

Helpful HIV Medication Tables for Pharmacists

Nucleoside/Nucleotide Reverse Transcriptase Inhibitors

Medication	Standard Dosing	Patient Counseling Points - Food Effect and Adverse Effects
Abacavir (Ziagen®)	300mg twice daily or 600mg once daily	Food Effect – Take without regard to meals. Adverse Effects – Patients should be warned about the abacavir hypersensitivity reaction (HSR) which is characterized by fever, rash, nausea, vomiting, malaise or fatigue, loss of appetite, sore throat, cough, shortness of breath. Fatalities associated with the HSR have been reported, especially if patients are rechallenged. *
Didanosine (Videx EC®)	≥60kg – 400mg once daily; with tenofovir give 250mg once daily <60kg – 250mg once daily; with tenofovir give 200mg once daily	Food Effect – Take 1/2 hour before or 2 hours after a meal. Adverse Effects – Peripheral neuropathy, pancreatitis and nausea. *
Emtricitabine (Emtriva®)	200mg once daily	Food Effect – Take without regard to meals. Adverse Effects – Minimal; Hyperpigmentation/skin discoloration has been reported. *
Lamivudine (EpiVir®)	150mg twice daily or 300mg once daily	Food Effect – Take without regard to meals. Adverse Effects – Minimal; pancreatitis has been reported. *
Stavudine (Zerit®)	≥60kg – 40mg twice daily <60kg – 30mg twice daily	Food Effect – Take without regard to meals. Adverse Effects – Peripheral neuropathy, lipodystrophy, hyperlipidemia, pancreatitis. Rare, rapidly ascending neuromuscular weakness. *
Tenofovir (Viread®)	300mg once daily	Food Effect – Take without regard to meals. Adverse Effects – Asthenia, headache, diarrhea, nausea, vomiting, flatulence, renal insufficiency. *
Zidovudine (Retrovir®)	300mg twice daily or 200mg three times daily	Food Effect – Take without regard to meals. Adverse Effects – Bone marrow suppression (macrocytic anemia, neutropenia), headache, insomnia, gastrointestinal intolerance, asthenia. *

* Lactic acidosis with hepatic steatosis is a rare, potentially life-threatening adverse event with the use of Nucleoside/Nucleotide Reverse Transcriptase Inhibitors.

Non-Nucleoside Reverse Transcriptase Inhibitors

Medication	Standard Dosing	Patient Counseling Points - Food Effect and Adverse Effects
Delavirdine (Rescriptor®)	400mg three times daily	Food Effect – Take without regard to meals. Adverse Effects – rash, increased liver function tests, headache.
Efavirenz (Sustiva®)	600mg once daily, preferably at bedtime	Food Effect – Take on an empty stomach. Adverse Effects – Rash, central nervous system symptoms, lasting for approximately the first 2-4 weeks, including abnormal dreams, dizziness, somnolence and euphoria; increased liver function tests, false-positive cannabinoid test, teratogenic (Pregnancy Category D).
Nevirapine (Viramune®)	200mg once daily for 14 days, then 200mg twice daily	Food Effect – Take without regard to meals. Adverse Effects – Rash, including Stevens-Johnson Syndrome; symptomatic hepatitis, including fatal hepatic necrosis reported. Higher frequency of hepatic events reported in treatment naïve females with CD4 >250 cells/mm ³ , and treatment naïve males with CD4 >400 cells/mm ³ .

Protease Inhibitors

Medication	Standard Dosing	Patient Counseling Points - Food Effect and Adverse Effects
Atazanavir (Reyataz®)	400mg once daily or 300mg with ritonavir 100mg once daily <u>If taken with Efavirenz or tenofovir: 300mg with ritonavir 100mg once daily</u> No data with nevirapine.	Food Effect – Take with food. Adverse Effects – Indirect hyperbilirubinemia; prolonged PR interval, (use with caution in patients with underlying conditions or concomitant medications that can cause PR prolongation); hyperglycemia, fat maldistribution, possible increased bleeding episodes in patients with hemophilia.
Darunavir (Prezista®)	600mg with ritonavir 100mg twice daily	Food Effect – Take with food. Adverse Effects – Skin rash (7%) including Stevens-Johnson Syndrome and erythema multiforme reported, caution in sulfa allergic patients, as darunavir contains a sulfonamide moiety; diarrhea, nausea, headache, hyperlipidemia, increased liver function tests, hyperglycemia, fat maldistribution, possible increased bleeding episodes in patients with hemophilia.
Fosamprenavir (Lexiva®)	1400mg twice daily or 1400mg with ritonavir 200mg once daily* or 700mg with ritonavir 100mg twice daily <u>If taken with Efavirenz:</u> 1400mg with ritonavir 300mg once daily* or 700mg with ritonavir 100mg twice daily *Once daily dosing is not recommended in ARV experienced patients. No data with nevirapine.	Food Effect – Take without regard to meals. Adverse Effects – Skin rash (19%) including Stevens-Johnson Syndrome, caution in sulfa allergic patients, as fosamprenavir contains a sulfonamide moiety; diarrhea, nausea, vomiting, headache, hyperlipidemia, increased liver function tests, hyperglycemia, fat maldistribution, possible increased bleeding episodes in patients with hemophilia.
Indinavir (Crixivan®)	800mg every 8 hours or 800mg with ritonavir 100mg every 12 hours	Food Effect – Requires 1.5 liters of fluid daily. Without ritonavir – Take 1 hour before or 2 hours after meals; may take with skim milk or low fat meal. With ritonavir – Take with or without food. Adverse Effects – Nephrolithiasis, GI intolerance, nausea, indirect hyperbilirubinemia, hyperlipidemia, headache, asthenia, blurred vision, dizziness, rash, metallic taste, thrombocytopenia, alopecia, hemolytic anemia, hyperglycemia, fat maldistribution, possible increased bleeding episodes in patients with hemophilia.
Lopinavir/rtv (Kaletra®)	Lopinavir 400mg/ritonavir 100mg (2 tablets) twice daily or Lopinavir 800mg/ritonavir 200mg (4 tablets) once daily * <u>If taken with Efavirenz or Nevirapine:</u> Lopinavir 600mg/ ritonavir 150mg (3 tablets) twice daily (for therapy experienced patients) *Once daily dosing is not recommended in ARV experienced patients.	Food Effect – Take with or without food. Adverse Effects – GI intolerance, nausea, vomiting, diarrhea, asthenia, hyperlipidemia (especially hypertriglyceridemia), increased liver function tests, hyperglycemia, fat maldistribution, possible increased bleeding episodes in patients with hemophilia.
Nelfinavir (Viracept®)	1250mg twice daily or 750mg three times daily	Food Effect – Take with meal or snack. Levels increased 2-3 fold. Adverse Effects – Diarrhea, hyperlipidemia, hyperglycemia, fat maldistribution, increased liver function tests, possible increased bleeding episodes in patients with hemophilia.
Ritonavir (Norvir®)	600mg twice daily (when ritonavir used as the sole Protease Inhibitor) <u>For Protease Inhibitor Boosting:</u> 100-400mg once to twice daily	Food Effect – Take with food to improve tolerability. Adverse Effects – GI intolerance, nausea, vomiting, diarrhea, circumoral and extremity paresthesias, hyperlipidemia (especially hypertriglyceridemia), hepatitis, asthenia, taste perversion, hyperglycemia, fat maldistribution, possible increased bleeding episodes in patients with hemophilia.
Saquinavir (Invirase®)	1000mg with ritonavir 100mg twice daily	Food Effect – Take within 2 hours of a meal when taken with ritonavir. Adverse Effects – GI intolerance, nausea, diarrhea, headache, elevated liver function tests, hyperlipidemia, hyperglycemia, fat maldistribution, possible increased bleeding episodes in patients with hemophilia.
Tipranavir (Aptivus®)	500mg with ritonavir 200mg twice daily	Food Effect – Take with food. High fat meals increase bioavailability. Adverse Effects – Rash, caution in sulfa allergic patients, as tipranavir contains a sulfonamide moiety; hepatotoxicity incing hepatic decompensation reported, especially in patients with underlying liver disease; hyperlipidemia, hyperglycemia, fat maldistribution, rare cases of fatal and non-fatal intracranial hemorrhages, possible increased bleeding episodes in patients with hemophilia.

Fusion Inhibitor

Medication	Standard Dosing	Patient Counseling Points - Food Effect and Adverse Effects
Enfuvirtide (Fuzeon®)	90mg SC twice daily	Food Effect – N/A. Adverse Effects – Local injection site reactions – pain, erythema, induration, nodules and cysts, pruritis, ecchymosis, bacterial pneumonia, hypersensitivity reaction (<1%) which includes rash, fever, nausea, vomiting, chills, rigors, hypotension, or increased liver function tests. Rechallenge not recommended.

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Combination Reverse Transcriptase Inhibitors

Medication	Standard Dosing	Patient Counseling Points - Food Effect and Adverse Effects
Efavirenz, Tenofovir, and Emtricitabine (Atripla®)	One tablet once daily, preferably at bedtime	Food Effect – Take on an empty stomach. Adverse Effects – Rash, central nervous system symptoms, lasting for approximately the first 2-4 weeks, including abnormal dreams, dizziness, somnolence and euphoria; increased liver function tests, false-positive cannabinoid test, teratogenic (Pregnancy Category D), asthenia, headache, diarrhea, nausea, vomiting, flatulence, renal insufficiency, skin hyperpigmentation. *
Zidovudine and Lamivudine (Combivir®)	One tablet twice daily	Food Effect – Take without regard to meals. Adverse Effects – Bone marrow suppression (macrocytic anemia, neutropenia), headache, insomnia, gastrointestinal intolerance, asthenia, rare pancreatitis.*
Abacavir and Lamivudine (Epzicom®)	One tablet once daily	Food Effect – Take without regard to meals. Adverse Effects – Patients should be warned about the abacavir hypersensitivity reaction (HSR) which is characterized by fever, rash, nausea, vomiting, malaise or fatigue, loss of appetite, sore throat, cough, shortness of breath. Fatalities associated with the HSR have been reported, especially if patients are rechallenged, rare pancreatitis.*
Abacavir, Zidovudine, and Lamivudine (Trizivir®)	One tablet twice daily	Food Effect – Take without regard to meals. Adverse Effects – Patients should be warned about the abacavir hypersensitivity reaction (HSR) which is characterized by fever, rash, nausea, vomiting, malaise or fatigue, loss of appetite, sore throat, cough, shortness of breath. Fatalities associated with the HSR have been reported, especially if patients are rechallenged. Bone marrow suppression (macrocytic anemia, neutropenia), headache, insomnia, gastrointestinal intolerance, asthenia, rare pancreatitis.*
Tenofovir and Emtricitabine (Truvada®)	One tablet once daily	Food Effect – Take without regard to meals. Adverse Effects – asthenia, headache, diarrhea, nausea, vomiting, flatulence, renal insufficiency, skin hyperpigmentation. *

* Lactic acidosis with hepatic steatosis is a rare, potentially life threatening adverse event with the use of Nucleoside/Nucleotide Reverse Transcriptase Inhibitors.

Components of an ARV Regimen Not Recommended

Regimen/Medication	Rationale
Atazanavir + Indinavir	Potential additive hyperbilirubinemia
Didanosine + Stavudine	High incidence of toxicities – peripheral neuropathy, pancreatitis, and hyperlactatemia. Reports of serious, even fatal, cases of lactic acidosis with hepatic steatosis with or without pancreatitis in pregnant women. Use only when no other antiretroviral options are available and potential benefits outweigh the risks.
Efavirenz in pregnancy	Teratogenic in humans and in nonhuman primates. Use only when no other antiretroviral options are available and potential benefits outweigh the risks.
Emtricitabine + lamivudine	Similar resistance profile, no potential benefit.
Nevirapine initiation in treatment-naïve women with CD4 >250 cells/mm³ or in treatment-naïve men with CD4 >400 cells/mm³	Higher incidence of symptomatic (including serious and even fatal) hepatic events in these patient groups. Use only if the benefits clearly outweigh the risks.
Saquinavir as single protease inhibitor	Poor oral bioavailability (4%). Inferior antiretroviral activity when compared with other protease inhibitors.
Stavudine + zidovudine	Antagonistic effect on HIV-1

Concurrent Medications to be Avoided with Protease Inhibitors or Non-Nucleoside Reverse Transcriptase Inhibitors

Medication or Class	HIV Medications to be Avoided
Amiodarone	Avoid with indinavir, ritonavir and tipranavir
Astemizole	Avoid with all Protease Inhibitors, delavirdine and efavirenz
Benzodiazepines – Midazolam and triazolam	Avoid with all Protease Inhibitors, delavirdine and efavirenz
Bepriidil	Avoid with amprenavir, fosamprenavir, atazanavir, ritonavir, tipranavir
Cisapride	Avoid with all Protease Inhibitors, delavirdine, and efavirenz
Ergot Alkaloids – Dihydroergotamine, ergotamine, ergonovine, methylergonovine	Avoid with all Protease Inhibitors, delavirdine, and efavirenz
Flecainide	Avoid with lopinavir/ritonavir, ritonavir, and tipranavir
Fluticasone	Avoid with all Protease Inhibitors except unboosted indinavir and nelfinavir
Garlic supplements	Avoid with saquinavir
Irinotecan	Avoid with atazanavir and indinavir
Pimozide	Avoid with all Protease Inhibitors
Propafenone	Avoid with lopinavir/ritonavir, ritonavir, and tipranavir
Proton pump inhibitors	Avoid with atazanavir and delavirdine
Quinidine	Avoid with ritonavir and tipranavir
Rifampin	Avoid with all Protease Inhibitors, nevirapine and delavirdine. Can be used with efavirenz; consider EFV dosage increase to 800mg daily.
St. Johns Wort	Avoid with all Protease Inhibitors and all Non-Nucleoside Reverse Transcriptase Inhibitors
Terfenadine	Avoid with all Protease Inhibitors, delavirdine and efavirenz
Simvastatin and lovastatin	Avoid with all Protease Inhibitors and delavirdine

Reference:

Guidelines for the Use of Antiretroviral Agents in HIV-Infected Adults & Adolescents. October 10, 2006. Available at: <http://www.aidsinfo.nih.gov>. Accessed March 5, 2007.

ACKNOWLEDGEMENTS

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If you are interested in HIV pharmacy trainings such as clinical consultations, lectures, workshops or preceptorships, please contact John Faragon, PharmD, the Regional Pharmacy Director for the New York/New Jersey AETC at faragoj@mail.amc.edu or 518.262.6864. You will be referred to the appropriate training site in your region.

Additional Information:

Visit the AETC's National Resource Center Website at www.aids-etc.org. This website provides a central repository of training materials developed within the AETC network, including resources for pharmacists.

Several pharmacy education materials are available from the New York/New Jersey AETC at no charge. Visit www.nynjaetc.org or call 212.304.5530.