

LIQUID DRUG FORMULATIONS

Drug	Liquid available?	Formulation	Status	Cost	Comments
ANTIRETROVIRALS					
abacavir	yes	20 mg/mL oral solution; 240 mL bottle	facilitated access	\$100.00/bottle	Yellow, strawberry-banana flavoured liquid; store oral solution at room temperature. Tablet is film-coated, no data on whether can be crushed.
amprenavir	yes	15 mg/ml oral liquid; 240 mL bottle	section 8	\$46.08/bottle	Yellow, grape/bubblegum flavoured liquid. Oral solution contains: vitamin E 46 IU/ml, propylene glycol 550 mg/ml, PEG400 170mg/ml, , saccharin Store at room temperature in original bottle. NB: due to high propylene glycol content, avoid in pregnancy, children <4 years, renal or hepatic dysfunction.
atazanavir	yes	50 mg/1.5 g dispersible oral powder, 180 g bottle	investigational only (PACTG 1020)	available in Europe	Powder may be mixed with small amount of water, applesauce, milk, or yogurt (consume within 3 hours of mixing). Do not mix with juices or foods with high pH.
AZT	yes	10 mg/mL oral syrup; 240 mL bottle	ODDMP	\$43.39/bottle	Strawberry-flavoured; stable at room temperature. May open capsules & give in small portion of food or 5-10 mL cool tap water.
AZT/3TC (Combivir)	no	use AZT & 3TC liquid products	facilitated access		No data, but likely OK to crush tablets; crush immediately before ingestion. May have bitter taste.
AZT/3TC/abacavir (Trizivir)	no	Use AZT, 3TC and abacavir liquid products	facilitated access		
darunavir	no				No pharmacokinetic data are available on chewing or crushing of PREZISTA film-coated tablets. However, since the tablets are not formulated as an extended release formulation, no potential problem is anticipated if the tablets are chewed or crushed for administration through a nasogastric (NG) tube. It is unlikely that chewing or crushing PREZISTA tablets would have a significant impact on pharmacokinetics (Data on File, Tibotec, November 2006).

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d4T	yes	1 mg/mL oral suspension; 200 ml bottle	SAP	no charge	Fruit-flavoured; stable 30 days in fridge; can also open up capsules give in small portion of food or 5-10 mL cool tap water
ddC	no				Investigational oral solution is no longer available.
ddl	yes	2 g and 4 g oral powder (pediatric solution); 10 mg/mL final concentration	ODDMP	\$67.84/4 g bottle; \$30/2 g bottle	Reconstitute oral powder with sterile water, then Mylanta TC suspension; stable for 30 days in fridge; (can also crush/dissolve buffered tablets in water, apple juice, or chocolate milk)
delavirdine	no				Can dissolve 100 mg tablets in water to make slurry (20% ↑ bioavailability). Disperse tablets in at least 90 mL of water, allow to stand for a few minutes, stir and consume.
efavirenz	yes	30 mg/mL; 180 mL bottle	pediatric suspension available via Sustiva Oral Liquid Expanded Access Program at 1-877-372-7097 (Massachusetts)		Strawberry-mint flavour. Store liquid at room temperature in original container; stable for 30 days after opening. Can open capsules and mix powder with apple sauce (but will result in hot "jalapeno" sensation); for nasogastric administration, may open capsules and mix with either 5 mL MCT oil or 15 mL Ora-Sweet (grind powder first to enhance dissolution). Powder is insoluble in water; do NOT mix with polyethylene glycol (will ↓ bioavailability).
Efavirenz/ emtricitabine/ tenofovir (Atripla)	no				Tablet should not be crushed or split. EFV is practically insoluble in water. There are no studies evaluating the pharmacokinetics (e.g., oral bioavailability) of a crushed EFV/FTC/TDF tablet dispersed into a liquid medium (e.g., milk, water, juice) compared to a whole tablet. Similarly, splitting EFV/FTC/TDF tablets has not been studied and it is not recommended. There are no studies evaluating the pharmacokinetics of a split EFV/FTC/TDF tablet versus a whole tablet.
emtricitabine (FTC)	no		investigational only in Canada		200 mg capsules may be opened and mixed with water.

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fosamprenavir	yes	50 mg/mL oral suspension, 225 mL bottle.	Section 8		Grape bubblegum and peppermint flavour. Suspension must be taken on an empty stomach. Store oral suspension between 2-30°C. Do not freeze. Discard the suspension 28 days after first opening. No information on crushing or dissolution of 700 mg tablets.
indinavir	no		liquid being formulated		do NOT open capsules (bitter taste; stability?); NB: 10 mg/mL indinavir syrup complex compounding formulation . Stable for 14 days in refrigerator, store in glass bottle. (Hugen et al. Am J Health Syst Pharm 2000; 57(14):1332-9).
Lamivudine (3TC)	yes	10 mg/mL oral solution; 240 mL bottle	facilitated access	\$70.40/bottle	Pale yellow, strawberry-banana flavoured solution; stable at room temperature. (Note:contains 6% v/v ETOH & 3g sugar) Can also crush tablets.
lopinavir/ritonavir	yes	80 mg/20 mg per mL; 160 mL bottle	facilitated access	\$316.27/bottle	Cotton-candy flavoured yellow-orange oral solution; stable in refrigerator until expiry date; stable at room temperature for 42 days. 42.4% alcohol. NB: tablets should be swallowed whole and not chewed, broken, or crushed. Risk of tablets shattering if broken/crushed. Also in house animal data suggest reduced bioavailability if tablets are broken (personal communication, Abbott Laboratories, November 15, 2006).
nelfinavir	yes	50 mg/g oral powder; 144 g bottle. (1g = 1 level scoop).	facilitated access	\$52.42/bottle	Can also dissolve tablets (i.e. 250 mg tablet in 5 mL sterile water to yield a 50 mg/mL liquid. Use syringe with 1 mL increments to measure. Round dose to nearest 50mg); tablet or powder may be mixed with food or liquid up to 6 hours (refrigerated) before dose is taken.
nevirapine	yes	10 mg/mL;240 mL bottle	SAP		Sweet-flavoured syrup; stable at room temperature. Can crush tablets in water.
ritonavir	yes	80 mg/mL oral liquid; 240 mL bottle	facilitated access	\$256.35/bottle	Orange-coloured oral solution, peppermint & caramel-flavoured. 43% v/v alcohol. Shake well before each use. Stable at room temperature; do not refrigerate.

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saquinavir	no		liquid not being formulated due to unpalatability		6 x 200 mg Fortavse whole caps mixed with 50 mL of whole milk or Advera nutritional supplement took 5-15 minutes to dissolve when heated to 40, 60 or 80 degrees C. The mixture remained in solution for up to 1 hour at room temperature. If refrigerated for 24 hours, it turned into a gel, but reliquified after reheating to 30 degrees C. The drug was still stable at 24 hours. (data on file, Hoffmann-LaRoche)
tenofovir	no		Pediatric suspension under development		Crushed tablet dissolves in 100 mL water in 20 minutes; grape juice may also be used. NB: crushed tablets have very disagreeable taste. May also try splitting tablets and inserting into empty gelatin capsules to mask taste.
tipranavir	no		investigational only in Canada		250 mg capsule. No information on opening or dissolution.
OTHER MEDICATIONS:					
acyclovir	yes	200 mg/5 mL; 125 mL bottle	Facilitated access	\$30,72/ bottle	Banana-flavoured suspension; store between 15-25C.
azithromycin	yes	pediatric oral powder/suspension 100 mg/5 mL (300 mg bottle) OR 200 mg/5 mL (600 & 900 mg bottles)	limited use	\$23.77/ 600mg bottle	Cherry-flavoured suspension. Dispose unused suspension after 10 days; may also open capsules and mix with water (ingest immediately on empty stomach, follow with full glass of water)
clarithromycin	yes	125 mg/5 mL & 250 mg/5mL; 55, 105 and 150 mL bottles			Fruit-flavoured suspension. Shake well before use. Store reconstituted liquid at room temperature.
Fenofibrate (Lipidil Supra, Lipidil EZ)	no				Tablets are not enteric-coated or sustained-release. Therefore while the company does not have any specific kinetic information, crushing or cutting the tablets is not expected to negatively affect bioavailability.

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hydroxyurea	no				Can open up capsules and mix with water; take immediately. Some inert material (used as a vehicle in capsule) may not dissolve, and may float on top. Do not allow powder to come in contact with skin and mucous membranes. Avoid inhalation of powder when opening capsules.
rifabutin	no				Can open capsules (experience in pediatrics: OK to mix with applesauce, syrup, cherry syrup); drug not soluble in water
TMP/SMX	yes	pediatric suspension 40 mg/200 mg per 5 mL (= ½ SS tablet); 400 & 800 mL bottles	formulary	\$0.20/10 mL (=1 SS tablet)	Cherry-flavoured. Store at Room temperature (Septra brand)

Key: ODDMP: Ontario Drug Distribution/Monitoring Program, SAP= Special Access Program, Health Protection Branch, Ottawa (ph: 613-941-2108; fax: 613-941-3194; http://www.hc-sc.gc.ca/hpfb-dgpsa/tpd-dpt/sap_requestform_e.html)