2014
Canadian Do Not Crush List

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The Canadian Pharmacist's Do Not Crush List

The document:

This document part one part of a two-part system. This document is intended to be used by pharmacists and assumes some degree of training in pharmacokinetics and pharmaceutics. It is recommended that other healthcare professionals use part two document ("The Canadian Medication Administrators Do Not Crush List"), and contact a pharmacist if further information is required. The "reason column" is intended to be a one-sentence statement to alert medication administrators as to the *general* problem with altering the medication. It is included on this comprehensive list so the medication specialist using this list is aware of what front line staff sees on their condensed document ("The Canadian Medication Administrators Do Not Crush List"). Please do not base clinical decisions on this section of the document.

Criteria for "Reasons column"

1. Altering dosage form may be hazardous to healthcare worker (drug class)
2. Altering dosage form significantly changes drug pharmacokinetics (potential sub therapeutic or toxic situations)
3. Modified-release dosage form (delayed-release *OR* sustained-release)
4. Sublingual tablet (altering tablet may change drug release profile, consult pharmacist)
5. Altering dosage form may expose patient to unpleasant taste of medicine
6. Administering altered dosage form may cause oropharyngeal ulceration OR irritation
7. Other (explanation)

The inclusion and exclusion criteria:

Due to the increasing complexity of pharmaceutical products and the uniqueness the practice of altering dosage forms, there will be a degree of subjectivity in generating any kind of do not crush list. Due to this subjectivity, different clinicians will find different shortcomings within the list due to differing opinions, differing clinical experiences, etc. The editor of this document has reviewed many lists and many references on the topic to try and incorporate suitable methods of relaying this information, and avoiding shortcomings. To minimize subjectivity, explain rational, and provide a method for constructive feedback; *general* guidelines for inclusion and exclusion of pharmaceutical products is given below:

1. Any products with an intended and marketed modified-release (including, but not limited to: enteric-coatings, sustained-releases, delayed-release, etc.) are included in the list by default.
2. Products with manufacturer data to support a clinically significant change in pharmacokinetics when altering dosage form are included (clinical significance in this document will be loosely defined as: a good chance for sub-therapeutic drug levels or supra-therapeutic or toxic levels).
3. Lozenges are included if the editor feels they are clinically relevant (ex. fentanyl)

4. If there are new medications available with no published data on crushing, dispersing, etc., and the editor feels there is significant risk to the patient if bioequivalence is not met between the crushed/dispersed product and the intact capsule or tablet; they are included (i.e. the list takes a *very* conservative approach). For these products the pharmacist should use professional judgment on a case-by-case basis as whether to alter dosage form.
5. Effervescent tablets, although considered a solid-dose oral formulation, are not included.

The management approach:

The general approach used in this document for management of patients with swallowing difficulties goes as follows:

1. If the patient is expected to have temporary swallowing difficulties, consider short-term cessation of treatment IF APPROPRIATE (document decision and monitor patient frequently)
    - The "MANAGEMENT" bullets contained in this document assumes that this option is not appropriate, however it should still be considered
2. If long-term swallowing difficulty expected; consider alternative commercially available routes of administration of medication (in general, oral route preferred)
3. If unavailable, consider other alternative medications (with appropriate routes of administration) OR consider discontinuation of medication IF APPROPRIATE
4. Consider altering solid-dose oral formulation IF APPROPRIATE as a last resort

When changing formulation of a medication or altering a dosage form ALWAYS consider that a change in pharmacokinetics may occur (T_{max}, C_{max}, and AUC) for ANY product. We recommend checking for dose equivalencies between formulations and frequent monitoring after the change has occurred (for efficacy and side effects).

NOTE: A method for dispersing tablets and capsules is given at the end of the following table.

Table 1. Comprehensive list of commercial tablets and capsules in Canada that should not be altered, or require special instructions to do so.

Active Ingredient	Product *Dosage Form*	Reason	Comments and Management (Reference)
abacavir/lamivudine	Kivexa® *Tablet, film-coated*	**Altering dosage form may expose patient to unpleasant taste of medicine**	• Tablets are film-coated to mask the bitter taste, to preserve stability and to improve swallowing of the tablet. ('don't rush to crush', pg. 45, 1st ed.) • MANAGEMENT OF SWALLOWING DIFFULTIES: consider switching to individual abacavir and lamivudine liquid preparations.
abacavir/ lamivudine/ zidovudine	Trizivir® *Tablet, film-coated*	**Altering dosage form may be hazardous to healthcare worker (Antiretroviral)** **Altering dosage form may expose patient to unpleasant taste of medicine**	• There is no specific data on crushing this tablet (2013). It is likely film-coated to mask poor taste. • MANAGEMENT OF SWALLOWING DIFFULTIES: consider switching to individual abacavir, lamivudine, and zidovudine commercial liquid preparations (DPD, 2013). • Zidovudine is in NIOSH's list of hazardous agent (NIOSH, 2012)
acamprosate	Campral® *Tablet, enteric-coated*	**Modified-release dosage form (delayed-release)**	• Manufacturer does not recommend splitting or crushing tablets. (e-CPS, Campral, 2013)
acetaminophen	Tylenol® Arthritis Pain Extended Release *Caplet, extended-release*	**Modified-release dosage form (sustained-release)**	• (OTC compendium, pg. 8, 1st ed.) • MANAGEMENT OF SWALLOWING DIFFULTIES: consider switching to oral liquid, plain immediate-release tablets can be dispersed ('don't rush to crush', pg. 440, 1st ed.).
acetylsalicylic acid	Various Manufacturers *Tablet, enteric-coated* *Tablet, delayed-release*	**Modified-release dosage form (delayed-release)**	• The reasoning for using enteric-coated ASA tablets is to minimize gastric intolerance. Crushing tablet would ruin this mechanism. • MANAGEMENT OF SWALLOWING DIFFULTIES: if patient does not have gastric contraindications, consider switching to chewable formulation.
acitretin	Soriatane® *Capsule*	**Altering dosage form may be hazardous to healthcare worker (Retinioid)**	• Healthcare workers should use appropriate precautions if altering dosage form (such as gloves, respirator, eye protection). Pregnant healthcare workers should not handle capsule contents, as acitretin is highly teratogenic. • Capsule contents can be dispersed ('don't rush to crush', pg. 50, 1st ed.)
acyclovir	Valtrex® *Tablet* Generics	**Other (no information available to support altering tablet)**	• The manufacturer does not have any stability data available once tablet crushed. • MANAGEMENT OF SWALLOWING DIFFULTIES: consider using parenteral formulation ('don't rush to crush', pg. 49, 1st ed.)
adefovir	Hepsera® *Tablet, IR*	**Other (no information available to support altering tablet)**	• There is no information available currently available to support crushing and dispersing this tablet (2013). It is therefore not recommended to alter dosage form. • Preferred course of action: consider other medications ('don't rush to crush', pg. 51, 1st ed.)
alendronate	Fosamax® *Tablet, uncoated* Fosavance® (alendronate/cholecalciferol) *Tablet*	**Administering altered dosage form may cause oropharyngeal ulceration**	• Manufacturer does not recommend chewing or sucking on the tablet because of a potential for oropharyngeal ulceration. (e-CPS, Fosamax, 2013) • MANAGEMENT OF SWALLOWING DIFFULTIES: consider: o Withhold alendronate (short-term swallowing difficulties) o Change to parenteral form (long-term swallowing difficulties) o Disperse tablet ('Don't rush to crush', pg. 54, 1st Ed.)

	Generics: Sorres-alendronate, sanis-alendronate, accord-alendronate, pdl-alendronate, sivem-alendronate, apo-alendronate, auro-alendronate, co-alendronate , dom-alendronate, jamp-alendronate, mint-alendronate, mylan-alendronate, phl-alendronate, pms-alendronate, q-alendronate, ran-alendronate, ratio-alendronate, riva-alendronate sandoz-alendronate, teva-alendronate, teva-alendronate/cholecalciferol *Tablet*		
alfuzosin	Apo-alfuzosin *Tablet, extended-release* Sandoz-alfuzosin *Tablet, extended-release* teva-alfuzosin PR *Tablet, extended-release* Xatral® (sanofi) *Tablet, extended-release*	**Modified-release dosage form (sustained-release)**	• Manufacturers do not recommend crushing, grinding or chewing tablets as high levels of alfuzosin may occur. (Product monographs)
alitretinoin	Toctino® *Capsule*	**Altering dosage form may be hazardous to healthcare worker (Retinoid)**	• No data available on altering dosage form, therefore it is not recommended to alter dosage form. • Healthcare workers should use appropriate precautions if handling capsule contents (such as gloves, respirator, eye protection). Pregnant healthcare workers should not handle capsule contents as alitretinoin is highly teratogenic.
aluminum hydroxide	Diovol® Plus tablets, Gastriform®, Gelusil® tablets *Tablet*	**Not suitable for tube feeds (may interact with feed, blockage)** ****Including liquid preparations**	• Aluminum hydroxide may form complexes with some enteral feeds and may block tubes. ('don't rush to crush', pg. 58, 1st ed.) o NOTE: this is applicable to liquid preparations as well. • MANAGEMENT OF SWALLOWING DIFFULTIES: consider a liquid preparation, tablets can be chewed or crushed (neither of these approaches are considered appropriate for administration via enteral feeding tubes)

amphetamine salts	Adderall XR® *Capsule*	**Modified-release dosage form (sustained-release)**	• MANAGEMENT OF SWALLOWING DIFFULTIES: capsule may be opened and the entire contents sprinkled on applesauce. If using the sprinkle administration method, the sprinkled applesauce should be consumed immediately and not stored. Patients should eat the applesauce with sprinkled beads in its entirety and refrain from chewing. The dose of a single capsule should not be divided—the contents of the entire capsule should be taken. (e-CPS, Adderall XR, 2013)
ascorbic acid	GNC Timed Release Vitamin C (GNC) *Tablet*	**Modified-release dosage form (sustained-release)**	• (OTC compendium, pg. 250, 1st ed.)
	Nutrol® C (M.Vachon) *Tablet, sustained-release*		• (OTC compendium, pg. 250, 1st ed.)
	Timed release C (Jamieson) *Tablet*		• (OTC compendium, pg. 251, 1st ed.)
	Timed release ester C (GNC) *Tablet*		• (OTC compendium, pg. 251, 1st ed.)
	Timed release Vitamin C (GNC) *Tablet*		• (OTC compendium, pg. 251, 1st ed.)
atomoxetine	Strattera® *Capsules*	**Altering dosage form may be hazardous to healthcare worker**	• Manufacturer does not recommend opening capsules (e-CPS, Strattera, 2013) • NOTE: Atomoxetine is an ocular irritant, if capsule contents come in contact with eyes was immediately and seek medical advice. ('don't rush to crush', pg. 84, 1st ed.)
	Generics: Apo-atometine, pdl-atomoxetine, dom-atomoxetine, mylan-atomoxetine, pms-atomoxetine, riva-atomoxetine, Sandoz-atomoxetine, teva-atomoxetine *Capsule*		
azathioprine	Imuran® *Tablet*	**Altering dosage form may be hazardous to healthcare worker (Immunosuppressant, 6-MP derivative)**	• Healthcare workers should use appropriate precautions if altering dosage form (such as gloves, respirator, eye protection). Risk may be higher for pregnant healthcare workers. • MANAGEMENT OF SWALLOWING DIFFULTIES: tablets can be dispersed in a closed system (such as an oral dispenser). o NOTE: azathioprine is light sensitive and should be given immediately ('don't rush to crush', pg. 88, 1st ed.)
	Generics: Apo-azathioprine, sanis-azathioprine, mylan-azathioprine, teva-azathiprine *Tablet*		
bisacodyl	Codulax® *Tablet, enteric coated*	**Modified-release dosage form (delayed-release)**	• The tablets are designed so that minimal drug is released in the small bowel; the active form is released in the colon by bacterial cleavage. (Handbook of Drug Admin. via enteral feeding tubes, pg. 115, 2007)
	Dulcolax®		

	Tablet, enteric coated Bisacolax® *Tablet, enteric coated* Various generic manufacturers *Tablet, enteric coated*		• Enteric-coating may also prevent gastric irritation and vomiting. (AHFS DI, bisacodyl, 2013) • MANAGEMENT OF SWALLOWING DIFFULTIES: consider switching to suppository.
budesonide	Entocort® *Capsules, controlled-ileal-release*	**Modified-release dosage form (delayed, sustained-release)**	• Formulated to release budesonide in the terminal ileum and ascending colon for the topical treatment of disease in this area. Alteration of this formulation will cause the drug to be released elsewhere and absorbed systemically. (Handbook of Drug Administration by Enteral Tubes, pg. 119, 2007) • MANAGEMENT OF SWALLOWING DIFFULTIES: Do not crush or chew capsule contents, may mix contents with orange juice and administer immediately ('Do Not Rush to Crush, pg. 104, 1st Ed.).
buprenorphine/ naloxone	Suboxone® *Tablet, sublingual*	**Sublingual tablet (altering tablet may change drug release profile, consult pharmacist)**	• MANAGEMENT OF SWALLOWING DIFFULTIES: breaking/crushing Suboxone to a granular appearance is common practice. Benefits must be balanced with potential changes in pharmacokinetics". ('don't rush to crush', pg. 107, 2013)
bupropion	Wellbutrin SR/XL® *Tablet, sustained-release* Zyban® *Tablet, sustained-release* Ava-Bupropion SR *Tablet, extended-release* Pdl-Bupropion SR *Tablet, extended-release* Novo-Bupropion SR *Tablet, extended-release* PMS-Bupropion SR *Tablet* ratio-Bupropion SR *Tablet, extended-release* Sandoz-Bupropion SR *Tablet, extended-release*	**Modified-release dosage form (sustained-release)**	• Manufacturer does not recommend altering dosage form as this may lead to an increased risk of seizures. • Splitting tablet in half may not have a significant impact on release. However, as buproprion is hydroscopic, tablet halves should be taken immediately after being broken. (Cochren, 1999)
busulfan	Myleran® *Tablet, film-coated*	**Altering dosage form may be hazardous to healthcare worker (Antineoplastic, alkylating agent)**	• No specific information on handling drug in product monograph. • Myleran is cytotoxic, therefore it is recommended not to alter dosage form. Tablets are film-coated and will likely expose healthcare worker to minimal levels of busulfan with normal handling of unbroken tablets. • Healthcare workers should use appropriate precautions handling broken tablets (such as gloves, respirator, eye protection). Risk may be higher for pregnant healthcare workers.

capecitabine	Xeloda® *Tablet, film-coated* Teva-capecitabine *Tablet*	**Altering dosage form may be hazardous to healthcare worker (Antineoplastic, antimetabolite)**	• Healthcare workers should use appropriate precautions if altering dosage form (such as gloves, respirator, eye protection). Risk may be higher for pregnant healthcare workers. • MANAGEMENT OF SWALLOWING DIFFULTIES: A 10 mg/mL oral solution may be made with tablets. Crush four 500 mg tablets in a mortar and reduce to a fine powder; add to 200 mL water. Capecitabine tablets are water soluble (data on file from Roche). Administer immediately after preparation, 30 minutes after a meal. (Lexi-comp, Capecitabine, 2013)
carbamazepine	Tegretol CR® *Tablet, controlled release, scored* Mylan-Carbamazepine CR *Tablets, controlled-release* Gen-carbamazepine CR *Tablets, controlled-release* Sandoz-carbamazepine CR *Tablets, controlled-release* PMS-carbamazepine CR *Tablets, controlled-release* dom-carbamazepine CR *Tablets, controlled-release* Taro-carbamazepine CR *Tablets, controlled-release*	**Modified-release dosage form (sustained-release)**	• Tegretol CR tablets can be split along the score line, do not quarter tablet (Novartis Pharmaceuticals, personal communication, 2013) • Do not crush or disperse controlled-release tablet ('don't rush to crush', pg. 122, 1st ed.) • Also in NIOSH list of hazardous agents (NIOSH, 2013). This is likely due to the teratogenicity seen when carbamazepine taken systemically. • MANAGEMENT OF SWALLOWING DIFFULTIES: consider switching to oral suspension (Tegretol suspension 100mg/5ml), chewable tablets, or a switch to a plain tablet which can be dispersed o IMPORTANT NOTE: narrow therapeutic index; consider changes in pharmacokinetics when interchanging products or utilizing these methods.
cefuroxime	Ceftin® *Tablet*	**Altering dosage form may expose patient to unpleasant taste of medicine**	• Cefuroxime has a bitter taste (Lexi-comp, cefuroxime, 2013). Crushing and/or dispersing tablets may be unpalatable for patient (inducing nausea and vomiting; leading to non-compliance). • MANAGEMENT OF SWALLOWING DIFFULTIES: consider switching to solution formulation (Ceftin powder for solution 125mg/5mls) tablets can be dispersed (mask bitter taste by giving liquids or food after administration).
celecoxib	Celebrex® *Capsule*	**Other (consult pharmacist before altering dosage form)**	• MANAGEMENT OF SWALLOWING DIFFULTIES: Can mix capsule contents with apple sauce/pudding and give immediately. ('don't rush to crush', pg. 127, 1st ed.) ('handbook of drug administration via enteral feeding tubes', pg. 144, 2007)
Cetirizine/ pseudoephedrine (120mg)	Reactine® Allergy & Sinus (Pfizer) *Tablet*	**Modified-release dosage form (sustained-release)**	• (OTC compendium, pg. 44, 1st ed.)
chloral hydrate	PMS-chloral hydrate *Capsule*	**Other (liquid filled)**	• MANAGEMENT OF SWALLOWING DIFFULTIES: Consider switching to a liquid formulation. o Pms-chloral hydrate 100mg/ml, Odan-chloral hydrate syrup 100mg/ml syrup available (DPD, 2013)
chlorambucil	Leukeran®	**Altering dosage form may be**	• Manufacturer does not recommend dividing tablets. (e-CPS, Leukeran, 2013)

	Tablet, film-coated	**hazardous to healthcare worker (Antineoplastic, alkylating agent)**	• Provided the outer coating is intact, there is no risk to handling. (e-CPS, Leukeran, 2013)
chlorpromazine	Teva-chlorpromazine	**Altering dosage form may be hazardous to healthcare worker (Typical antipsychotic)**	• Do not divide, crush, or chew tablet. Crushed tablets are irritant and may cause contact sensitization ('don't rush to crush', pg. 131, 1st ed.) • MANAGEMENT OF SWALLOWING DIFFULTIES: consider switching patient to commercial IM/IV products. (DPD, 2013)
cinacalcet	Sensipar® *Tablet, film-coated*	**Other (tablets are not scored and cutting may cause variable dosage accuracy)**	• Manufacturer recommends tablets are swallowed whole (e-CPS, Sensipar, 2013). Stability data and pharmacokinetic data on crushed or split tablets have not been done. Manufacturer states that as tablets are not scored, splitting may result in variable dose accuracy (Amgen, personal communication, 2013) • This, along with the fact that there is no third party data available (2013) regarding altering this dosage form; it is recommended not to crush and/or disperse tablet.
ciprofloxacin	Cipro XL® *Tablet*	**Modified-release dosage form (sustained-release)**	• Manufacturer states tablets should not be split, crushed or chewed (e-CPS, Cipro XL, 2013). • MANAGEMENT OF SWALLOWING DIFFULTIES: consider switching to an immediate-release tablet; which can be crushed and dispersed ('don't rush to crush', pg. 139, 1st ed.)
	Various generics	**Altering dosage form may expose patient to unpleasant taste of medicine**	• Medication has bitter taste (PL 'Meds that should not be crushed', pg. 6, July 2012). Crushing and/or dispersing tablets may be unpalatable for patient (inducing nausea and vomiting; leading to non-compliance). • MANAGEMENT OF SWALLOWING DIFFULTIES: Tablets *can* be crushed and dispersed.
clarithromycin	Biaxin-XL® *Tablet, extended release, film-coated*	**Modified-release dosage form (sustained-release)**	• Manufacturer states tablets should not be crushed (e-CPS, Biaxin-XL, 2013) • MANAGEMENT OF SWALLOWING DIFFULTIES: consider switching to a commercially available oral liquid formulation, consider switching to an immediate-release tablet; which can be crushed and dispersed ('don't rush to crush', pg. 141, 1st ed.)
clodronate disodium	Bonefos® *Capsule* Clasteon® *Capsule*	**Administering altered dosage form may cause oropharyngeal ulceration**	• Clodronate is irritant and may cause oesophageal or gastric irritation if tablets are crushed or capsules opened. ('don't rush to crush', pg. 144, 1st ed.) • MANAGEMENT OF SWALLOWING DIFFULTIES: o Withhold alendronate (short-term swallowing difficulties), o Consider switching to parenteral therapy (long-term swallowing difficulties) ▪ (Bonefos 60mg/ml IV solution available)
colchicine	Euro-colchicine *Tablet* odan-colchicine *Tablet* jamp-colchicine *Tablet* pms-colchicine *Tablet*	**Altering dosage form may be hazardous to healthcare worker (Antigout agent)**	• Healthcare workers should use appropriate precautions if altering dosage form (such as gloves, respirator, eye protection). Risk may be higher for pregnant healthcare workers. • MANAGEMENT OF SWALLOWING DIFFULTIES: tablets can be dispersed in a closed system (such as an oral dispenser) o To minimize exposure, do not crush; tablets disperse within 1-5 minutes ('don't rush to crush', pg. 153, 1st ed.)
colestipol	Colestid® *Tablets, film-coated*	**Other (colestipol will readily absorb water from the air)**	• Colestipol is hygroscopic and water insulouble (e-CPS, Colestid, 2013). Colestipol will likely absorb water from the air if film coating disrupted and may swell when patient tries to swallow (Pfizer, personal communication, 2013) • Manufacturer does not recommend cutting or crushing tablet (e-CPS, Colestid, 2013).
cyanocobalamin	Vitamin B12 1200ug (Jamieson)	**Modified-release dosage form (sustained-release)**	• (OTC compendium, pg. 252, 1st ed.)

	Tablet, sustained-release		
cyclophosphamide	Procytox® *Tablet*	**Altering dosage form may be hazardous to healthcare worker (Alkylating agent)**	• Cyclophosphamide is cytotoxic, carcinogenic, mutagenic and teratogenic (Proctytox Product Monograph, Revised September 7th/2012), therefore it is not recommended to alter dosage form. • Healthcare workers should use appropriate precautions if handling broken tablets (such as gloves, respirator, eye protection). Risk may be higher for pregnant healthcare workers. Manufacturer recommends washing hands after glove use.
cyclosporine	Neoral® *Capsule*	**Altering dosage form may be hazardous to healthcare worker (Immunosuppressant, calcineurin inhibitor)**	• On NIOSH's list of hazardous agents. (NIOSH, 2012) • Manufacturer recommends swallowing capsules whole (e-CPS, Neoral, 2013). • MANAGEMENT OF SWALLOWING DIFFULTIES: consider switching to oral solution (apo-cyclosporine 100mg/ml oral solution, Neoral Oral solution 100mg/ml) or parenteral formulation (sandimmune 50mg/ml)
d-pantothenic acid	Timed release D-Pantothenic acid (Swiss) *Tablet*	**Modified-release dosage form (sustained-release)**	• (OTC compendium, pg. 251, 1st ed.)
dabigatran	Pradaxa® *Capsule*	**Altering dosage form significantly changes drug pharmacokinetics (potential sub therapeutic or toxic situations)**	• The oral bioavailability may be increased by 75% (about 1.8-fold) compared to the reference capsule formulation when the pellets are taken without the HPMC capsule shell. Hence, the integrity of the HPMC capsules should always be preserved in clinical use to avoid unintentionally increased bioavailability of Pradaxa. (e-CPS, Pradaxa, 2013)
darifenacin	Enablex® *Tablet, extended-release, film-coated*	**Modified-release dosage form (sustained-release)**	• Manufacturer does not recommend chewing, dividing or crushing tablet (e-CPS, Enablex, 2013).
darunavir ethanolate	Prezista® *Tablet, film-coated*	**Other MANUFACTURER RESPONSE PENDING**	• There is no information available to support crushing and dispersing this tablet ('don't rush to crush', pg. 168, 1st ed.). It is therefore not recommended to alter dosage form. • A liquid formulation is under investigation. (PENTA Steering Commitee, 2009)
dasatinib	Sprycel® *Tablet, film-coated*	**Altering dosage form may be hazardous to healthcare worker (Antineoplastic, tyrosine kinase inhibitor)**	• Healthcare workers should use appropriate precautions if altering dosage form (such as gloves, respirator, eye protection). Risk may be higher for pregnant healthcare workers and manufacturer recommends pregnant workers to avoid contact with altered tablets. • MANAGEMENT OF SWALLOWING DIFFULTIES: Add tablet to 30ml of chilled orange juice or apple juice without preservatives and let stand, swirl every 5 minutes for a total time of 20 minutes. Swirl once immediately before administration. ('don't rush to crush', pg. 169, 1st ed.)
deferasirox	Exjade® *Tablet, dispersable*	**Other (do not give as tablet; tablets are meant to be given as a liquid; see company insert)**	• MANAGEMENT OF SWALLOWING DIFFULTIES: Exjade tablets should be completely dispersed by stirring in water, orange juice, or apple juice until a fine suspension is obtained. Doses of <1 g should be dispersed in 100 mL of liquid and doses of >1 g in 200 mL of liquid. After swallowing the suspension, any residue should be resuspended in a small volume of liquid and swallowed. Tablets must not be chewed, split, crushed or swallowed whole. (e-CPS, Exjade, 2013)
desloratidine/ pseudoephedrine	Aerius® Dual Action (Schering-Plough) *Tablet, extended-release*	**Modified-release dosage form (sustained-release)**	• (OTC compendium, pg. 32, 1st ed.)
desvenlafaxine	Pristiq® *Tablet, extended-release*	**Modified-release dosage form (sustained-release)**	• Manufacturer does not recommend dividing or chewing tablets as drug release from tablet changes with changing surface area to tablet volume ratio and may result in erratic absorption, failure to achieve adequate plasma concentrations, or excessive amount of drug (e-CPS, Pristiq, 2013), (Pfizer, personal communication, 2013)
dexlansoprazole	Dexilant® *Capsule, 'dual delayed-*	**Modified-release dosage form (delayed-release)**	• MANAGEMENT OF SWALLOWING DIFFULTIES: o Open capsule

	release technology', enteric coated granules		o Sprinkle intact granules on one tablespoon of applesauce; o Swallow immediately. Granules should not be chewed. (e-CPS, Dexilant, 2013)
diclofenac	Apo-diclo SR *Tablets, slow-release*	**Modified-release dosage form (sustained-release)**	• Manufacturer recommends swallowing tablet whole. • MANAGEMENT OF SWALLOWING DIFFULTIES: Consider alternative NSAID with liquid formulation available (ex. ibuprofen), diclofenac suppositories available o Pms-diclofenac suppository (50-100mg), Sandoz-diclofenac suppository (50-100mg), Teva-diclofenac suppository (50-100mg), Voltarin suppository (50-100mg).
	Ava-diclofenac *Tablet, enteric-coated, not scored* Ava-diclofenac SR *Tablet, sustained-release, not scored*	**Modified-release dosage form**	
	San-diclofenac EC *Tablet, enteric-coated, not scored* San-diclofenac SR *Tablet, film-coated, slow-release, not scored*		
	Pro-diclofenac ECT *Tablets, not scored* Pro-diclofenac SR *Tablets, not scored*		
	Dom-diclofenac-SR *Tablet, slow-release, not scored*	**Modified-release dosage form (sustained-release)**	
	Pms-diclofenac *Tablet, delayed-release, not scored*	**Modified-release dosage form (delayed-release)**	
	Pms-diclofenac SR *Tablet, not scored*	**Modified-release dosage form (sustained-release)**	
	Sandoz-diclofenac *Tablet, enteric-coated* Sandoz-diclofenac *Tablet, slow-release*	**Modified-release dosage form (delayed-release)**	
	Teva-diclofenac EC *Tablet, enteric coated* Teva-diclofenac SR *Tablet, sustained-release*	**Modified-release dosage form**	
	Voltaren SR® *Film-coated, slow-release,*	**Modified-release dosage form (sustained-release)**	

	not scored		
diclofenac sodium/ misoprostol	Co-diclo Miso *Tablet, enteric-coated* Arthrotec® *Tablet, Enteric-coated*	**Modified-release dosage form (delayed-release)**	• Manufacturers recommends swallowing tablet whole. • Pregnant healthcare workers should avoid skin contact with broken tablets.
didanosine	Videx® *Capsule, enteric-coated*	**Modified-release dosage form (delayed-release)**	• Manufacturer recommends swallowing capsule whole. • MANAGEMENT OF SWALLOWING DIFFULTIES: Capsules can be opened and sprinkled on a spoonful of food e.g. yogurt. There is a decrease in AUC. (PENTA Steering Commitee, 2009)
diltiazem	Cardizem CD® *Capsule, controlled delivery* Apo-diltiazem CD/SR/TZ *Capsule* Co-diltiazem CD/T *Capsule, extended-release* sanis-diltiazem CD *Capsule, controlled-delivery* Pdl-diltiazem TZ/CD *Capsule* PMS-diltiazem CD *Capsule, controlled-delivery* ratio-diltiazem CD *Capsule, controlled-delivery* Sandoz-diltiazem CD/T *Capsule, extended-release* teva-diltiazem CD *Capsule, extended-release* Tiazac/XC® *Tablet, extended-release, film-coated (XC)*	**Modified-release dosage form (sustained-release)**	• MANAGEMENT OF SWALLOWING DIFFULTIES: Empty capsule contents into a mortar, do not crush or chew the pellets, mix with thickened water or smooth yoghurt, give immediately. ('don't rush to crush', pg. 189, 1st ed.) Capsule contents may alternatively be sprinkled on applesauce. • Manufacturer does not recommend chewing or crushing tablet. (e-CPS, Tiazac, 2013)
dimenhydrinate	Gravol® Long Action Dual Releif Tablets (Church & Dwight) *Tablet, long-acting*	**Modified-release dosage form (sustained-release)**	• (OTC compendium, pg. 86, 1st ed.)
dimethyl fumarate	Tecfidera® *Capsules, delayed-release*	**Modified-release dosage form (delayed-release)**	• Manufacturer does not recommend crushing, dividing or dissolving capsules as the enteric-coating of the microtablets in the capsule helps to prevent irritant effects on the stomach. (e-CPS, Tecfidera, 2013)
dipyridamole/ASA	Aggrenox® *Capsule*	**Modified-release dosage form (sustained-release)**	• Manufacturer recommends capsules should be swallowed whole without chewing. (e-CPS, Aggrenox, 2013) • Aggrenox contains 200mg extended-release dipyridamole pellets, manipulation would result in "dose-dumping" and place the patient at risk for serious side effects, and well as undermining of

			efficacy (Boehringer Ingelheim Canada Ltd, personal communication, 2013)
divalproex	Epival® *Tablet, enteric-coated*	**Altering dosage form may be hazardous to healthcare worker (Antiepileptic)** **Modified-release dosage form (delayed-release)**	• Product is enteric-coated an attempt to product against the common gastrointestinal side effects seen with valproic acid (stomach irritation with subsequent nausea and vomiting), altering tablet would destroy this preventative mechanism. • MANAGEMENT OF SWALLOWING DIFFULTIES: consider switching to valproic acid syrup, or valproic acid tablet (for which there is evidence to support crushing and dispersing). o Patient *may* experience more GI side effects with valproic acid than with divalproex. o NOTE: consider dose equivalencies and pharmacokinetic changes when switching between these products • In NIOSH's list of hazardous agents (NIOSH, 2012)
	Generics Apo-divalproex, novo-divalproex, phl-divalproex, pms-divalproex, sanis-divalproex, pdl-divalproex, dom-divalproex *Tablet, enteric-coated*	**Altering dosage form may be hazardous to healthcare worker (Antiepileptic)**	
docusate	Colace®, Colax-C®, Regulex®, Selax®, Soflax® *Capsule*	**Altering dosage form may expose patient to unpleasant taste of medicine**	• Docusate has a bitter taste; dispersing tablets may be unpalatable for patient (inducing nausea and vomiting; leading to non-compliance). • MANAGEMENT OF SWALLOWING DIFFULTIES: Give syrup or drops in 120 mL of milk or fruit juice or in infant formula, to mask bitter taste. (e-CPS, docusate, 2013)
	Various generic manufacturers *Capsule*		
docusate with senna	Euro-senna S *Tablet*	**Altering dosage form may expose patient to unpleasant taste of medicine**	• Docusate has a bitter taste; dispersing tablets may be unpalatable for patient (inducing nausea and vomiting; leading to non-compliance). • MANAGEMENT OF SWALLOWING DIFFULTIES: tablets can be dispersed ('don't rush to crush', pg. 196, 1st ed.)
	Jamp-senna S *Tablet*		
	Senna laxative and docusate sodium tablets *Tablet*		
	Senna S. tablet *Tablet*		
	Sennosides with docusate sodium *Tablet*		
	Senokot S® *Tablet*		
doxycycline	Apprilon® *Capsule, immediate and delayed-release beads*	**Modified-release dosage form (delayed-release)**	• Manufacturer does not provide any information in product monograph with regards to opening and dispersing capsules. • MANAGEMENT OF SWALLOWING DIFFULTIES: switch to immediate-release tablets; which are dispersible, can open capsule contents and mix with thickened water or smooth yoghurt and give immediately ('do not rush to crush', pg. 202, 1st ed.)
doxylamine /	Diclectin®	**Modified-release dosage form**	• Manufacturer does not recommend crushing or splitting tablets.

pyridoxine	*Tablet, delayed-release, film-coated*	**(delayed-release)**	
duloxetine	Cymbalta® *Capsule, delayed-release*	**Modified-release dosage form (sustained-release)**	• Manufacturer does not recommend sprinkling capsule contents on food or mixing with liquids and states this may affect the enteric coating. (e-CPS, Cymbalta, 2013) • MANAGEMENT OF SWALLOWING DIFFULTIES: Mixing duloxetine pellets with applesauce or apple juice (~pH 3.5) appears to be an acceptable vehicle for administration. However, exposing the pellets to chocolate pudding (pH 5.5-6) damaged the pellets' enteric coating, suggesting that pudding may be an unacceptable vehicle for administration (Wells & Losin, 2008).
dutasteride	Avodart® *Capsule*	**Administering altered dosage form may cause oropharyngeal irritation**	• Manufacturer recommends Avodart capsules should be swallowed whole and not chewed or opened, as contact with the capsule contents may result in irritation of the oropharyngeal mucosa (e-CPS, Avodart, 2013) • Pregnant healthcare workers should use appropriate precautions if handling broken capsules (such as gloves).
efavirenz/ emtricitabine/ tenofovir	Atripla® *Tablet, film-coated*	**Altering dosage form significantly changes drug pharmacokinetics (potential sub therapeutic or toxic situations)**	• A bioequivalence study was done between intact Atripla® and dispersed tablets in 14 healthy subjects. Efavirenz C_{max} and AUC 90% CI fell under and over, respectively, the 80-125% range. Tenofovir C_{max} and AUC 90% CI both fell above the 80-125% range. The authors stated the two formulations where not bioequivalent for these reasons. Emtricitabine CI's fell within the 80-125% range for both parameters (Bristol-Myers Squibb & Gilead Sciences, personal communication, 2013) • MANAGEMENT OF SWALLOWING DIFFULTIES: consider other medicines (with a liquid preparation available or evidence to support altering dosage form).
entecavir	Baraclude® *Tablet, film-coated* apo-entecavir *Tablet, film-coated*	**Altering dosage form may be hazardous to healthcare worker (Antiviral)**	• The bioavailability, stability, palatability, and efficacy of any altered formulation cannot be guaranteed by the company (Bristol-Myers Canada, personal communication, 2013). • MANAGEMENT OF SWALLOWING DIFFULTIES: the manufacturer states they product a liquid preparation in Canadan (entecavir 0.05mg/ml), this however, is not in DPD (2013) • Listed in NIOSH list of hazardous agents (NIOSH, 2012)
erlotinib	Tarceva® *Tablet, film-coated*	**Altering dosage form may be hazardous to healthcare worker (Antineoplastic, tyrosine kinase inhibitor)**	• Healthcare workers should use appropriate precautions if altering dosage form (such as gloves, respirator, eye protection). Risk may be higher for pregnant healthcare workers. • MANAGEMENT OF SWALLOWING DIFFULTIES: can disperse tablet. Dissolve tablets in 100mLs of water (in a closed system, if possible), with the resulting suspension administered by swallowing. Container should be rinsed twice with 40mls of water to ensure full dose has been given. (Lam, 2011)
erythromycin (free base)	ERYC® *Capsule, enteric-coated pellets*	**Modified-release dosage form (delayed-release)**	• MANAGEMENT OF SWALLOWING DIFFULTIES: (e-CPS, Eryc, 2013) o Hold the capsule with the clear end down. Gently twist off the orange cap to open. o Sprinkle the **entire** contents of the capsule on a spoonful of applesauce, fruit jellies, ice cream, etc. The pellets should not be chewed or crushed. o Have your child swallow the spoonful of applesauce, fruit jellies or ice cream. Your child should drink some water to make sure all the pellets are swallowed. o If the pellets are accidentally spilled, start over with a new capsule. o NOTE: manufacturer recommends to do this over food to not lose any pellets (as capsules are very full)
	Erythro-EC *Capsule, enteric-coated, delayed release*		• Manufacturer product monograph does not make a statement regarding whether or not capsule can be opened and dispersed (AAP-erythromycin Product Monograph, Prepared: June 11th/ 2011) • MANAGEMENT OF SWALLOWING DIFFULTIES: mixed capsule contents in thickened water or

			smooth yoghurt within a mortar and give immediately. Do not crush or chew the pellets ('don't rush to crush', pg. 217, 1st ed.)
esomeprazole	Nexium® *Tablet, delayed-release* mylan-esomeprazole *Tablet, delayed-release* Apo-esomeprazole *Tablet, delayed-release* Pdl-esomeprazole *Tablet, delayed-release*	**Modified-release dosage form (delayed-release)**	• MANAGEMENT OF SWALLOWING DIFFULTIES: The tablets may also be dispersed in half a glass of non-carbonated water. No other liquids should be used as the enteric coating may be dissolved. Stir until the tablets disintegrate and drink the liquid with the pellets immediately or within 30 minutes. Rinse the glass with half a glass of water and drink. The pellets must not be chewed or crushed. (e-CPS, Nexium, 2013) o NOTE: only data for Nexium and Mylan-esomeprazole for this method • Manufacturer does not recommend dispersing, dividing or crushing the tablets.
estramustine	Emcyt® *Capsule*	**Altering dosage form may be hazardous to healthcare worker (Antineoplastic)**	• Professional staff administering estramustine should exercise particular care to prevent spillage and contact with the drug. Should skin contact occur, the area should be vigorously washed with soap and cold water and material used for cleansing disposed of by incineration • It is known that both estradiol and nitrogen mustard are mutagenic. (e-CPS, Emcyt, 2013)
ethacrynic acid	Edecrin® *Tablet, scored*	**Other (no information available to support altering tablet)**	• The splitting of Edecrin 25 mg tablets is not advised. (e-CPS, Edecrin, 2013). The manufacturer does not give reason for this recommendation (Valeant, personal communication, 2013), this is likely an extremely conservative statement for liability issues. • MANAGEMENT OF SWALLOWING DIFFULTIES: a product can be compounded extemporaneously via ethacrynic powder (Das Gupta, Gibbs Jr., & Ghanekar, 1978), consider other loop diuretics if appropriate, consider parenteral formulation; sodium edecrine 50mg/vial (DPD, 2013)
etoposide	Vepeside® *Capsule, liquid-filled*	**Altering dosage form may be hazardous to healthcare worker (Antineoplastic, mitotic inhibitor)**	• Considered a human teratogen and carcinogen. DO NOT TRY TO OPEN CAPSULES
etravirine	Intelence® *Tablet*	**Other (do not crush, follow manufacturer's dispersion instructions)**	• MANAGEMENT OF SWALLOWING DIFFULTIES: Patients who are unable to swallow the INTELENCE tablet(s) whole may disperse the tablet(s) in a glass of water. o place the tablet(s) in 5 mL (1 teaspoon) of water, or at least enough liquid to cover the medication, o stir well until the water looks milky, o if desired, add more water or alternatively orange juice or milk (patients should not place the tablets in orange juice or milk without first adding water), o drink it immediately, o rinse the glass several times with water, orange juice, or milk and completely swallow the rinse each time to make sure the patient takes the entire dose. o The use of grapefruit juice, warm liquids (>40°C) or carbonated beverages should be avoided. (e-CPS, Intelence, 2013)
everolimus	Afinitor® *Tablet*	**Altering dosage form may be hazardous to healthcare worker (Antineoplastic/immunosuppressant, mTOR kinase inhibitor)**	• Manufacturer does not recommend crushing tablets. • Healthcare workers should use appropriate precautions if altering dosage form (such as gloves, respirator, eye protection). Risk may be higher for pregnant healthcare workers. • MANAGEMENT OF SWALLOWING DIFFULTIES: An oral liquid may be prepared using tablets. Disperse tablet in ~30 mL (1 oz) of water; gently stir until the tablets break apart and give immediately. Administer and rinse container with additional 30 mL (1 oz) water and administer to

			ensure entire dose is administered. ('don't rush to crush', pg. 234, 1st ed.)
fampridine	Fampyra® *Tablet, sustained release*	**Modified-release dosage form (sustained-release)**	• Manufacturer does not recommend dividing, crushing or dissolving tablet as this can release a large amount of the drug at one time and increase risk of seizures.
felodipine	Plendil® *Tablet, extended-release, film-coated* Sandoz-felodipine *Tablet, extended-release, film-coated* Renedil® *Tablet, extended-release*	**Modified-release dosage form (sustained-release)**	• Manufacturer does not recommend crushing tablet (Sandoz does not recommend splitting their tablet)
fentanyl	Abstral® *Sublingual Tablet*	**Sublingual tablet (altering tablet may change drug release profile, consult pharmacist)**	• Manufacturer recommends tablets should not be chewed, sucked or swallowed, but allowed to completely dissolve in the sublingual cavity. (e-CPS, Abstral, 2013) • Fentanyl is poorly absorbed by the gastrointestinal tract (Yaksh & Wallace, 2011), therefore administering this tablet orally or altering sublingual tablet to increase transit to gastrointestinal tract (GIT) will likely result in lower systemic levels.
Iron Salts (fumarate, gluconate, sulfate)	GNC Timed Release Iron (GNC) *Tablet* Iron 50mg Timed Disintegrating (Jamieson) *Tablet* Slow-Fe® (Novartis) *Tablet, sustained-release*	**Modified-release dosage form (sustained-release)** **Modified-release dosage form (sustained-release)** **Modified-release dosage form (sustained-release)**	• MANAGEMENT OF SWALLOWING DIFFULTIES: consider switching to a liquid preparation: o PMS-ferrous sulfate solution 30mg/ml, Euro-fer suspension (ferrous fumarate 60mg/ml), fer-in-sol (ferrous sulfate 30mg/ml), ferodan syrup (ferrous sulfate 30mg/ml), Palafer suspension (ferrous fumarate 60mg/ml), PediaFer (ferrous sulfate 75mg/ml), PediaFer solution (ferrous sulfate 30mg/ml)
fesoterodine	Toviaz® *Tablet, extended-release*	**Modified-release dosage form (sustained-release)**	• Manufacturer does not recommend crushing tablets. • MANAGEMENT OF SWALLOWING DIFFULTIES: consider switching to an immediate-release alternative which has a liquid preparation available or has crushable and dispersible tablets (ex. oxybutynin).
fexofenadine	Allegra® 24 Hour (Sanofi-aventis) *Tablet*	**Modified-release dosage form (sustained-release)**	• (OTC compendium, pg. 32, 1st ed.)
fexofendadine/ pseudoephedrine	Allegra-D® (Sanofi-aventis) *Tablet*	**Modified-release dosage form (sustained-release)**	• (OTC compendium, pg. 32, 1st ed.)
fludarabine	Fludara® *Tablet, film-coated*	**Altering dosage form may be hazardous to healthcare worker (Antineoplastic, antimetabolite)**	• Manufacturer recommends that FLUDARA (fludarabine phosphate) should not be handled by pregnant staff. (e-CPS, Fludara, 2013) • Do not divide or crush tablets. Do not handle crushed tablets. ('don't rush to crush', pg. 249, 1st ed.)
fluvastatin	Lescol XL® *Tablet, extended-release, film-coated*	**Modified-release dosage form (sustained-release)**	• Manufacturer recommends tablets to be swallowed whole.
fosamprenavir	Telzir® *Tablet*	**Other (no information to support altering dosage form)**	• There is no specific information available to support crushing and dispersing dosage form ('don't rush to crush', pg. 258, 2013), it is therefore not recommended to alter tablet. • MANAGEMENT OF SWALLOWING DIFFULTIES: consider switching to oral suspension: Telzir

			50mg/ml (DPD, 2013)
galantamine	Reminyl ER® *Capsule, extended-release*	**Modified-release dosage form (sustained-release)**	• No information in e-CPS monograph about opening capsules. • MANAGEMENT OF SWALLOWING DIFFULTIES: a reference ('Don't rush to crush') has listed that capsules can be opened and contents sprinkled on apple sauce or yogurt. • Editor note: MANUFACTURER RESPONSE PENDING
	Mylan-galantamine ER *Capsule*	**Modified-release dosage form (sustained-release)**	• Manufacturer does not recommend opening capsules.
	Generics: Pat-galantamine ER, pms-galantamine ER, teva-galantamine ER *Capsule, extended-release*	**Modified-release dosage form (sustained-release)**	• Manufacturer product monograph does not mention anything regarding opening capsule.
gefitinib	Iressa® *Tablet, film-coated*	**Altering dosage form may be hazardous to healthcare worker (Antineoplastic, tyrosine kinase inhibitor)**	• Healthcare workers should use appropriate precautions if altering dosage form (such as gloves, respirator, eye protection). Risk may be higher for pregnant healthcare workers. • MANAGEMENT OF SWALLOWING DIFFULTIES: tablet is dispersible ('don't rush to crush', pg. 265, 1st ed.).
gliclazide	Diamicron MR® *Tabet, modified-release*	**Modified-release dosage form (sustained-release)**	• Manufacturer does not recommend crushing tablets. • The 60mg tablets can be halved (e-CPS, Diamicron MR, 2013)
	Gliclazide MR® (AA) *Tablet, unscored*	**Modified-release dosage form (sustained-release)**	
guanfacine	Intuniv XR® *Tablet, extended-release*	**Modified-release dosage form (sustained-release)**	• Manufacturer does not recommend crushing tablet as this will increase the rate of guanfacine release. (e-CPS, Intuniv XR, 2013)
hydromorphone	Hydromorph Contin® *Capsule, controlled release*	**Modified-release dosage form (sustained-release)**	• **DO NOT CHEW, CRUSH OR DISSOLVE capsules or capsule contets as this could lead to the rapid release and absorption of a potentially FATAL dose of HYDROmorphone.** • MANAGEMENT OF SWALLOWING DIFFULTIES: capsules can be opened and the contents sprinkled onto a tablespoonful of warm or cold (4-40°C) applesauce or room temperature custard. The entire contents of the tablespoonful of food and HYDROmorphone mixture should be swallowed as soon as possible after sprinkling and should be discarded if not consumed. The food/drug mixture should not be chewed, and the ingestion should be followed by rinsing the mouth with fluid to ensure that the entire contents are swallowed. (e-CPS, Hydromorph Contin, 2013)
	Jurnista® *Tablet, extended-release*		• **DO NOT CHEW, CRUSH OR DISSOLVE capsules or capsule contets as this could lead to the rapid release and absorption of a potentially FATAL dose of HYDROmorphone.** • Manufacturer does NOT recommend dividing or crushing tablet as this may lead to uncontrolled release and rapid absorption of a potentially FATAL dose of hydromorphone. (e-CPS, Jurnista, 2013)
hydroxyurea	Hydrea® *Capsule*	**Altering dosage form may be hazardous to healthcare worker (Antineoplastic, antimetabolite)**	• MANAGEMENT OF SWALLOWING DIFFULTIES: Capsules can be opened and the contents mixed with water immediately prior to administration. Hydroxycarbamide is cytotoxic. Steps should be taken to minimize operator exposure to the powder (Patients and caregivers must be cautioned not to allow the powder to come in contact with the skin and mucous membranes, including avoidance of inhaling the powder when opening the capsules.). (Handbook of Drug Administration by enteral tubes, pg. 283, 2007). • To decrease the risk of exposure, wear disposable gloves when handling Hydrea or bottles
	Apo-hydroxyurea *Capsule*		
	Sanis-hydroxyurea *Capsule*		
	Mylan-hydroxyurea		

	Capsule		containing Hydrea. Anyone handling Hydrea should wash their hands before and after contact with the bottle or capsules. (e-CPS, Hydrea, 2013)
imatinib	Gleevec® *Tablet, scored* **400mg tablet may be "scored or unscored"..*	**Altering dosage form may be hazardous to healthcare worker (Antineoplastic, tyrosine kinase inhibitor)** **Altering dosage form may expose patient to unpleasant taste of medicine**	• Healthcare workers should use appropriate precautions if altering dosage form (such as gloves, respirator, eye protection). Risk may be higher for pregnant healthcare workers. • This drug may have an unpleasant taste which may lead to nausea/vomiting and non-compliance (PL 'Meds that should not be crushed', pg. 6, July 2012). • MANAGEMENT OF SWALLOWING DIFFULTIES: For patients unable to swallow the film-coated tablets, the tablets may be dispersed in a glass of water or apple juice. The required number of tablets should be placed in the appropriate volume of beverage (approximately 50 mL for a 100 mg tablet, and 200 mL for a 400 mg tablet) and stirred with a spoon. The suspension should be administered immediately after complete disintegration of the tablet(s). Traces of the disintegrated tablet left in the glass after drinking should also be consumed. (e-CPS, Gleevec, 2013) • American ISMP had this listed as 'do not crush' because of a taste issue. [Nothing in monograph regarding a taste issue]
	Apo-imatinib *Tablet*		
	Teva-imatinib *Tablet*		
indinavir	Crixivan® *Capsule (IR)*	**Altering dosage form may expose patient to unpleasant taste of medicine**	• Indinavir has a bitter taste (PL 'Meds that should not be crushed', pg. 6, July 2012); dispersing tablets may be unpalatable for patient (inducing nausea and vomiting; leading to non-compliance). • There is also no specific information available for crushing this form ('don't rush to crush', pg. 296, 1st ed.), for this reason (along with potential taste issues) it is not recommended to alter dosage form.
isosorbide dinitrate	AA-isosorbide dinitrate (ISDN) *Tablet, sublingual*	**Sublingual tablet (altering tablet may change drug release profile, consult pharmacist)**	• Product intended to be dissolved in mouth. A crushed oral tablet has been shown to have more pronounced effects (vasodilation) in dogs (AA-ISDN Product Monograph, pg. 8, Prepared: June 18th/2010), this phenomenon may occur with crushed sublingual tablets.
isosorbide-5-mononitrate	Imdur® *Tablet, extended-release, film-coated, scored*	**Modified-release dosage form (sustained-release)**	• Manufacturer does not recommend crushing tablets. • Tablet can be broken in half along the score line (e-CPS, Imdur, 2013).
	APO-ISMN *Tablet, extended-release, scored*		• Manufacturer does not recommend crushing tablets. • Can be broken in half along the score line (Apo-ISMN Product Monograph, pg. 13, Revised Dec. 15th/2010).
	Pro-ISMN *Tablet, extended-release*		• Do not crush extended-release tablet.
isotretinoin	Accutane-Roche® *Capsule*	**Altering dosage form may be hazardous to healthcare worker (Retinoid)**	• Healthcare workers should use appropriate precautions handling broken capsules or altering dosage form (such as gloves, respirator, eye protection). Risk may be higher for pregnant healthcare workers.
	Clarus® *Capsule (paste fill)*		
	Epuris® *Capsule*		
itraconazole	Sporanox® *Capsule*	**Other**	• Manufacturer recommends swallowing capsules whole. • MANUFACTURER RESPONSE PENDING • MANAGEMENT OF SWALLOWING DIFFULTIES: consider switching to a liquid formulation (Sporanox oral solution 10mg/ml), capsule contents can be dispersed with thickened water or smooth yogurt, give immediately. ('don't rush to crush', pg. 306, 1st ed.), do not crush or chew the pellets.
ketoprofen	Ketoprofen SR® (AA)	**Modified-release dosage form**	• Manufacturer does not recommend crushing tablets.

	Tablet, extended-release	**(sustained-release)**	
	Ketoprofen-E® *Tablet, enteric-coated*	**Modified-release dosage form (delayed-release)**	• Manufacturer does not recommend crushing tablets.
	PMS-ketoprofen ECT *Tablet, enteric-coated*		• No monograph available. Crushing tablet would presumably destroy enteric coating and may increase the risk for oropharyngeal and gastric irritation.
lamivudine/ zidovudine	Combivir® *Tablet, film-coated*	**Altering dosage form may be hazardous to healthcare worker (Antiretroviral)**	• There is no specific information is available with regards to crushing and dispersing tablet ('don't rush to crush', pg. 315, 1st ed.). It is therefore not recommended to alter dosage form. • Zidovudine in NIOSH list of hazardous agent (NIOSH, 2012)
lansoprazole	Prevacid® *Capsules, delayed-release granules*	**Modified-release dosage form (delayed-release)**	• MANAGEMENT OF SWALLOWING DIFFULTIES: Lansoprazole delayed-release capsules can be opened, and the intact granules contained within can be sprinkled on one tablespoon of applesauce and swallowed immediately. The granules should not be chewed or crushed. (e-CPS, Prevacid, 2013)
	Prevacid FasTab® *Tablet (uncoated), orally-disintegrating, enteric coated microgranules*	**Modified-release dosage form (delayed-release)**	• MANAGEMENT OF SWALLOWING DIFFULTIES: For administration via oral syringe, Prevacid FasTab can be administered as follows: o Place a 15 mg tablet in oral syringe and draw up approximately 4 mL of water, or place a 30 mg tablet in oral syringe and draw up approximately 10 mL of water. o Shake gently to allow for a quick dispersal. o After the tablet has dispersed, administer the contents within 15 minutes. o Refill the syringe with approximately 2 mL (5 mL for the 30 mg tablet) of water, shake gently, and administer any remaining contents. (e-CPS, Prevacid, 2013)
	Generics: Apo-lansoprazole Sanis-lansoprazole Pdl-lansoprazole Sivem-lansoprazole Mylan-lansoprazole Pms-lansoprazole QD-lansoprazole Ran-lansoprazole Sandoz-lansoprazole Teva-lansoprazole *Capsule, delayed-release*	**Modified-release dosage form (delayed-release)**	• Manufacturer does not recommend opening capsules. • Proton pump inhibitors undergo an acid-catalyzed reaction resulting in an INACTIVE dimer (Tutunji, Qaisi, El-Eswed, & Tutunji, 2006) (i.e. product is acid labile, products are formulated to bypass the low pH environment of the stomach and altering product may destroy this mechanism resulting in ineffective therapy). • MANAGEMENT OF SWALLOWING DIFFULTIES: Empty capsule contents into apple juice, orange juice or tomato juice. Mix and give immediately ('don't rush to crush', pg. 317, 1st ed.)
lapatinib	Tykerb® *Tablet, film-coated*	**Altering dosage form may be hazardous to healthcare worker (Antineoplastic, tyrosine kinase inhibitor)**	• Do not crush or disperse tablet. • Healthcare workers should use appropriate precautions if handling broken tablets (such as gloves, respirator, eye protection). Risk may be higher for pregnant healthcare workers.

leflunomide	Generics: Apo-leflunomide Sanis-leflunomide Mylan-leflunomide Novo-leflunomide Phl-leflunomide Pms-leflunomide Sandoz-leflunomide *Tablet* Arava® *Tablet, film-coated*	**Altering dosage form may be hazardous to healthcare worker (Anti-rheumatic, DMARD)**	• Healthcare workers should use appropriate precautions if altering dosage form (such as gloves, respirator, eye protection). Risk may be higher for pregnant healthcare workers. • MANAGEMENT OF SWALLOWING DIFFULTIES: Disperse tablets in a closed system such as an oral dispenser. Tablets disperse within 5 minutes with shaking.
lenalidomide	Revlimid® *Capsule*	**Altering dosage form may be hazardous to healthcare worker (Antineoplastic/ Immunomodulator)**	• Manufacturer recommend tablets be swallowed whole. • Lenalidomide is an analogue of thalidomide, a known human teratogen that causes severe and life-threatening birth defects. • Manufacturer recommends that health care providers consider wearing gloves when directly handling Revlimid® (lenalidomide) capsules, along with standard hand washing. Manufacturer states that females who could become pregnant, or who plan to become pregnant can handle Revlimid® capsules if they are using latex gloves. (Revlimid Product Monograph, pg. 32, Revised: September 25, 2013)
levetiracetam	Various manufacturers	**Altering dosage form may expose patient to unpleasant taste of medicine**	• Drug may have an unpleasant taste (potential for inducing nausea/vomiting leading to non-compliance) (PL 'Meds that should not be crushed', pg. 6, July 2012)
levodopa/carbidopa	Sinemet CR® *Tablet, not scored*	**Modified-release dosage form (sustained-release)**	• Manufacturer recommends administering only whole tablets as crushing tablets will not maintain controlled-release properties. (e-CPS, Sinemet CR, 2013)
	Levocarb CR (AA) *Tablet, controlled-release*		• Manufacturer recommends administering only whole tablets as crushing tablets will not maintain controlled-release properties. (Levocarb CR Product Monograph, pg. 9, Prepared Jan 6, 2011) • 200mg/50mg tablet may be administered as a whole or as half tablets. (Levocarb CR Product Monograph, pg. 9, Prepared Jan 6, 2011)
levodopa/carbidopa/ entacapone	Stalevo® *Tablet, unscored, film-coated*	**Other**	• There is no data currently available (2013) to support crushing and dispersing this formulation. For this reason, it is not recommended to alter dosage form. • MANAGEMENT OF SWALLOWING DIFFULTIES: consider switching to individual forms of these three medications for crushing ('don't rush to crush', pg. 331, 1st ed.)
levodopa/ benserazide	Prolopa® *Capsule*	**Other**	• Manufacturer does not recommend opening capsules and dissolving in liquid. • The manufacturer does not have any stability, efficacy or safety data or opened capsules. Product is light sensitive. For these reasons, it is not recommended to alter dosage form.
lithium carbonate	Lithmax® *Tablet, extended-release*	**Modified-release dosage form (sustained-release)**	• Manufacturer does not recommend crushing tablet. • Tablet may be broken in half. (Lithmax Product Monograph, pg. 20, Prepared Nov. 19, 2010)
lomustine	Ceenu® *Capsule*	**Altering dosage form may be hazardous to healthcare worker (Antineoplastic, alkylating agent, nitrosurea)**	• Manufacturer recommends that preparation of CeeNU should be done in a vertical laminar flow hood, and that personnel handling CeeNU should wear gloves, safety glasses, a mask and disposable protective clothing (e-CPS, Ceenu, 2013).
loperamide	Imodium®	**Other (no information available**	• There is no specific information is available for crushing this form ('don't rush to crush', pg. 339, 1st

	Tablet Various generic manufacturers *Tablet*	**to support crushing)**	ed.). • MANAGEMENT OF SWALLOWING DIFFULTIES: consider a switch to a quick dissolve formulation or an oral solution (DPD, 2013).
lopinavir/ritonavir	Kaletra® *Tablets, film-coated*	**Altering dosage form significantly changes drug pharmacokinetics (potential sub therapeutic or toxic situations)**	• Manufacturer does not recommend crushing tablet. • Kaletra is film-coated primarily for taste reasons. • A randomized, prospective, open□label, cross□over study compared the pharmacokinetics of a single oral dose of 2 crushed 200/50 mg Kaletra tablets (mixed in 4 ounces of Jell□O brand pudding) with 2 whole 200/50 mg Kaletra tablets in 12 HIV□positive pediatric subjects already receiving Kaletra tablets for greater than 2 weeks. The geometric mean of the lopinavir $AUC_{0□12}$ for crushed to whole tablets was 0.55 (90% confidence interval [CI], 0.45□0.69; *P*=0.003). The geometric mean of the ritonavir $AUC_{0□12}$ for crushed to whole tablets was 0.53 (90% CI, 0.4□0.71; *P*=0.006) (AbbVie, personal communication, 2013) • MANAGEMENT OF SWALLOWING DIFFULTIES: consider switching to liquid formulation (Kaletra Oral solution); suitable for tube feeds (analysis indicated that greater than or equal to 92% of the dose administered with a 20ml water rinse passed through each GI tube), a small amount of white particulate was observed but tube clogging did not occur.
maraviroc	Celsentri® *Tablet, film-coated*	**Other (no information available to support crushing)**	• There is no data currently available (2013) to support crushing and dispersing this formulation. For this reason, it is not recommended to alter dosage form. ('don't rush to crush', pg. 347, 1st ed.) • Manufacturer does not make a statement regarding crushing, dispersing, or splitting product. (e-CPS, Celsentri, 2013)
mefenamic acid	Ponstan® *Capsule* Various generic manufacturers	**Other (no information available to support opening and dispersing capsule contents)**	• Manufacturer does not make a statement in product monograph regarding opening and dispersing capsule contents (Ponstan Product Monograph, Revised: October 3, 2011). • There is no data currently available (2013) to support crushing and dispersing this formulation. For this reason, it is not recommended to alter dosage form. ('don't rush to crush', pg. 353, 1st ed.) • MANAGEMENT OF SWALLOWING DIFFULTIES: consider switching to an alternative NSAID that has commercial oral liquid availability
melphalan	Alkeran® *Tablet, film-coated*	**Altering dosage form may be hazardous to healthcare worker (Antineoplastic, alkylating agent)**	• Cytotoxic. Do not handle crushed tablets. DO NOT DIVIDE, CRUSH, OR CHEW TABLETS. ('don't rush to crush', pg. 357, 1st ed.)
memantine	Ebixa® *Tablet, scored* Various generic manufacturers *Tablet*	**Other (no information available to support opening and dispersing capsule contents)**	• Manufacturer does not have any stability data with regards to crushed tablets and does not recommend crushing tablets. • Ebixa film-coating primarly in place to mask taste (Lundbeck, personal communication, 2013) • MANAGEMENT OF SWALLOWING DIFFULTIES: consider crushing tablet and dispersing in a food vehicle (such as applesauce) administer immediately.
mercaptopurine	Purinethol® *Tablet, scored*	**Altering dosage form may be hazardous to healthcare worker (Antineoplastic, antimetabolite)**	• Healthcare workers should use appropriate precautions if altering dosage form (such as gloves, respirator, eye protection). Risk may be higher for pregnant healthcare workers • MANAGEMENT OF SWALLOWING DIFFULTIES: o A 50 mg/mL oral suspension may be prepared in a vertical flow hood with tablets and a mixture of sterile water for injection (SWFI), simple syrup, and cherry syrup. Crush thirty 50 mg tablets in a mortar and reduce to a fine powder. Add ~5 mL SWFI and mix

			to a uniform paste; then add ~10 mL simple syrup; mix while continuing to add cherry syrup to make a final volume of 30 mL; transfer to a calibrated bottle. Label "shake well" and "caution chemotherapy". Stable for 35 days at room temperature (Aliabadi, Romanick, Desai, & Lavasanifar, 2008) o Tablets may be dispersed in a closed system such as an oral dispenser ('don't rush to crush', pg. 359, 1st ed.)
mesalamine	Mesasal® *Tablet, EC*	**Modified-release dosage form (delayed-release)**	• Manufacturer recommends swallowing tablet whole in order to keep the outer coating intact until the terminal ileum (pH 7) to ensure mesalamine's availability throughout the colon.
	Mezavant® *Tablet, Delayed/extended release*	**Modified-release dosage form (delayed, extended-release)**	
	Pentasa® *Tablet, extended release*	**Modified-release dosage form (sustained-release)**	
	Salofalk® *Tablet, delayed release*	**Modified-release dosage form (delayed-release)**	
	Asacol (Asacol 800) ® *Tablet, EC*		
	Novo-5-ASA ECT *Tablet, enteric-coated*		
metformin	Sandoz-metformin FC *Tablet, film-coated (methylhydroxypropylcellulose)*	**Modified-release dosage form (delayed-release)**	• Although not modified release these tablets have a polymeric film coating which may be intended to prevent gastric irritation. Crushing these tablets would destroy this design. • MANAGEMENT OF SWALLOWING DIFFULTIES: consider using insulin for blood glucose control (if long-term swallowing difficulty is expected), consider switching patient to plain immediate-release tablet as they are crushable and dispersible (slow to disperse, longer than 5 minutes).
	Glumetza® *Tablet, extended-release*	**Modified-release dosage form (sustained-release)**	• Manufacturer does not recommend crushing tablets. • MANAGEMENT OF SWALLOWING DIFFULTIES: consider using insulin for blood glucose control (if long-term swallowing difficulty is expected), consider switching patient to plain immediate-release tablet as they are crushable and dispersible (slow to disperse, longer than 5 minutes).
metformin/linagliptin	Jentadueto® *Tablet, film-coated*	**Other (no information available to support opening and dispersing capsule contents)**	• There is no data currently available (2013) to support crushing and dispersing this formulation. For this reason, it is not recommended to alter dosage form.
metformin HCl/saxagliptin HCl	Komboglyze® *Tablet, film-coated, immediate release*	**Other (no information available to support opening and dispersing capsule contents)**	• There is no data currently available (2013) to support crushing and dispersing this formulation. For this reason, it is not recommended to alter dosage form.
methotrexate	Methotrexate® *Tablet, scored*	**Altering dosage form may be hazardous to healthcare worker (Antimetabolite)**	• Healthcare workers should use appropriate precautions if altering dosage form (such as gloves, respirator, eye protection). Risk may be higher for pregnant healthcare workers. • MANAGEMENT OF SWALLOWING DIFFULTIES: o Consider parenteral formulations: Sandoz-methotrexate (50mg/2ml, 500mg/20ml), accord-methotrexate (25mg/ml), hospira-methotrexate (25mg/ml, 10mg/ml), novo-methotrexate (25mg/ml), metoject (20mg/2ml, 7.5mg/0.75ml, 10mg/ml, 15mg/1.5ml, 25mg/2.5ml) o Tablet is dispersible in a closed system, such as an oral dispenser.
	Apo-methotrexate, hospira-methotrexate, ratio-methotrexate *Tablet*		
methylphenidate	Concerta®	**Modified-release dosage form**	• Manufacturer does not recommend crushing tablets.

	Tablet (capsule shaped), extended release	**(sustained-release)**	
	Biphentin® *Capsule, controlled release*		• MANAGEMENT OF SWALLOWING DIFFULTIES: The contents may be sprinkled on these soft foods: apple sauce, ice cream or yogurt. (e-CPS, Biphentin, 2013)
	Teva-methylphenidate ER-C *Tablet, extended-release*		• Manufacturer's product monograph does not make a statement on crushing or splitting tablet. It is therefore recommended not to crush or split tablet.
	Ritalin SR® *Tablets, extended release*		• Manufacturer does not recommend crushing tablets.
	Apo-methylphenidate SR, *Tablet, sustained-release*		
	Sandoz-methylphenidate SR *Tablet, sustained-release*		
metoprolol	Apo-metoprolol SR *Tablet, slow-release*	**Modified-release dosage form (sustained-release)**	• Manufacturer recommends swallowing tablets whole.
	Apo-metoprolol (type L) *Tablet, film-coated*	**Other (altering dosage form disrupts film-coating, consult pharmacist)**	• Manufacturer does not recommend splitting tablets as it will damage the film coating.
	Pdl-metoprolol (type L) *Tablet, film-coated*	**Other (altering dosage form disrupts film-coating, consult pharmacist)**	• Manufacturer does not recommend splitting tablets as it will damage the film coating.
	Pdl-metoprolol SR *Tablet, slow-release*	**Modified-release dosage form (sustained-release)**	• Nothing regarding crushing tablet in product monograph. • Do not crush or split tablet (splitting tablet damages film-coating).
	Sandoz-metoprolol SR *Tablet, film-coated*	**Modified-release dosage form (sustained-release)**	• The manufacturer does not make a statement regarding crushing or splitting tablet in their product monograph. It is therefore not recommended to crush or split tablet.
mirabegron	Myrbetriq® *Tablet, extended-release, film-coated*	**Modified-release dosage form (sustained-release)**	• Manufacturer recommends swallowing tablet whole. • MANAGEMENT OF SWALLOWING DIFFULTIES: consider switching to another agent for overactive bladder which has a liquid formulation commercially available, such as oxybutynin (apo-oxybutynin 1mg/ml syrup, PHL-oxybutynin 1mg/ml syrup, pms-oxybutynin 1mg/ml syrup)
mitotane	Lysodren® *Tablet*	**Altering dosage form may be hazardous to healthcare worker (Antineoplastic)**	• Manufacturer does not recommend crushing tablets. • Manufacturer recommends wearing impervious gloves when handling bottles containing Lysodren® tablets to minimize exposure. They state this should include all handling activities in clinical settings, pharmacies, storerooms and home healthcare settings, including during unpacking and inspection, transport within a facility and dose preparation and administration. (e-CPS, Lysodren®, 2013)
morphine	Kadian® *Capsule, SR (pellets)*	**Modified-release dosage form (sustained-release)**	• **DO NOT CHEW, CRUSH OR DISSOLVE capsules or capsule contents as this could lead to the rapid release and absorption of a potentially FATAL dose of morphine.** • MANAGEMENT OF SWALLOWING DIFFULTIES: Capsules may be opened and the pellets may be sprinkled onto a small amount of soft foods (such as yogurt, apple sauce or jam). This should be taken within 30 minutes of sprinkling. The pellets must not be chewed or crushed, and the mouth should be rinsed to ensure that all pellets have been swallowed. (e-CPS, Kadian®, 2013)

	M-Eslon® *Capsule, extended release microgranules*		• **DO NOT CHEW, CRUSH OR DISSOLVE capsules or capsule contents as this could lead to the rapid release and absorption of a potentially FATAL dose of morphine.** • MANAGEMENT OF SWALLOWING DIFFULTIES: The capsules may be opened, and the microgranules given mixed with soft food or liquids (e-CPS, M-Eslon®, 2013).
	M.O.S.-SR® *Tablet, film-coated, slow release*		• **DO NOT CHEW OR CRUSH TABLETS as this could lead to the rapid release and absorption of a potentially FATAL dose of morphine.** • Manufacturer does not recommend crushing tablet.
	MS Contin® *Tablet, sustained release, film-coated*		• **DO NOT CHEW OR CRUSH TABLETS as this could lead to the rapid release and absorption of a potentially FATAL dose of morphine.** • Manufacturer does not recommend crushing tablet as this may result in rapid release and a potentially fatal dose of morphine. • The 200mg tablet is scored and may be broken in half. The half tablet must be swallowed intact (e-CPS, MS Contin®, 2013).
	Sanis-morphine SR *Tablet, sustained-release*		• **DO NOT CHEW OR CRUSH TABLETS as this could lead to the rapid release and absorption of a potentially FATAL dose of morphine.** • Manufacturer does not recommend crushing tablet. • The 200mg tablet is scored and may be broken in half. The half tablet must be swallowed intact. (Sanis-morphine SR Product monograph)
	Sandoz-morphine SR *Tablet, sustained-release*		• **DO NOT CHEW OR CRUSH TABLETS as this could lead to the rapid release and absorption of a potentially FATAL dose of morphine.** • Manufacturer does not recommend crushing tablet.
	Teva-morphine SR *Tablet, sustained-release*		• **DO NOT CHEW OR CRUSH TABLETS as this could lead to the rapid release and absorption of a potentially FATAL dose of morphine.** • Manufacturer does not recommend crushing tablet. • The 200mg tablet is scored and may be broken in half. The half tablet must be swallowed intact. (Teva-morphine SR Product monograph)
multivitamin	Mega B® 100 Timed Release (SunOpta) *Tablet*	**Modified-release dosage form (sustained-release)**	• (OTC compendium, pg. 224, 1st ed.)
	Super Once A Day® Timed Release (SunOpta) *Tablet*		• (OTC compendium, pg. 238, 1st ed.)
	Time Released Balanced B® (Lee-Adams) *Tablet*		• (OTC compendium, pg. 238, 1st ed.)
	Timed Released Mega Men® (GNC) *Tablet*		• (OTC compendium, pg. 238, 1st ed.)
	Timed Release Stress B® with C (GNC) *Caplet*		• (OTC compendium, pg. 240, 1st ed.)
	Timed Release Swiss One 50® with B Vitamins (Swiss)		• (OTC compendium, pg. 240, 1st ed.)

	Caplet		
	Timed Release Ultra Mega® (GNC) *Tablet*		• (OTC compendium, pg. 240, 1st ed.)
	Timed Release Ultra Mega Gold® (GNC) *Tablet*		• (OTC compendium, pg. 240, 1st ed.)
	Timed Release Ultra Mega Gold® without (GNC) *Tablet*		• (OTC compendium, pg. 240, 1st ed.)
	Vitalux® Time Release *Tablet*		• (OTC compendium, pg. 242, 1st ed.)
	Women's Timed Release Ultra Mega® without Iron (GNC) *Tablet*		• (OTC compendium, pg. 246, 1st ed.)
mycophenolate sodium	Myfortic® *Tablet, enteric coated, film-coated*	**Altering dosage form may be hazardous to healthcare worker (Immunosuppresant)**	
mycophenolate mofetil	Cellcept® *Tablet/Capsules, (IR?)*	**Altering dosage form may be hazardous to healthcare worker (Immunosuppresant)**	• Do not crush tablets or open capsules. Manufacturer does not recommend crushing tablets or opening capsules, and recommends avoiding inhalation, skin, or mucous membrane contact with power from crushed tablets or open capsules. • MANAGEMENT OF SWALLOWING DIFFULTIES: consider switching to oral suspension (Cellcept® Powder for suspension 200mg/ml), or parenteral therapy (Cellcept® powder for solution 500mg/vial). • American ISMP: "Skin contact may enhance tumor production; avoid direct contact."
	Apo-mycophenolate *Tablet*		
	Mylan-mycophenolate *Tablet*		
	Novo-mycophenolate *Tablet*		
	Sandoz-mycophenolate *Tablet*		
	Co-mycophenolate *Tablet, film-coated*		
	Jamp-mycophenolate *Tablet, film-coated*		
	Jamp-mycophenolate *Capsule*		
	Accord-mycophenolate *Capsule*		
naproxen	Naprosyn E/SR® *Tablet, enteric coated/sustained release* Naprelan® *Tablet, controlled release,*	**Modified-release dosage form (delayed-release)**	• Manufacturer does not recommend crushing or splitting tablets.

	film-coated Generics: Apo-naproxen EC/SR® Ava-naproxen EC® Mylan-naproxen EC® Pms-naproxen EC® Pro-naproxen EC® Teva-naproxen EC/SR® *Tablet*		
naproxen / esomeprazole	Vimovo® *Tablet, film-coated, modified release (enteric coated naproxen, IR esomeprazole)*	**Modified-release dosage form (delayed-release)**	• Manufacturer does not recommend crushing or splitting tablets. • Proton pump inhibitors undergo an acid-catalyzed reaction resulting in an INACTIVE dimer (Tutunji, Qaisi, El-Eswed, & Tutunji, 2006) (i.e. product is acid labile, products are formulated to bypass the low pH environment of the stomach and altering product may destroy this mechanism resulting in ineffective therapy)
nevirapine	Viramune XR® *Tablet, extended-release*	**Modified-release dosage form (sustained-release)**	• MANAGEMENT OF SWALLOWING DIFFULTIES: consider switching to immediate-release tablet; which are crushable and dispersible.
nicotine	Nicorette® Lozenge, thrive lozenge	**Note: integrity compromised by chewing or crushing**	• Nicotine is intended to be absorbed through the buccal mucosa from these products; crushing may increase transit to stomach and may increase gastric side effects (irriration, nausea, etc.)
nicotinic acid	Niaspan® *Tablet, extended-release, unscored* Niaspan FCT® *Tablet, extended-release, film-coated, unscored*	**Modified-release dosage form (sustained-release)**	• Manufacturer does not recommend crushing or breaking tablet.
	Niodan® *Tablet, extended-release*		• No monograph available (e-CPS or DPD) • Do not crush or split tablet.
nifedipine	Adalat® XL *Tablet* Apo-Nifed PA SRT *Tablet, prolonged-action* Mylan-nifedipine ER *Tablet, extended-release*	**Modified-release dosage form (sustained-release)**	• Manufacturer does not recommend crushing or splitting tablet as this may result in a large release of the drug.
nilotinib	Tasigna® *Capsule*	**Altering dosage form may be hazardous to healthcare worker (Antineoplastic, tyrosine kinase Inhibitor)**	• Healthcare workers should use appropriate precautions if altering dosage form (such as gloves, respirator, eye protection). Risk may be higher for pregnant healthcare workers. • MANAGEMENT OF SWALLOWING DIFFULTIES: the content of each capsule may be dispersed in one teaspoon of applesauce and should be taken immediately. Not more than one teaspoon of applesauce should be used. Yogurt was shown to result in a significant increase in bioavailability and therefore must be avoided and **no food other than applesauce must be used** (e-CPS, Tasigna®, 2013)
nitroglycerin	Nitrostat SLT® *Tablet, sublingual*	**Sublingual tablet (altering tablet may change drug release profile, consult pharmacist)**	• Manufacturer does not recommend crushing tablet.

olanzapine	Zyprexa® *Tablet, film-coated*	**Altering dosage form may be hazardous to healthcare worker (Antipsychotic)**	• Do not crush tablets. Crushed tablets are irritant to the eyes and may cause contact dermatitis. ('don't rush to crush', pg. 416, 1st ed.) • MANAGEMENT OF SWALLOWING DIFFULTIES: use disintegrating tablet (dissolve directly on patient's tongue, or disperse in appropriate liquid). The orally disintegrating tablet may also be stirred into 125 mL (4 ounces) of water, milk, coffee, orange juice or apple juice and the contents promptly consumed. (e-CPS, Zyprexa®, 2013).
omeprazole	Losec® *Tablet/Capsule, delayed-release*	**Modified-release dosage form (delayed-release)**	• Manufacturer's product monograph does not make a statement on whether capsules can be open and dispersed in a vehicle (e-CPS, Losec, 2013). • Proton pump inhibitors undergo an acid-catalyzed reaction resulting in an INACTIVE dimer (Tutunji, Qaisi, El-Eswed, & Tutunji, 2006) (i.e. product is acid labile, products are formulated to bypass the low pH environment of the stomach and altering product may destroy this mechanism resulting in ineffective therapy)
	Mylan-omeprazole *Tablet, delayed-release*		• Proton pump inhibitors undergo an acid-catalyzed reaction resulting in an INACTIVE dimer (Tutunji, Qaisi, El-Eswed, & Tutunji, 2006) (i.e. product is acid labile, products are formulated to bypass the low pH environment of the stomach and altering product may destroy this mechanism resulting in ineffective therapy) • MANAGEMENT OF SWALLOWING DIFFULTIES: The tablets may also be dispersed in half a glass of non-carbonated water. No other liquids should be used as the enteric coating may be dissolved. Stir until the tablets disintegrate and drink the liquid with the pellets immediately or within 30 minutes. Rinse the glass with half a glass of water and drink. The pellets must not be chewed or crushed. (Mylan-omeprazole Product Monograph, pg. 18, Revised: November 14th/2013)
	Generics: Apo-omeprazole, Ava-omeprazole, Dom-omeprazole DR, Pdl-omeprazole, Sanis-omeprazole, Sivem-omeprazole, Pms-omeprazole, Pms-omeprazole DR, QD-omeprazole, Ran-omeprazole, Ratio-omeprazole, Sandoz-omeprazole, Teva-omeprazole *Tablet/Capsule, delayed-release*		• Manufacturer does not recommend opening capsules or crushing tablets. • Proton pump inhibitors undergo an acid-catalyzed reaction resulting in an INACTIVE dimer (Tutunji, Qaisi, El-Eswed, & Tutunji, 2006) (i.e. product is acid labile, products are formulated to bypass the low pH environment of the stomach and altering product may destroy this mechanism resulting in ineffective therapy) • MANAGEMENT OF SWALLOWING DIFFULTIES: Consider switching to an alternative proton pump inhibitor that may be dispersed.
ondansetron	Brand/generics *Tablet, film-coated*	**Other (no information available to support opening and dispersing capsule contents)**	• There is no data currently available (2013) to support crushing and dispersing this formulation. For this reason, it is not recommended to alter dosage form. • MANAGEMENT OF SWALLOWING DIFFULTIES: consider switching to oral solution, or parenteral therapy.
orphenadrine	Norflex® *Tablet, sustained-release* Sandoz-orphenadrine	**Modified-release dosage form (sustained-release)**	• Do not crush tablet.

	Tablet, extended-release Orfenace® *Tablet*		
oseltamivir	Tamiflu® *Capsule*	**Altering dosage form may expose patient to unpleasant taste of medicine**	• Capsule contents taste bitter. • MANAGEMENT OF SWALLOWING DIFFULTIES: Use oral liquid: Oseltamivir powder for oral suspension (6mg/ml, 12mg/ml when reconstituted). "Using a separate container, the withdrawn dose must be mixed with an equal amount of sweetened liquid, such as sugar water, chocolate syrup, cherry syrup, dessert toppings (like caramel or fudge sauce) to mask the bitter taste." (Oseltamivir Product Monograph, pg. 21, Revised: June 12, 2012) Alternatively, Capsule contents can also be mixed with sweet-tasting soft foods such as regular or sugar-free chocolate syrup, honey, light brown or table sugar dissolved in water, apple sauce or yoghurt. Give immediately.
oxybutynin	Ditropan XL® *Tablet, extended-release*	**Modified-release dosage form (sustained-release)**	• Manufacturer does not recommend dividing or crushing tablet. • MANAGEMENT OF SWALLOWING DIFFULTIES: consider switching to a syrup formulation (Apo-oxybutynin 1mg/ml, Phl-oxybutynin 1mg/ml, Pms-oxybutynin 1mg/ml), topical gel also available (Gelnique®, 10% oxybutynin)
oxycodone	Oxyneo® *Tablet, controlled-release*	**Modified-release dosage form (sustained-release)**	• Manufacturer does not recommend dissolving, breaking or crushing tablets as this could lead to a rapid release and absorption of a potentially fatal dose of oxycodone. • NOTE: testing over the range of OxyNEO tablet fragment sizes showed that some of the controlled release properties were still retained. Hydrogelling properties continued to be demonstrated and dose dumping was not associated with Oxyneo®. (e-CPS, Oxyneo®, 2013)
	Apo-oxycodone CR, , *Tablet, controlled-release* Co-oxycodone CR *Tablet, extended-release* Pms-oxycodone CR *Tablet, controlled-release*		• Manufacturer does not recommend dissolving, breaking or crushing tablets as this could lead to a rapid release and absorption of a potentially fatal dose of oxycodone. • MANAGEMENT OF SWALLOWING DIFFULTIES: consider switching to equivalent dose of hydromorphone liquid formulation. Oxycodone suppositories are also available.
oxycodone hydrochloride/ naloxone hydrochloride	Targin® *Tablet, controlled-release*	**Modified-release dosage form (sustained-release)**	• **DO NOT CHEW OR CRUSH TABLETS as this could lead to the rapid release and absorption of a potentially FATAL dose of oxycodone.** • Manufacturer does not recommend dissolving, breaking or crushing tablets as this could lead to a rapid release and absorption of a potentially fatal dose of oxycodone. (e-CPS, Targin®, 2013)
paliperidone	Invega® *Tablet, extended-release*	**Modified-release dosage form (sustained-release)**	• Manufacturer does not recommend crushing or dividing tablet.
pancrealipase	Pancrease MT® *Capsules, enteric-coated microtablets*	**Modified-release dosage form (delayed-release)**	• MANAGEMENT OF SWALLOWING DIFFULTIES: Where swallowing of capsules is difficult, they may be opened and the contents may be shaken onto a small quantity of a soft food which does not require chewing (e.g.applesauce, dessert gelatin, etc.), and swallowed immediately. • NOTE: Contact of the microtablets with foods having a pH greater than 7.3 (e.g.milk, custard, ice cream and many other dairy products) can dissolve the protective enteric coating and destroy enzyme activity. (e-CPS, Pancrease MT®, 2013) • Care must be taken to not spill capsule contents on hands or inhaled as it may be irritating to skin or mucous membranes. It has been documented that inhalation of the airborne powder can precipitate an asthma attack.

	Cotazym®/Cotazym 65 B®/Cotazym ECS®	**Modified-release dosage form (delayed-release)**	• MANAGEMENT OF SWALLOWING DIFFULTIES: Capsules can be opened for sprinkling the powder on food or drink. • Care must be taken to not spill capsule contents on hands or inhaled as it may be irritating to skin or mucous membranes. It has been documented that inhalation of the airborne powder can precipitate an asthma attack.
	Creon® *Capsule*	**Modified-release dosage form (sustained-release)**	• MANAGEMENT OF SWALLOWING DIFFULTIES: they may be opened and the minimicrospheres taken with soft food or fluid. Any mixture of the minimicrospheres with food or liquids should be used immediately and not stored; otherwise dissolution of the enteric coating may occur. Do not crush or chew minimicrospheres. (e-CPS, Creon®, 2013) • Care must be taken to not spill capsule contents on hands or inhaled, as it may be irritating to skin or mucous membranes. It has been documented that inhalation of the airborne powder can precipitate an asthma attack.
	Ultrase MT® *Capsules, enteric-coated minitablets*	**Modified-release dosage form (delayed-release)**	• MANAGEMENT OF SWALLOWING DIFFULTIES: Capsules may be opened and the minitablets added to a small quantity of a soft food (e.g., applesauce, gelatin, etc.), that does not require chewing, and swallowed immediately. Contact of the minitablet with foods having a pH greater than 5.5 can dissolve the protective enteric shell. (e-CPS, Ultrase MT, 2013) • Care must be taken to not spill capsule contents on hands or inhaled as it may be irritating to skin or mucous membranes. It has been documented that inhalation of the airborne powder can precipitate an asthma attack.
	Viokase® *Tablet*	**Other**	• Some enzymatic activity is inactivated in the acidic environment of stomach. Specifically, lipases are well known to be inactivated pH < 4. Although Viokase® tablets are immediate release and enzymes are released in the stomach, the tablet formulation likely reduces some exposure to acid (Aptalis Pharma, personal communication, 2013). Thus crushed tablet powder will likely result in lower deleivered dose of enzymes to distal portions of gastrointestinal tract. • One Viokase® 16 tablet will yeild approximately 1/3rd teaspoon of powder. Resulting powder has shown to dissolve in 250mls of water or 500mls of Similac® formula with continuous stirring for 30 seconds. Viokase® powder is stable in water or Similac® infant formula for a maximum of 60 minutes (Aptalis Pharma, personal communication, 2013). • Care must be taken to not spill capsule contents on hands or inhaled, as it may be irritating to skin or mucous membranes. It has been documented that inhalation of the airborne powder can precipitate an asthma attack.
pantoprazole	Pantoloc® *Tablet, enteric-coated* Tecta® *Tablet, enteric-coated*	**Modified-release dosage form (delayed-release)**	• Manufacturer does not recommend crushing tablet. • Proton pump inhibitors undergo an acid-catalyzed reaction resulting in an INACTIVE dimer (Tutunji, Qaisi, El-Eswed, & Tutunji, 2006) (i.e. product is acid labile, products are formulated to

	Generics: Apo-pantoprazole, Ava-pantoprazole, Co-pantroprazole, Dom-pantoprazole, Mylan-pantoprazole, Melia-pantoprazole, Sorres-pantoprazole, Pdl-pantoprazole, Sanis-pantoprazole, Sivem-pantoprazole, Pms-pantoprazole, QD-pantoprazole, Ran-pantoprazole, Ratio-pantoprazole, Riva-pantoprazole, Sandoz-pantoprazole, Teva-pantoprazole *Tablet, enteric-coated/delayed-release*		bypass the low pH environment of the stomach and altering product may destroy this mechanism resulting in ineffective therapy) • MANAGEMENT OF SWALLOWING DIFFULTIES: consider switching to an alternative proton pump inhibitor that may be dispersed.
paroxetine	Paxil CR® *Tablet, enteric-coated, film-coated, controlled-release*	**Modified-release dosage form (sustained-release)** **Altering dosage form may be hazardous to healthcare worker (Selective serotonin reuptake inhibitor)**	• Manufacturer does not recommend crushing tablet. (e-CPS, Paxil CR®, 2013) • On NIOSH's list of hazardous agents (NIOSH, 2012)
pazopanib	Votrient® *Tablet, film-coated*	**Altering dosage form significantly changes drug pharmacokinetics (potential sub therapeutic or toxic situations)** **Altering dosage form may be hazardous to healthcare worker (Antineoplastic, tyrosine kinase inhibitor)**	• Healthcare workers should use appropriate precautions if handling broken tablets such as gloves, respirator, eye protection). Risk may be higher for pregnant healthcare workers as studies in animals have shown that pazopanib is tertatogenic, embryotoxic, and abortifacient (e-CPS, Votrient, 2013). • Administration of a single pazopanib 400 mg crushed tablet increased $AUC_{(0\text{-}72)}$ by 46% and C_{max} by approximately 2 fold and decreased t_{max} by approximately 1.5 hours compared to administration of the whole tablet. Therefore, due to this potential for increased exposure, tablets should not be crushed. (e-CPS, Votrient, 2013) • Also on NIOSH's list of hazardous agents (NIOSH, 2012) • American ISMP: "crushed or broken tablets may cause dangerous skin problems"
pentoxifylline	Pentoxifylline SR (AA) *Tablets, sustained-release*	**Modified-release dosage form (sustained-release)**	• Manufacturer recommends administering tablets whole.

phenytoin	Dilantin® *Capsule*	**Altering dosage form may significantly change drug pharmacokinetics (potential sub therapeutic or toxic situations)**	• Giving opened capsules may result in increased serum levels and toxic effects. ('don't rush to crush', pg. 460, 1st ed.). • MANAGEMENT OF SWALLOWING DIFFULTIES: Consider liquid suspension formulations (Dilantin® 125mg/5ml and 30mg/5ml and Taro 125mg/5ml suspensions available. Omega, Hospira, and Sandoz phenytoin 50mg/ml parenteral products available) • NOTE: o Phenytoin bioavailability is formulation dependent, and this may result in differences in serum levels when switching between routes and potentially even brands. o There are free-acid formulations as well as the sodium salt; make sure dose equivalency between products is checked when making changes.
	Novo-phenytoin *Capsule*		
piroxicam	Dom-piroxicam, *Capsule*	**Other (no information available to support opening and dispersing capsule contents)**	• Manufacturer does not make a statement regarding opening and dispersing capsule contents. • There is no data currently available (2013) to support opening and dispersing capsule contents ('Don't rush to Crush, pg. 464, 1st Ed.). For this reason, it is not recommended to alter dosage form. • MANAGEMENT OF SWALLOWING DIFFULTIES: consider switching to an alternative NSAID that has a liquid preparation commercially available (ex. ibuprofen) or has a tablet or capsule dosage form that can be dispersed (ex. immediate-release naproxen tablets).
	Apo-piroxicam *Capsule*		
	Novo-piroxicam *Capsule*		
	Pms-piroxicam *Capsule*		
potassium chloride	K-Dur® *Tablet, sustained release*	**Modified-release dosage form (sustained-release)**	• Tablets may be broken in half. • MANAGEMENT OF SWALLOWING DIFFULTIES: Place the whole tablet in approximately one-half glass of water (115 mL). Allow 2 to 3 minutes for the tablet to disintegrate. Stir for about half a minute after the tablet has disintegrated. Drink the entire contents of the glass immediately. Add another small quantity of water, stir and drink immediately. (e-CPS, K-Dur®, 2013)
	Slow-K® *Tablet, slow-release*	**Modified-release dosage form (sustained-release)**	• No information in product monograph. • Do not crush or split tablet.
	Slo-Pot® (valeant) *Tablet, extended-release*	**Modified-release dosage form (sustained-release)**	
	Odan K-20® *Tablet, sustained-release*	**Modified-release dosage form (sustained-release)**	
	Apo-K	**Other**	• (OTC compendium, pg. 248, 1st ed.) • Tablets should be administered whole with a full glass of water, and should not be broken or chewed (e-CPS, potassium salts CPhA monograph, 2013)
	Micro-K Extencaps® *Capsule*	**Modified-release dosage form (sustained-release)**	• MANAGEMENT OF SWALLOWING DIFFULTIES: Capsules may be opened and contents sprinkled onto a spoonful of soft food to facilitate ingestion. (e-CPS, Micro-K Extencaps®, 2013).
potassium citrate	Urocit®-K *Tablet, extended-release*	**Modified-release dosage form (sustained-release)**	• Manufacturer does not recommend crushing tablet.
	Urocit-K® *Tablet, extended-release*	**Modified-release dosage form (sustained-release)**	• Manufacturer does not recommend crushing tablet.
potassium gluconate	Timed release potassium (GNC) *Tablet*	**Modified-release dosage form (sustained-release)**	• (OTC compendium, pg. 251, 1st ed.)
praziquantel	Biltricide®	**Altering dosage form may expose**	• Tablets may be crushed, but taste is extremely bitter and may cause gagging or vomiting

	Tablet, tri-scored	**patient to unpleasant taste of medicine**	(Micromedex, praziquantel, 2013) ('Do not rush to crush', pg. 473, 1st ed.) • MANAGEMENT OF SWALLOWING DIFFULTIES: Tablet is tri-scored, consider breaking tablet into smaller pieces.
procarbazine	Matulane® *Capsule*	**Altering dosage form may be hazardous to healthcare worker (Antineoplastic)**	• Do not open capsules or handle capsule contents. ('don't rush to crush', pg. 481, 1st ed.)
promethazine	Histanil® *Tablet*	**Altering dosage form may expose patient to unpleasant taste of medicine**	• Drug may have a significantly unpleasant taste (potential for nausea/vomiting and non-compliance)
propafenone	Rythmol® *Tablet, film-coated*	**Other (no information available to support crushing and dispersing tablets)**	• There is no data currently available (2013) to support crushing and dispersing tablets. For this reason, it is not recommended to alter dosage form. • In NIOSH's list of hazardous agents (NIOSH, 2012)
propranolol	Inderal LA® *Capsule, extended-release*	**Modified-release dosage form (sustained-release)**	• Gelatin capsule is only for delivery and does not affect bioavailability of drug (Pfizer, personal communication, 2013). • Manufacturer does not have stability data regarding capsule contents dispersed in food. • MANAGEMENT OF SWALLOWING DIFFULTIES: sprinkle capsule contents on food, administer immediately, and drink a glass of water thereafter. • Administer consistently.
pseudoephedrine	Eltor 120® (Sanofi-aventis) *Tablet*	**Modified-release dosage form (sustained-release)**	• (OTC compendium, pg. 40, 1st ed.)
	Entex LA® (Purdue) *Tablet, sustained-release*		• (OTC compendium, pg. 40, 1st ed.)
	Sudafed® Decongestant 12 hour (McNeil) *Caplet*		• (OTC compendium, pg. 50, 1st ed.)
pseudoephedrine (120mg/240mg)/ loratidine	Claritin® Allergy & Sinus/Extra-strength (Schering-Plough) *Tablet*	**Modified-release dosage form (sustained-release)**	• (OTC compendium, pg. 38, 1st ed.)
pseudoephedrine/ dexbrompheniramine	Drixoral® Cold & Sinus (Schering-Plough) *Tablet*	**Modified-release dosage form (sustained-release)**	• (OTC compendium, pg. 40, 1st ed.)
pyridostigmine	Mestinon-SR® *Tablet*	**Modified-release dosage form (sustained-release)**	• Mestinon SR tablets may be cut in half (manufacturer does not recommend quartering tablets as this would destroy too much of the sustained-release matrix).
quetiapine	Seroquel XR® *Tablet, extended-release, film-coated*	**Modified-release dosage form (sustained-release)**	• Manufacturer does not recommend crushing tablets. • MANAGEMENT OF SWALLOWING DIFFULTIES: consider switching patient to immediate-release quetiapine tablets; as they can be crushed and dispersed. ('don't rush to crush', pg 493)
	Teva-quetiapine XR *Tablet, extended-release*		
	Sandoz-quetiapine XRT *Tablet, extended-release*		
quinapril	Accupril®	**Other (no information available**	• There is no data currently available (2013) to support crushing and dispersing tablets. For this

	Tablet, film-coated Apo-quinapril *Tablet*	**to support crushing and dispersing tablets)**	reason, it is not recommended to alter dosage form. ('don't rush to crush, pg. 495, 1st ed.) • MANAGEMENT OF SWALLOWING DIFFULTIES: consider a switch to an angiotensin converting enzyme inhibitor that has data to support dispersing contents (ex. ramipril).
quinapril/ hydrochlorothiazide	Accuretic® *Tablet, film-coated* Apo-quinapril/hydrochlorothiazide *Tablet*	**Other (no information available to support crushing and dispersing tablets)**	• There is no data currently available (2013) to support crushing and dispersing tablets. For this reason, it is not recommended to alter dosage form. ('don't rush to crush, pg. 495, 1st ed.) • MANAGEMENT OF SWALLOWING DIFFULTIES: consider a switch to individual agents of hydrochlorothiazide which can be dispersed, and an angiotensin converting enzyme inhibitor that has data to support dispersing contents (ex. ramipril).
rabeprazole	Pariet® *Tablet, delayed release, enteric coated, as sodium (Lexi-comp, rabeprazole 2013)* Generics: Apo-rabeprazole, EC, Dom-rabeprazole, Mylan-rabeprazole, Pat-rabeprazole, Pms-rabeprazole EC, Pdl-rabeprazole, Sivem-rabeprazole, Sorres-rabeprazole EC, Melia-rabeprazole EC, Ran-rabeprazole, Riva-rabeprazole EC, Sandoz-rabeprazole, Teva-rabeprazole EC *Tablet, enteric-coated*	**Modified-release dosage form (delayed-release)**	• Manufacturer does not recommend crushing tablets, as they are enteric-coated. • Proton pump inhibitors undergo an acid-catalyzed reaction resulting in an INACTIVE dimer (Tutunji, Qaisi, El-Eswed, & Tutunji, 2006) (i.e. product is acid labile, products are formulated to bypass the low pH environment of the stomach and altering product may destroy this mechanism resulting in ineffective therapy). • MANAGEMENT OF SWALLOWING DIFFULTIES: consider switching to a different proton pump inhibitor that can be dispersed.
raloxifene	Evista® *Tablet, film-coated* Apo-raloxifene *Tablet* co-raloxifene pms-raloxifene teva-raloxifene	**Altering dosage form may be hazardous to healthcare worker (SERM)** **Altering dosage form may expose patient to unpleasant taste of medicine**	• Teratogenic; do not handle crushed or dispersed tablets if pregnant or intending to become pregnant. Other personnel: wear mask, gloves and eye glasses if crushing or dispersing tablets. ('Do not Rush to Crush, pg. 498, 1st Ed.) • Gives no information on whether you can disperse, etc. ('Do not Rush to Crush, pg. 498, 1st Ed.) • Altering this dosage form may expose patient to poor taste of medication, which may lead to nausea/vomiting and potential non-compliance (PL 'Meds that should not be crushed', pg. 6, July 2012).

raltegravir	Isentress® *Tablet, film-coated*	**Altering dosage form may significantly change drug pharmacokinetics (potential sub therapeutic or toxic situations)**	• Manufacturer does not recommend crushing or dividing tablet as it feels the formulation's pharmacokinetic profile would change.
risedronate	Generics: Apo-risedronate, Auro-risedronate, Dom-risedronate, Jamp-risedronate, Mylan-risedronate, Pms-risedronate, Ratio-risedronate, Pdl-risedronate, Sanis-risedronate, Sivem-risedronate, Riva-risedronate,, Sandoz-risedronate, Teva-risedronate *Tablet*	**Administering altered dosage form may cause oropharyngeal ulceration OR irritation**	• Manufacturer does not recommend crushing or cutting tablets. • Risedronate is an irritant and may cause oroparyngeal irritation if chewed, sucked, or crushed (Don't rush to crush, 4th Ed, pg. 511). • MANAGEMENT OF SWALLOWING DIFFULTIES: o Short-term swallowing difficulty: consider withholding dose. o Long-term swallowing difficulty: Consider parenteral therapy.
	Actonel®/Actonel DR® *Tablet (DR: enteric coated, delayed release)*	**Modified-release dosage form (delayed-release)** **Administering altered dosage form may cause oropharyngeal ulceration OR irritation**	
ritonavir	Norvir® *Tablet*	**Altering dosage form significantly changes drug pharmacokinetics (potential sub therapeutic or toxic situations)**	• A randomized, prospective, open□label, cross□over study compared the pharmacokinetics of a single oral dose of 2 crushed 200/50 mg Kaletra® tablets (mixed in 4 ounces of Jell□O brand pudding) with 2 whole 200/50 mg Kaletra® tablets in 12 HIV□positive pediatric subjects already receiving Kaletra® tablets for greater than 2 weeks. The geometric mean of the lopinavir $AUC_{0□12}$ for crushed to whole tablets was 0.55 (90% confidence interval [CI], 0.45□0.69; *P*=0.003). The geometric mean of the ritonavir $AUC_{0□12}$ for crushed to whole tablets was 0.53 (90% CI, 0.4□0.71; *P*=0.006) (AbbVie, personal communication, 2013) • MANAGEMENT OF SWALLOWING DIFFULTIES: consider switching to liquid formulation (Norvir® 80mg/ml)
ruxolitinib	Jakavi® *Tablet*	**Other (no information available to support crushing and dispersing tablets)**	• There is no data currently available (2013) to support crushing and dispersing tablets. For this reason, it is not recommended to alter dosage form. • MANAGEMENT OF SWALLOWING DIFFULTIES: A suspension for nasogastric administration may be prepared with tablets. Place one tablet into ~40 mL water; stir for approximately 10 minutes. Administer within 6 hour after preparation. (Lexicomp, 2013)
saquinavir	Invirase® *Tablet*	**Other (no information available to support crushing and dispersing tablets)**	• There is no data currently available (2013) to support crushing and dispersing tablets. For this reason, it is not recommended to alter dosage form. • MANAGEMENT OF SWALLOWING DIFFULTIES: there is data to support dispersing capsule

			contents ('don't rush to crush', pg. 521, 1st ed.), consider a switch to this formulation.
sevelamer (carbonate)	Revenla® *Tablet*	**Other (not suitable to be dispersed in water)**	• Manufacturer does not recommend crushing or breaking tablet. • MANAGEMENT OF SWALLOWING DIFFULTIES: consider other phosphate binders, as some are crushable and dispersable (ex. Apo-Cal) • NOTE: calcium carbonate delivers a relatively high calcium load, caution for hypercalcemia (as this may have been a reason patient was being administered sevelamer)
sevelamer (hydrochloride)	Renagel® *Tablet, film-coated*		
sirolimus	Rapamune® *Tablet*	**Altering dosage form may be hazardous to healthcare worker (Immunosuppressant)**	• Manufacturer does not recommend crushing or breaking tablet, as bioavailability has not been determined after these alterations. • MANAGEMENT OF SWALLOWING DIFFULTIES: consider switching patient to oral solution (1mg/ml Rapamune®) • Immunosuppressant. Do not handle crushed or dispersed tablets if pregnant or intending to become pregnant. ('don't rush to crush', pg. 529, 1st ed.) • Also in NIOSH's list of hazardous agents (NIOSH, 2012)
sorafenib	Nexavar® *Tablet, film-coated*	**Altering dosage form may be hazardous to healthcare worker (Tyrosine kinase inhibitor)**	• Hazard. Do not handle crushed or dispersed tablets if pregnant or intending to become pregnant. Other personnel: wear mask, gloves and eye glasses if dispersing tablets. ('don't rush to crush', pg. 540, 1st ed.) • Tablet may be dispersed in a closed system such as an oral dispenser.
sulfasalazine	Salazopyrin EN® *Tablet, EC, Delayed release*	**Modified-release dosage form (delayed-release)**	• No data in product monograph regarding crushing. • Enteric-coated product, do not crush or split tablets.
	Pms-sulfasalazine E.C. *Tablet, enteric-coated*		• Electronic monograph unavailable (DPD, 2013) • Enteric coated product, do not crush or split tablets.
sumatriptan	Imitrex® *Tablet*	**Altering dosage form may expose patient to unpleasant taste of medicine**	• Altering this dosage form may expose patient to poor taste of medication, which may lead to nausea/vomiting and potential non-compliance ('don't rush to crush', pg. 550, 1st ed.) • MANAGEMENT OF SWALLOWING DIFFULTIES: consider switching to nasal spray or parenteral therapy.
sunitinib	Sutent® *Capsule*	**Altering dosage form may be hazardous to healthcare worker (Tyrosine kinase inhibitor)**	• Healthcare workers should use appropriate precautions if altering dosage form (such as gloves, respirator, eye protection). Risk may be higher for pregnant healthcare workers. • MANAGEMENT OF SWALLOWING DIFFULTIES: Mix capsule contents with 1 level teaspoon of room temperature apple sauce or refrigerated yoghurt. Use within 30 minutes. Follow dose with at least 60mLs water. ('don't rush to crush', pg. 551, 1st ed.)
tacrolimus	Advagraf® *Capsule, extended-release*	**Altering dosage form may be hazardous to healthcare worker (Immunosuppressant)**	• Manufacturer does not make a statement in product monograph regarding opening and dispersing capsules. Due to extended-release formulation, it is not recommended to open capsules.
	Prograf® *Capsule, IR*		• Healthcare workers should use appropriate precautions if altering dosage form (such as gloves, respirator, eye protection). Risk may be higher for pregnant healthcare workers. • MANAGEMENT OF SWALLOWING DIFFULTIES: Can disperse capsule contents.
tamsulosin	Flomax CR® *Tablet, controlled-release*	**Modified-release dosage form**	• Manufacturer does not recommend crushing tables or opening capsules.

	Generics: Apo-tamsulosin CR, Ava-tamsulosin CR, Sandoz-tamsulosin CR, Teva-tamsulosin, *Tablet, controlled-release* Teva-tamsulosin CR, Sandoz-tamsulosin *Capsule, sustained-release*	**(sustained-release)**	
tamsulosin/dutasteride	Jalyn® *Capsules, modified-release*	**Modified-release dosage form (sustained-release)**	• No data available in monograph. (e-CPS, Jalyn®, 2013) • Do not open capsules.
tapentadol	Nucynta CR® *Tablet, controlled-release*	**Modified-release dosage form (sustained-release)**	• **DO NOT CHEW OR CRUSH tablets as this could lead to the rapid release and absorption of a potentially FATAL dose of tapentadol.** • Manufacturer does not recommend dividing, dissolving, or crushing tablet as this could lead to an uncontrolled release and rapid absorption of a potentially fatal dose of tapentadol. (e-CPS, Nucynta CR®, 2013)
	Nucynta IR® *Tablet, film-coated*	**Other (no information available to support crushing and dispersing tablets)**	• **DO NOT CHEW OR CRUSH tablets as this could lead to the rapid release and absorption of a potentially FATAL dose of tapentadol.** • Cannot find any information on dispersing/crushing/etc. this tablet.
telbivudine	Sebivo® *Tablet, film-coated*	**Other (no information available to support crushing and dispersing tablets)**	• There is no data currently available (2013) to support crushing and dispersing tablets. For this reason, it is not recommended to alter dosage form ('don't rush to crush', pg. 557, 1st ed.).
temozolomide	Temodal® *Capsule*	**Altering dosage form may be hazardous to healthcare worker (Antineoplastic, alkylating agent)**	• Do not open capsules. Manufacturer does not recommend opening capsule. • Healthcare workers should use appropriate precautions if handling broken capsules (such as gloves, respirator, eye protection). Risk may be higher for pregnant healthcare workers. • If skin or mucous membrane contact occurs, flush with water.
	Ahi-temozolomide *Capsule*		
	Co-temozolomide *Capsule*		
theophylline	Apo-theo-LA® *Tablet, extended-release*	**Modified-release dosage form (sustained-release)**	• No Product monograph available (DPD) • Do not crush, dissolve or split tablet.
	Uniphyl® *Tablet, scored*		• Manufacturer does not recommend dissolving or crushing tablet as this may lead to a rapid release of theophylline with the potential for toxicity. • MANAGEMENT OF SWALLOWING DIFFULTIES: consider switching patient to an oral liquid formulation (atlas-elixer de theophylline, pms-theophylline elixir, riva-pulmophylline elx, valeant-theolair)
	Teva-theophylline SR *Tablet, sustained-release*		
	Theo-ER® (AA) *Tablet, extended-release*		
thioguanine	Lanvis *Tablet, scored*	**Altering dosage form may be hazardous to healthcare worker (Antimetabolite)**	• It is not recommended to divide or crush the tablets. • Healthcare workers should use appropriate precautions when handling or halving tablets (such as gloves, respirator, eye protection). Risk may be higher for pregnant healthcare workers.

tipranavir	Aptivus® *Capsule, IR*	**Altering dosage form may expose patient to unpleasant taste of medicine**	• Altering this dosage form may expose patient to poor taste of medication, which may lead to nausea/vomiting and potential non-compliance (PL 'Meds that should not be crushed', pg. 6, July 2012).
tolterodine	Detrol LA® *Capsules, extended-release*	**Modified-release dosage form (sustained-release)**	• Manufacturer does not make a statement on opening capsules in product monograph. It is not recommended to open extended-release capsules (Lexi-comp, tolterodine, 2013). • MANAGEMENT OF SWALLOWING DIFFULTIES: consider switching to another anticholinergic medication with a commercially available liquid dosage form (such as oxybutynin), can 'disperse' IR tablet (Handbook of Administration by Enteral Feeding Tubes, pg. 513, 2007)
topiramate	Topamax® *Tablet, Capsule ('sprinkle')*	**Altering dosage form may expose patient to unpleasant taste of medicine**	• Manufacturer recommends that tablets should not be broken. • MANAGEMENT OF SWALLOWING DIFFULTIES: Topamax Sprinkle Capsules may be swallowed whole or may be administered by carefully opening the capsule and sprinkling the entire contents on a small amount (teaspoon) of soft food. This drug/food mixture should be swallowed immediately and not chewed. • NOTE: topiramate has a bitter taste
	Generics: Apo-topiramate, Auro-topiramate, Ava-topiramate, Co-topiramate, dom-topiramate, GD-topiramate, Mint-topiramate, Mylan-topiramate, Phl-topiramate, Pms-topiramate, Pdl-topiramate, QD-topiramate, ran-topiramate, Sandoz-topiramate, teva-topiramate, melia-topiramate, sanis-topiramate, sivem-topiramate, accord-topiramate, zym-topiramate		• Altering this dosage form may expose patient to poor taste of medication, which may lead to nausea/vomiting and potential non-compliance. At least one reference recommends to not alter dosage form for this reason. (PL 'Meds that should not be crushed', pg. 6, July 2012) ('don't rush to crush', pg. 579, 1st ed.).
tramadol	Durela® *Capsules, extended-release*	**Modified-release dosage form (sustained-release)**	• Manufacturer does not recommend to dissolve, crush or break capsules or tablets as this can lead to rapid release and absorption of tramadol resulting in a potentially fatal dose.
	Ralivia® *Tablet, extended-release*		
	Tridural® *Tablet, extended-release*		
	Zytram XL® *Tablet, controlled-release*		

trandolapril/verapamil	Tarka® *Tablet, film coated, sustained-release (verapamil)*	**Modified-release dosage form (sustained-release)**	• Manufacturer does not recommend dividing or crushing tablet.
trazodone	Oleptro® *Tablet, extended-release*	**Modified-release dosage form (sustained-release)**	• Manufacturer does not recommend crushing tablets.
	Various generic products	**Altering dosage form may expose patient to unpleasant taste of medicine**	• Altering this dosage form may expose patient to poor taste of medication, which may lead to nausea/vomiting and potential non-compliance (PL 'Meds that should not be crushed', pg. 6, July 2012).
tretinoin	Vesanoid® *Capsule*	**Altering dosage form may be hazardous to healthcare worker (Retinoid)**	• Healthcare workers should use appropriate precautions if handling broken capsules (such as gloves, respirator, eye protection). Risk may be higher for pregnant healthcare workers.
typhoid vaccine	Vivotif Oral® *Capsule, enteric coated*	**Modified-release dosage form (delayed-release)**	• Do not crush or open capsules.
valganciclovir	Valcyte® *Tablet, film-coated*	**Altering dosage form may be hazardous to healthcare worker (Antiviral)**	• Valganciclovir is considered a potential teratogen and carcinogen in humans. The active metabolite (ganciclovir) is an antimetabolite and therefore should be treated as cytotoxic. Avoid direct contact of broken or crushed tablets or reconstituted solution with skin or mucous membranes. • MANAGEMENT OF SWALLOWING DIFFULTIES: consider switching patient to oral liquid (Valcyte® 50mg/ml)
	Apo-valganciclovir *Tablet*		
vancomycin	Vancocin® *Capsule*	**Other**	• Capsule contents cannot be dispersed or crushed. ('don't rush to crush', pg. 600, 1st ed.) o Editor note: MANUFACTURER RESPONSE PENDING • MANAGEMENT OF SWALLOWING DIFFULTIES: give injection solution orally ('don't rush to crush', pg. 600, 1st ed.)
vancomycin	PPC-Vancomycin *Capsule*		
vardenafil	Levitra® *Tablet, film-coated*	**Other (no information available to support crushing and dispersing tablets)**	• There is no data currently available (2013) to support crushing and dispersing tablets. For this reason, it is not recommended to alter dosage form. ('don't rush to crush', pg. 601, 1st ed.). • MANAGEMENT OF SWALLOWING DIFFULTIES: consider ODT formulation.
	Staxyn® *Tablet, ODT, uncoated*		
varenecline	Champix® *Tablet, film-coated*	**Other (no information available to support crushing and dispersing tablets)**	• Manufacturer does not recommend crushing ('don't rush to crush', pg. 601, 1st ed.).
venlafaxine	Effexor XR® *Caspsule, extended-release*	**Modified-release dosage form**	• Manufacturer does not make a statement regarding opening their capsules in monographs and

	Generics: Apo-Venlafaxine XR, Co-venlafaxine XR, Dom-venlafaxine XR, GD-venlafaxine XR, Mylan-venlafaxine XR, PMS-venlafaxine XR, Ran-venlafaxine XR, Riva-venlafaxine XR, Sandoz-venlafaxine XR, Teva-venlafaxine XR, Pms-venlafaxine XR, Pdl-venlafaxine XR, Sanis-venlafaxine XR, Sivem-venlafaxine XR *Capsule, extended-release*	**(sustained-release)**	recommends they be swallowed whole. • MANAGEMENT OF SWALLOWING DIFFULTIES: Capsules may be administered by opening capsule and sprinkling contents on a spoonful of applesauce, swallow immediately without chewing, and follow with a glass of water. (Micromedex, venlafaxine hydrochloride, 2013)
verapamil	Apo-Verap® SR *Tablet, sustained-release*	**Modified-release dosage form (sustained-release)**	• No monograph available (DPD, 2013) • Do not crush or split tablet.
	Dom-Verapamil SR *Tablet, sustained-release*		• No monograph available (DPD, 2013) • Do not crush or split tablet.
	Isoptin SR® *Tablet, sustained-release, 180mg and 240mg tablets scored* *Only split 240mg tablet		• Manufacturer does not recommend crushing tablets as sustained-release effect will be altered by damage to tablet structure. • NOTE: manufacturer states only 240mg tablet may be cut in half without damaging the modified release formulation. (Isoptin SR® Product Monograph, pg. 21,37, Revised: August 11th/2011)
	Generics: Mylan-Verapamil SR, Novo-Veramil SR, PHL-Verapamil SR, PMS-Verapamil SR, PRO-Verapamil SR, Riva-Verapamil SR, sorres-Verapamil SR *Tablet, sustained-release, film-coated* *Only split 240mg tablet		
vismodegib	Erivedge® *Capsule*	**Altering dosage form may be hazardous to healthcare worker (Antineoplastic, hedgehog**	• Manufacturer state capsules must not be opened under any circumstances.

		pathway inhibitor)	
solifenacin	Vesicare® *Tablet, film-coated*	**Altering dosage form may be hazardous to healthcare worker (Anticholinergic)**	• Crushed tablets may be irritating to eyes. • MANAGEMENT OF SWALLOWING DIFFULTIES: tablet can be crushed and dispersed.
vitamin A	Vitamin A Cap 25000IU (Novo) *Capsule*	**Other**	• There is no data currently available (2013) to support crushing and dispersing tablets. For this reason, it is not recommended to alter dosage form.
vitamin B1-B2-B3-B5-B6-B12-folic acid complex	B Complex 100 Timed Release (Jamieson) *Tablet*	**Modified-release dosage form (sustained-release)**	• (OTC compendium, pg. 212, 1st ed.)
	Balanced B50 Complex, timed-release (Vitality) *Tablet*		• (OTC compendium, pg. 212, 1st ed.)
vorinostat	Zolinza® *Capsule*	**Altering dosage form may be hazardous to healthcare worker (Antineoplastic, histone deacetylase inhibitor)**	• Manufacturer warns to avoid direct contact of the powder in capsules with skin or mucous membranes.
zinc gluconate	Zinc 50mg (Jamieson) *Tablet, sustained-release*	**Modified-release dosage form (sustained-release)**	• (OTC compendium, pg. 253, 1st ed.)
zolmitriptan	Zomig® *Tablet, film-coated*	**Other (no information available to support crushing and dispersing tablets)**	• There is no data currently available (2013) to support crushing and dispersing tablets. For this reason, it is not recommended to alter dosage form. ('don't rush to crush', pg. 619, 1st ed.) • MANAGEMENT OF SWALLOWING DIFFULTIES: consider switching to oral disintegrating tablets (ODT).
zolmitriptan	Various generic manufacturers		
zolpidem	Sublinox® *Sublingual Tablet*	**Sublingual tablet (altering tablet may change drug release profile, consult pharmacist)**	• Manufacturer recommends tablet to not be chewed, swallowed or taken with water.

A method for 'dispersing' tablets or capsules:

- Add tablet or capsule contents to a mortar, medicine cup or oral dispenser. (Tablets may need crushing beforehand if MANAGEMENT bullet states: "crush and disperse")
- Mix with 10-15mls water
    - If crushed tablets are in a mortar, pour in water then draw up into oral dispenser
    - Mortar may need to be rinsed again with water and solution up again to ensure all medication has been drawn up (an extra 10mls of water may be used)
- Allow the tablet or capsule contents to disperse. This may take several minutes. Gentle shaking may be required.
    - NOTE: a solution is not intended, a "rough suspension" will likely be the final product of this process. This may be non-uniform, thus do not give partial doses by this method
- Give the solution immediately (gently swirl or shake immediately before administration to re-disperse)

Table 2. List of capsules or tablets that pregnant healthcare workers should avoid skin contact with and use gloves when handling.

Hazardous Substance	**Class**
acitretin	Retinioid
alitretinoin	Retinoid
ambrisentan	Vasodilating agent
anagrelide	Platelet production inhibitor
anastrozole	Aromatase inhibitor
azathioprine	Immunosuppressant (6-MP derivative)
bicalutamide	Antiandrogen
bosentan	Endothelin antagonists
busulfan	Antineoplastic (alkylating agent)
cabergoline	Antihyperprolactinemic
capecitabine	Antineoplastic (antimetabolite)
carbamazepine	Anticonvulsant
chlorambucil	Antineoplastic (alkylating agent)
clomiphene	SERM
clonazepam	Benzodiazepine
colchicine	Antigout agent
conjugated estrogen	Estrogen derivative
cyclophosphamide	Alkylating agent
cyclosporine	Immunosuppressant (calcineurin inhibitor)
cyproterone	Antiandrogen
danazol	Androgen
dasatinib	
dienogest	Progestin (antiandrogen)

Hazardous Substance	Class
dinoprostone	Oxytocic (PGE2)
dronedarone	Antiarrhythmic
dutasteride	5-alpha-reductase inhibitor
EE w/ cyproterone	Combined estrogen-progestin/antiandrogen
EE w/ desogestrel	Combined estrogen-progesterone
EE w/ drospirenone	Combined estrogen/progesterone
EE w/ levonorgestrel	Combined estrogen/progesterone
EE w/ Norethindrone	Combined estrogen/progesterone
entecavir	Antiviral
erlotinib	Tyrosine kinase inhibitor
estradiol	Estrogen
estramustine	Antineoplastic
etoposide	Antineoplastic (mitotic inhibitor)
everolimus	
exemestane	Aromatase inhibitor
finasteride	5-alpha-reductase inhibitor
fludarabine	Antineoplastic (antimetabolite)
flutamide	Antineoplastic (antiandrogen)
gefitinib	Antineoplastic (tyrosine kinase inhibitor)
hydroxyurea	Antineoplastic (antimetabolite)
imatinib	Antineoplastic (tyrosine kinase inhibitor)
isotretinoin	Retinoid
lapatinib	Antineoplastic (tyrosine kinase inhibitor)

Hazardous Substance	Class
leflunomide	Anti-rheumatic (DMARD)
lenalidomide	Antineoplastic/ Immunomodulator
letrozole	Aromatase inhibitor
levodopa/benserazide	Antiparkinsonian
levonorgestrel	Progesterone
lomustine	Antineoplastic (alkylating agent, nitrosurea)
medroxyprogesterone	Progesterone
megestrol	Progesterone
melphalan	Antineoplastic (alkylating agent)
mercaptopurine	Antineoplastic (antimetabolite)
methotrexate	Antimetabolite
misoprostol	Prostaglandin E1 analogue
mitotane	Antineoplastic
mycophenolate	Immunosuppresant
nilotinib	Antineoplastic (tyrosine kinase Inhibitor)
nilutamide	Antineoplastic (Antiandrogen)
norethindrone	Progesterone
olanzapine	Antipsychotic
oxcarbazepine	Antiepileptic
paroxetine	SSRI
pazopanib	Antineoplastic (tyrosine kinase inhibitor
procarbazine	
raloxifene	SERM

Hazardous Substance	Class
rasagiline	Antiparkinsonian (MAO-B inhibitor)
ribavirin	Antiviral
risperidone	Atypical Antipsychotic
sirolimus	Immunosuppressant
sorafenib	Tyrosine kinase inhibitor
sunitinib	
tacrolimus	Immunosuppressant
tamoxifen	SERM
temozolomide	Antineoplastic (alkylating agent)
testosterone	Androgen
tetracycline	Antibiotic
thalidomide	Immunomodulator
thioguanine	Antimetabolite
tretinoin	Retinoid
valganciclovir	Antiviral
valproic acid/ divalproex Na	Antiepileptic
vigabatrin	Antiepileptic
vismodegib	Antineoplastic
vorinostat	Antineoplastic (Histone Deacetylase Inhibitor)
ziprasidone	Atypical Antipsychotic
zudovudine	Antiviral

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