Characteristics of Protease Inhibitors (PIs) (Last updated February 12, 2013; last reviewed May 1, 2014) (page 3 of 5)

| Generic Name (Abbreviation) Trade Name | Formulations | Dosing Recommendations ^a | Elimination/ Metabolic Pathway | Serum Half-Life | Storage | Adverse Events ^b |
|--|--|--|--|--------------------|--|---|
| Ritonavir- Boosted Lopinavir (LPV/r) <i>Kaletra</i> | <p><u>Tablets:</u></p> <ul style="list-style-type: none"> • LPV 200 mg + RTV 50 mg, or • LPV 100 mg + RTV 25 mg <p><u>Oral Solution:</u></p> <ul style="list-style-type: none"> • Each 5 mL contains (LPV 400 mg + RTV 100 mg) • Oral solution contains 42% alcohol. | <p>LPV/r 400 mg/100 mg BID or LPV/r 800 mg/200 mg once daily</p> <p>Once-daily dosing is not recommended for patients with ≥3 LPV-associated mutations, pregnant women, or patients receiving EFV, NVP, FPV, NFV, carbamazepine, phenytoin, or phenobarbital.</p> <p><u>With EFV or NVP (PI-Naive or PI-Experienced Patients):</u></p> <ul style="list-style-type: none"> • LPV/r 500 mg/125 mg tablets BID (use a combination of 2 LPV/r 200 mg/50 mg tablets + 1 LPV/r 100 mg/25 mg tablet to make a total dose of LPV/r 500 mg/125 mg), or • LPV/r 533 mg/133 mg oral solution BID <p><u>Tablet:</u></p> <ul style="list-style-type: none"> • Take without regard to meals. <p><u>Oral Solution:</u></p> <ul style="list-style-type: none"> • Take with food. | <p>CYP3A4 inhibitor and substrate</p> | <p>5–6 hours</p> | <p>Oral tablet is stable at room temperature.</p> <p>Oral solution is stable at 2° to 8° C (36° to 46° F) until date on label and is stable for up to 2 months when stored at room temperature (up to 25° C or 77° F).</p> | <ul style="list-style-type: none"> • GI intolerance, nausea, vomiting, diarrhea • Pancreatitis • Asthenia • Hyperlipidemia (especially hypertriglyceridemia) • Serum transaminase elevation • Hyperglycemia • Insulin resistance/diabetes mellitus • Fat maldistribution • Possible increased bleeding episodes in patients with hemophilia • PR interval prolongation • QT interval prolongation and torsades de pointes have been reported; however, causality could not be established. |
| Nelfinavir (NFV) <i>Viracept</i> | <p>250 and 625 mg tablets</p> <p>50 mg/g oral powder</p> | <p>1250 mg BID or 750 mg TID</p> <p>Dissolve tablets in a small amount of water, mix admixture well, and consume immediately.</p> <p>Take with food.</p> | <p>CYP2C19 and 3A4 substrate—metabolized to active M8 metabolite; CYP3A4 inhibitor</p> | <p>3.5–5 hours</p> | <p>Room temperature (15° to 30° C/59° to 86° F)</p> | <ul style="list-style-type: none"> • Diarrhea • Hyperlipidemia • Hyperglycemia • Fat maldistribution • Possible increased bleeding episodes in patients with hemophilia • Serum transaminase elevation |

Appendix B, Table 3. Characteristics of Protease Inhibitors (PIs) (Last updated February 12, 2013; last reviewed May 1, 2014) (page 4 of 5)

| Generic Name (Abbreviation) Trade Name | Formulations | Dosing Recommendations ^a | Elimination/ Metabolic Pathway | Serum Half-Life | Storage | Adverse Events ^b |
|---|---|--|--|--------------------|---|--|
| Ritonavir (RTV) <i>Norvir</i> | 100 mg tablet 100 mg soft gel capsule 80 mg/mL oral solution Oral solution contains 43% alcohol. | <u>As PK Booster for Other PIs:</u> • 100–400 mg per day in 1 or 2 divided doses (refer to other PIs for specific dosing recommendations) <i>Tablet:</i> • Take with food. <i>Capsule and Oral Solution:</i> • To improve tolerability, take with food if possible. | CYP3A4 >2D6 substrate; potent 3A4, 2D6 inhibitor | 3–5 hours | Tablets do not require refrigeration. Refrigerate capsules. Capsules can be left at room temperature (up to 25° C or 77° F) for up to 30 days. Oral solution should not be refrigerated; store at room temperature (20° to 25° C/68° to 77° F). | <ul style="list-style-type: none"> • GI intolerance, nausea, vomiting, diarrhea • Paresthesia (circumoral and extremities) • Hyperlipidemia (especially hypertriglyceridemia) • Hepatitis • Asthenia • Taste perversion • Hyperglycemia • Fat maldistribution • Possible increased bleeding episodes in patients with hemophilia |
| Saquinavir (SQV) <i>Invirase</i> | 500 mg tablet 200 mg capsule | SQV 1000 mg + RTV 100 mg BID Unboosted SQV is not recommended. Take with meals or within 2 hours after a meal. | CYP3A4 inhibitor and substrate | 1–2 hours | Room temperature (15° to 30° C/59° to 86° F) | <ul style="list-style-type: none"> • GI intolerance, nausea, and diarrhea • Headache • Serum transaminase elevation • Hyperlipidemia • Hyperglycemia • Fat maldistribution • Possible increased bleeding episodes in patients with hemophilia • PR interval prolongation • QT interval prolongation, torsades de pointes have been reported. Patients with pre-SQV QT interval >450 msec should not receive SQV. |

Appendix B, Table 3. Characteristics of Protease Inhibitors (PIs) (Last updated February 12, 2013; last reviewed May 1, 2014) (page 5 of 5)

| Generic Name (Abbreviation) Trade Name | Formulations | Dosing Recommendations ^a | Elimination/ Metabolic Pathway | Serum Half-Life | Storage | Adverse Events ^b |
|--|---|---|---|------------------------------------|--|--|
| Tipranavir (TPV) <i>Aptivus</i> | 250 mg capsule 100 mg/mL oral solution | TPV 500 mg + RTV 200 mg BID Unboosted TPV is not recommended. <u>With RTV Tablets:</u> • Take with meals. <u>With RTV Capsules or Solution:</u> • Take without regard to meals. | CYP P450 3A4 inducer and substrate Net effect when combined with RTV (CYP3A4, 2D6 inhibitor) | 6 hours after single dose of TPV/r | Refrigerate capsules. Capsules can be stored at room temperature (25° C or 77° F) for up to 60 days. Oral solution should not be refrigerated or frozen and should be used within 60 days after bottle is opened. | <ul style="list-style-type: none"> • Hepatotoxicity: Clinical hepatitis (including hepatic decompensation and hepatitis-associated fatalities) has been reported; monitor patients closely, especially those with underlying liver diseases. • Skin rash (3% to 21%): TPV has a sulfonamide moiety; use with caution in patients with known sulfonamide allergy. • Rare cases of fatal and nonfatal intracranial hemorrhages have been reported. Risks include brain lesion, head trauma, recent neurosurgery, coagulopathy, hypertension, alcoholism, use of anti-coagulant or anti-platelet agents (including vitamin E). • Hyperlipidemia • Hyperglycemia • Fat maldistribution • Possible increased bleeding episodes in patients with hemophilia |

^a For dosage adjustment in hepatic insufficiency, see [Appendix B, Table 7](#).

^b Also see [Table 14](#).

Key to Acronyms: APV = amprenavir; ARV = antiretroviral; ATV = atazanavir; AV = atrioventricular; BID = twice daily; CYP = cytochrome P; DRV = darunavir; EFV = efavirenz; FPV = fosamprenavir; GI = gastrointestinal; IDV = indinavir; LPV = lopinavir; LPV/r = ritonavir-boosted lopinavir; msec = millisecond; NFV = nelfinavir; NVP = nevirapine; PI = protease inhibitor; PK = pharmacokinetic; PPI = proton pump inhibitor; RTV = ritonavir; SQV = saquinavir; TDF = tenofovir disoproxil fumarate; TID = three times a day; TPV = tipranavir

Appendix B, Table 4. Characteristics of Integrase Inhibitors (Last updated May 1, 2014; last reviewed May 1, 2014)

| Generic Name (Abbreviation) Trade Name | Formulations | Dosing Recommendations ^a | Elimination/ Metabolic Pathway | Serum Half-Life | Adverse Events ^b |
|--|--|--|--|--------------------|---|
| Dolutegravir (DTG) <i>Tivicay</i> | 50 mg tablet | <p><u>ARV-Naive or ARV-Experienced, INSTI-Naive Patients:</u></p> <ul style="list-style-type: none"> • 50 mg once daily <p><u>ARV-Naive or ARV-Experienced, INSTI-Naive Patients when Co-Administered with EFV, FPV/r, TPV/r, or Rifampin:</u></p> <ul style="list-style-type: none"> • 50 mg BID <p><u>INSTI-Experienced Patients with Certain INSTI Mutations (See Product Label) or with Clinically Suspected INSTI Resistance:</u></p> <ul style="list-style-type: none"> • 50 mg BID <p>Take without regard to meals</p> | <p>UGT1A1 mediated glucuronidation</p> <p>Minor contribution from CYP3A4</p> | ~14 hours | <ul style="list-style-type: none"> • HSRs including rash, constitutional symptoms, and organ dysfunction (including liver injury) have been reported. • Insomnia • Headache |
| Elvitegravir (EVG) <i>Stribild</i> (only available as a co-formulated product with <i>cobi/TDF/FTC</i>) | EVG 150 mg + <i>cobi</i> 150 mg + TDF 300 mg + FTC 200 mg tablet | <p>1 tablet once daily with food</p> <p>Not recommended for patients with baseline CrCl < 70 mL/min (see Appendix B Table 7 for the equation for calculating CrCl).</p> <p>Not recommended for use with other antiretroviral drugs.</p> | <p>EVG: CYP3A, UGT1A1/3</p> <p><i>cobi</i>: CYP3A, CYP2D6 (minor)</p> | ~13 hours | <ul style="list-style-type: none"> • Nausea • Diarrhea • New onset or worsening renal impairment • Potential decrease in bone mineral density • Severe acute exacerbation of hepatitis may occur in HBV-coinfected patients who discontinue FTC and TDF. |
| Raltegravir (RAL) <i>Isentress</i> | <p>400 mg tablet</p> <p>25 and 100 mg chewable tablets</p> <p>100 mg single-pack for oral suspension</p> | <p>400 mg BID</p> <p><u>With Rifampin:</u></p> <ul style="list-style-type: none"> • 800 mg BID <p>Take without regard to meals.</p> | UGT1A1-mediated glucuronidation | ~9 hours | <ul style="list-style-type: none"> • Rash, including Stevens-Johnson syndrome, HSR, and toxic epidermal necrolysis • Nausea • Headache • Diarrhea • Pyrexia • CPK elevation, muscle weakness, and rhabdomyolysis |

^a For dosage adjustment in hepatic insufficiency, see [Appendix B, Table 7](#).

^b Also see [Table 14](#).

Key to Abbreviations: BID = twice daily; *cobi* = cobicistat; CPK = creatine phosphokinase; CrCl = creatinine clearance; CYP = cytochrome P; DTG = dolutegravir; EFV = efavirenz; EVG = elvitegravir; FTC = emtricitabine; FPV/r = ritonavir-boosted fosamprenavir; HBV = hepatitis B virus; HSR = hypersensitivity reaction; INSTI = integrase strand transfer inhibitor; RAL = raltegravir; TDF = tenofovir disoproxil fumarate; TPV/r = ritonavir-boosted tipranavir; UGT = uridine diphosphate gluconyltransferase

Appendix B, Table 5. Characteristics of Fusion Inhibitor (Last updated January 29, 2008; last reviewed May 1, 2014)

| Generic Name (Abbreviation) Trade Name | Formulation | Dosing Recommendation | Serum Half-Life | Elimination | Storage | Adverse Events ^a |
|--|---|---------------------------------|-----------------|--|--|---|
| Enfuvirtide (T20) <i>Fuzeon</i> | <ul style="list-style-type: none"> Injectable; supplied as lyophilized powder Each vial contains 108 mg of T20; reconstitute with 1.1 mL of sterile water for injection for delivery of approximately 90 mg/1 mL. | 90 mg (1 mL) subcutaneously BID | 3.8 hours | Expected to undergo catabolism to its constituent amino acids, with subsequent recycling of the amino acids in the body pool | Store at room temperature (up to 25° C or 77° F). Re-constituted solution should be refrigerated at 2° to 8°C (36° to 46° F) and used within 24 hours. | <ul style="list-style-type: none"> Local injection site reactions (e.g., pain, erythema, induration, nodules and cysts, pruritus, ecchymosis) in almost 100% of patients Increased incidence of bacterial pneumonia HSR (<1% of patients): Symptoms may include rash, fever, nausea, vomiting, chills, rigors, hypotension, or elevated serum transaminases. Re-challenge is not recommended. |

^a Also see [Table 14](#).

Key to Abbreviations: BID = twice daily, HSR = hypersensitivity reaction, T20 = enfuvirtide

Appendix B, Table 6. Characteristics of CCR5 Antagonist (Last updated March 27, 2012; last reviewed May 1, 2014)

| Generic Name (Abbreviation)/ Trade Name | Formulation | Dosing Recommendations ^a | Serum Half-Life | Elimination/ Metabolic Pathway | Adverse Events ^b |
|---|------------------------|---|-----------------|-----------------------------------|--|
| Maraviroc (MVC) <i>Selzentry</i> | 150 and 300 mg tablets | <p>150 mg BID when given with drugs that are strong CYP3A inhibitors (with or without CYP3A inducers) including PIs (except TPV/r)</p> <p>300 mg BID when given with NRTIs, T20, TPV/r, NVP, RAL, and other drugs that are not strong CYP3A inhibitors or inducers</p> <p>600 mg BID when given with drugs that are CYP3A inducers, including EFV, ETR, etc. (without a CYP3A inhibitor)</p> <p>Take without regard to meals</p> | 14–18 hours | CYP3A4 substrate | <ul style="list-style-type: none"> Abdominal pain Cough Dizziness Musculoskeletal symptoms Pyrexia Rash Upper respiratory tract infections Hepatotoxicity, which may be preceded by severe rash or other signs of systemic allergic reactions Orthostatic hypotension, especially in patients with severe renal insufficiency |

^a (For dosage adjustment in hepatic insufficiency, see [Appendix B, Table 7](#).)

^b Also see [Table 14](#).

Key to Abbreviations: BID = twice daily, CYP = cytochrome P, EFV = efavirenz, ETR = etravirine, MVC = maraviroc, NRTI = nucleoside reverse transcriptase inhibitor, NVP = nevirapine, PI = protease inhibitor, RAL = raltegravir, T20 = enfuvirtide, TPV/r = ritonavir-boosted tipranavir

Appendix B, Table 7. Antiretroviral Dosing Recommendations in Patients with Renal or Hepatic Insufficiency (Last updated May 1, 2014; last reviewed May 1, 2014) (page 1 of 6)

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

| ARVs Generic Name (Abbreviation) Trade Name | Usual Daily Dose (Refer to Appendix B, Tables 1–6 for additional dosing information.) | Dosing in Renal Insufficiency ^a | Dosing in Hepatic Impairment | | |
|---|---|---|--|--------------------------------|--------------------------------|
| Nucleoside Reverse Transcriptase Inhibitors (NRTIs) | | | | | |
| 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, Complera, Stribild, Trizivir, or Epzicom. Use of Truvada is not recommended in patients with CrCl <30 mL/min. | | | | | |
| Abacavir (ABC) <i>Ziagen</i> | 300 mg PO BID | No dosage adjustment necessary | <u>Child-Pugh Score 5–6:</u> • 200 mg PO BID (use oral solution) <u>Child-Pugh Score >6:</u> • Contraindicated | | |
| Didanosine EC (ddl) Videx EC | <u>Body weight ≥60 kg:</u> • 400 mg PO once daily <u>Body weight <60 kg:</u> • 250 mg PO once daily | Dose (Once Daily) | | No dosage adjustment necessary | |
| | | 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 ddl oral solution | |
| Didanosine oral solution (ddl) Videx | <u>Body weight ≥60 kg:</u> • 200 mg PO BID, or • 400 mg PO once daily <u>Body weight <60 kg:</u> • 250 mg PO once daily, or • 125 mg PO BID | Dose (Once Daily) | | No dosage adjustment necessary | |
| | | 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 | |
| Emtricitabine (FTC) <i>Emtriva</i> | 200 mg oral capsule once daily or 240 mg (24 mL) oral solution once daily | Dose | | No dosage recommendation | |
| | | 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. | | | |
| Lamivudine (3TC) <i>Epivir</i> | 300 mg PO once daily or 150 mg PO BID | CrCl (mL/min) | Dose | | No dosage adjustment necessary |
| | | 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. | | | |

Appendix B, Table 7. Antiretroviral Dosing Recommendations in Patients with Renal or Hepatic Insufficiency (Last updated May 1, 2014; last reviewed May 1, 2014) (page 2 of 6)

| ARVs Generic Name (Abbreviation) Trade Name | Usual Daily Dose (Refer to Appendix B, Tables 1–6 for additional dosing information.) | Dosing in Renal Insufficiency ^a | | Dosing in Hepatic Impairment | |
|---|--|--|---|---|--------------------------------|
| NRTIs, continued | | | | | |
| Stavudine (d4T) <i>Zerit</i> | <u>Body Weight ≥60 kg:</u> • 40 mg PO BID <u>Body Weight <60 kg:</u> • 30 mg PO BID | Dose | | No dosage recommendation | |
| | | 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. | | | | | |
| Tenofovir Disoproxil Fumarate (TDF) <i>Viread</i> | 300 mg PO once daily | CrCl (mL/min) | Dose | | No dosage adjustment necessary |
| | | 30–49 | 300 mg q48h | | |
| | | 10–29 | 300 mg twice weekly (every 72–96 hours) | | |
| | | <10 and not on HD | No recommendation | | |
| | | On HD* | 300 mg q7d | | |
| *On dialysis days, take dose after HD session. | | | | | |
| Emtricitabine (FTC) + Tenofovir Disoproxil Fumarate (TDF) <i>Truvada</i> | 1 tablet PO once daily | CrCl (mL/min) | Dose | | No dosage recommendation |
| | | 30–49 | 1 tablet q48h | | |
| | | <30 or on HD | Not recommended | | |
| Zidovudine (AZT, ZDV) <i>Retrovir</i> | 300 mg PO BID | CrCl (mL/min) | Dose | | No dosage recommendation |
| | | <15 or on HD* | 100 mg TID or 300 mg once daily | | |
| | | *On dialysis days, take dose after HD session. | | | |
| Non-Nucleoside Reverse Transcriptase Inhibitors (NNRTIs) | | | | | |
| Delavirdine (DLV) <i>Rescriptor</i> | 400 mg PO TID | No dosage adjustment necessary | | No dosage recommendation; use with caution in patients with hepatic impairment. | |

Appendix B, Table 7. Antiretroviral Dosing Recommendations in Patients with Renal or Hepatic Insufficiency (Last updated May 1, 2014; last reviewed May 1, 2014) (page 3 of 6)

| ARVs Generic Name (Abbreviation) Trade Name | Usual Daily Dose (Refer to Appendix B, Tables 1–6 for additional dosing information.) | Dosing in Renal Insufficiency ^a | Dosing in Hepatic Impairment |
|--|--|---|---|
| NNRTIs, continued | | | |
| Efavirenz (EFV) <i>Sustiva</i> | 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 Disoproxil Fumarate (TDF) + Emtricitabine (FTC) <i>Atripla</i> | 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) <i>Intelece</i> | 200 mg PO BID | No dosage adjustment necessary | <u>Child-Pugh Class A or B:</u> • No dosage adjustment <u>Child-Pugh Class C:</u> • No dosage recommendation |
| Nevirapine (NVP) <i>Viramune</i> or <i>Viramune XR</i> | 200 mg PO BID or 400 mg PO once daily (using Viramune XR formulation) | <u>Patients on HD:</u> Limited data; no dosage recommendation | <u>Child-Pugh Class A:</u> • No dosage adjustment <u>Child-Pugh Class B or C:</u> • Contraindicated |
| Rilpivirine (RPV) <i>Edurant</i> | 25 mg PO once daily | No dosage adjustment necessary | <u>Child-Pugh Class A or B:</u> • No dosage adjustment <u>Child-Pugh Class C:</u> • No dosage recommendation |
| Rilpivirine (RPV) + Tenofovir Disoproxil Fumarate (TDF) + Emtricitabine (FTC) <i>Complera</i> | 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. | <u>Child-Pugh Class A or B:</u> • No dosage adjustment <u>Child-Pugh Class C:</u> • No dosage recommendation |

Appendix B, Table 7. Antiretroviral Dosing Recommendations in Patients with Renal or Hepatic Insufficiency (Last updated May 1, 2014; last reviewed May 1, 2014) (page 4 of 6)

| ARVs Generic Name (Abbreviation) Trade Name | Usual Daily Dose (Refer to Appendix B, Tables 1–6 for additional dosing information.) | Dosing in Renal Insufficiency ^a | Dosing in Hepatic Impairment |
|---|--|--|--|
| Protease Inhibitors (PIs) | | | |
| Atazanavir (ATV) <i>Reyataz</i> | 400 mg PO once daily or ATV 300 mg + RTV 100 mg PO once daily | No dosage adjustment for patients with renal dysfunction who do not require HD <u>ARV-Naive Patients on HD:</u> • ATV 300 mg + RTV 100 mg once daily <u>ARV-Experienced Patients on HD:</u> • ATV or ATV/r not recommended | <u>Child-Pugh Class B:</u> • 300 mg once daily <u>Child-Pugh Class C:</u> • Not recommended RTV boosting is not recommended in patients with hepatic impairment (Child-Pugh Class B or C). |
| Darunavir (DRV) <i>Prezista</i> | DRV 800 mg + RTV 100 mg PO once daily (ARV-naive patients only) otherwise DRV 600 mg + RTV 100 mg PO BID | No dosage adjustment necessary | <u>Mild-to-Moderate Hepatic Impairment:</u> • No dosage adjustment <u>Severe Hepatic Impairment:</u> • Not recommended |
| Fosamprenavir (FPV) <i>Lexiva</i> | 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 | <u>PI-Naive Patients Only</u> <u>Child-Pugh Score 5–9:</u> • 700 mg BID <u>Child-Pugh Score 10–15:</u> • 350 mg BID <u>PI-Naive or PI-Experienced Patients:</u> <u>Child-Pugh Score 5–6:</u> • 700 mg BID + RTV 100 mg once daily <u>Child-Pugh Score 7–9:</u> • 450 mg BID + RTV 100 mg once daily <u>Child-Pugh Score 10–15:</u> • 300 mg BID + RTV 100 mg once daily |
| Indinavir (IDV) <i>Crixivan</i> | 800 mg PO q8h | No dosage adjustment necessary | <u>Mild-to-Moderate Hepatic Insufficiency Because of Cirrhosis:</u> • 600 mg q8h |
| Ritonavir-Boosted Lopinavir (LPV/r) <i>Kaletra</i> | LPV/r 400/100 mg PO BID or LPV/r 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. |

Appendix B, Table 7. Antiretroviral Dosing Recommendations in Patients with Renal or Hepatic Insufficiency (Last updated May 1, 2014; last reviewed May 1, 2014) (page 5 of 6)

| ARVs Generic Name (Abbreviation) Trade Name | Usual Daily Dose (Refer to Appendix B, Tables 1–6 for additional dosing information.) | Dosing in Renal Insufficiency ^a | Dosing in Hepatic Impairment |
|---|--|---|---|
| PIs, continued | | | |
| Nelfinavir (NFV) <i>Viracept</i> | 1250 mg PO BID | No dosage adjustment necessary | <u>Mild hepatic impairment:</u> • No dosage adjustment <u>Moderate-to-severe hepatic impairment:</u> • Do not use. |
| Ritonavir (RTV) <i>Norvir</i> | <u>As a PI-Boosting Agent:</u> • 100–400 mg per day | No dosage adjustment necessary | Refer to recommendations for the primary PI. |
| Saquinavir (SQV) <i>Invirase</i> | SQV 1000 mg + RTV 100 mg PO BID | No dosage adjustment necessary | <u>Mild-to-Moderate Hepatic Impairment:</u> • Use with caution. <u>Severe Hepatic Impairment:</u> • Contraindicated |
| Tipranavir (TPV) <i>Aptivus</i> | TPV 500 mg + RTV 200 mg PO BID | No dosage adjustment necessary | <u>Child-Pugh Class A:</u> • Use with caution <u>Child-Pugh Class B or C:</u> • Contraindicated |
| Integrase Inhibitors (INSTIs) | | | |
| Dolutegravir (DTG) <i>Tivicay</i> | 50 mg once daily or 50 mg BID | No dosage adjustment necessary | <u>Child-Pugh Class A or B:</u> • No dosage adjustment <u>Child-Pugh Class C:</u> • Not recommended |
| Elvitegravir (EVG) + Cobicistat (cobi) + Tenofovir Disoproxil Fumarate (TDF) + Emtricitabine (FTC) <i>Stribild</i> (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. | <u>Mild-to-Moderate Hepatic Insufficiency:</u> • No dosage adjustment necessary <u>Severe Hepatic Insufficiency:</u> • Not recommended |
| Raltegravir (RAL) <i>Isentress</i> | 400 mg BID | No dosage adjustment necessary | <u>Mild-to-Moderate Hepatic Insufficiency:</u> • No dosage adjustment necessary <u>Severe Hepatic Insufficiency:</u> • No recommendation |

Appendix B, Table 7. Antiretroviral Dosing Recommendations in Patients with Renal or Hepatic Insufficiency (Last updated May 1, 2014; last reviewed May 1, 2014) (page 6 of 6)

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

^a Including with chronic ambulatory peritoneal dialysis and hemodialysis

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; **DTG = dolutegravir**; 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; q(n)d = every (n) days; q(n)h = every (n) hours; RAL = raltegravir; RPV = rilpivirine; RTV = ritonavir; SQV = saquinavir; T20 = enfuvirtide; TDF = tenofovir disoproxil fumarate; 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