Pharmacists and pharmacy staff in community and hospital settings are often asked to prepare or dispense medications in a different strength or form than originally supplied by the manufacturer. In some cases, alternative dosage forms can help save money for the patient. For example, a prescription may be written for a patient to take one-half of a 10 mg tablet nightly instead of one whole 5 mg tablet. This reduces the total quantity of pills the patient pays for each month, and possibly the total cost of the prescription. Drugs may also need to be altered for children or other patients to increase palatability or compliance, as with a tablet that is crushed and sprinkled over applesauce to administer a dose. In other cases, patients may not be able to ingest anything, including medications, by mouth for a variety of medical reasons. Patients unable to ingest food or liquids by mouth often receive nutrition through an “enteral feeding tube” inserted into the mouth, nose, or an opening surgically made in the skin. These patients might also require their medications to be administered through the feeding tube. Whatever the reason, these scenarios can create dilemmas in the pharmacy. Pharmacists and technicians need to know which tablets can be crushed or split, and which capsules can be opened. Making the right decision will help ensure that patients get the correct dose and do not experience loss of drug effectiveness or drug toxicity. Pharmacy technicians play an important role in assisting the pharmacist in these decisions and preparing prescriptions for medications that need to be delivered in alternate dosage forms.

Mr. Brown, a 65-year-old male patient, brings in the following prescription:

\[ \text{Advicor 1000/40, T 1/2 tablet qHS} \]

\[ \text{Rx 3} \]

The prescription is written for Advicor 1000/40, one-half tablet, taken daily at bedtime.

When Mr. Brown hands you the prescription, he mentions that his prescriber reduced his dose of Advicor to 500/20 each day. However, he still has some of the 1000/40 tablets left. He asked his prescriber to continue writing 1000/40 because he thinks he might save money by splitting the tablets.

As you are preparing Mr. Brown’s prescription, you are unsure how you should enter the directions into the pharmacy computer. You also wonder whether you are supposed to go ahead and split all of the tablets for Mr. Brown or if you leave them for Mr. Brown to split at home.

What should you consider when entering a prescription into the pharmacy computer when tablets will be split?

Although splitting tablets may provide a benefit to the patient, the practice may be new to some patients and confusing to those who are not accustomed to it. Always spell out the directions rather than using numbers on the pharmacy label to help avoid patient error. For example, entering this sig as “Take one-
half tablet at bedtime” is preferred over “Take ½ tablet at bedtime.” Patients who are unable to read the smaller fraction numbers may misinterpret the “1/2” as “1,” “2,” “12,” or “1 to 2.”

Always double-check your days’ supply in the computer to ensure that it is correct. Pharmacy computer systems may default to the number of tablets as the days’ supply, so you may need to manually enter the correct days’ supply for insurance purposes.

**What are some reasons a tablet CANNOT be split or crushed, or that a capsule CANNOT be opened?**

Splitting a tablet or opening a capsule is not always okay, even if the prescription is written with directions to do so. The following are reasons that tablets or capsules must be administered intact:

- **Splitting, crushing, or opening the capsule would destroy a modified-release mechanism.** If a modified-release mechanism (e.g., delayed-release, extended-release, controlled-release) is destroyed, a large portion of the dose can be “dumped” or released into the body all at once or into a part of the GI tract where it might not be absorbed. This could increase or reduce the effects of the drug. An example is extended-release oxycodone (OxyContin-U.S., OxyNeo-Canada). Crushing these tabs prior to administration could cause overdose, with very serious side effects such as sedation and slow breathing.

- **Some medications taste very bad.** An example of this is cefuroxime tablets. They have an undesirable metallic taste.

- **Some medications might be irritating.** Destroying a mechanism to protect against exposure to an irritating drug, such as an enteric coating, can result in irritation or injury. Or contact with a drug could be cytotoxic or irritating to the skin or mucous membranes of the person handling the dosage form.

- **Some medications might be harmful to the person administering them if they are not administered intact.** An example of this is dutasteride (Avodart, etc). Dutasteride can be absorbed through the skin and can cause birth defects in male babies. Dutasteride caps or tabs shouldn’t be crushed, and they should not even be handled by women of childbearing potential.

**How do you know if it is okay to split or crush a tablet, or to open a capsule?**

Most of the time, single-ingredient tablets that aren’t coated and aren’t modified-release can be split or crushed. If a tablet is scored, such as Toprol XL-U.S., then you know it can be split.

Some capsules can be opened, and the contents administered with a beverage or mixed with food. Some examples of meds where this is true are Aggrenox and Tiazac. The specific beverage or food that the capsule contents can be mixed with might be specified in the package insert. Applesauce is a common recommendation.

It’s not always possible to figure this out by simply looking at the tablets or capsules. Plus, you can’t always depend on the suffix to indicate a controlled-release product. Go to our **PL Technician Tutorial, What Drug Names Really Mean**, for more information on drug name suffixes. We have a helpful list, **Meds That Should Not be Crushed**, with many tablets and capsules that must be administered intact. You can also check the package insert.

**With these principles in mind, you do some more research on Mr. Brown’s Advicor. There’s nothing in the brand name of the drug (XL, CR, etc) to indicate that it’s a controlled-release tablet. However, you know Advicor is not scored, so you are still unsure whether it’s okay to split. You check the Meds That Should Not be Crushed list and, sure enough, Advicor is on the list. It’s a controlled-release product.**
You alert the pharmacist and she notifies the patient about the need for a change to Advicor 500/20. She explains to Mr. Brown that the reason his prescription must be changed is that Advicor tablets should not be split.

For tablets that are okay to split, should this be done in the pharmacy for the entire prescription at the point of dispensing, or should the patient split tablets individually at home as they are dosed?
It depends. Ideally, tablets should not be split in advance in the pharmacy since long-term storage of a split tablet may theoretically affect tablet and drug stability. Also, tablet splitting is an inexact science, so not each tablet will be split into an exact half dose. Splitting all tablets at once could result in dose variations if patients take all the “large halves” first or if tablet pieces disintegrate into smaller parts. Instead, most experts prefer that patients split tablets at home as they are scheduled to take them. This ensures that the inside of a tablet is not exposed to the elements for longer than necessary to optimize stability. It also helps minimize dose fluctuations since an unevenly split tablet will be taken in two successive doses.

However, not all patients are able to split tablets effectively. Elderly patients with limited eyesight or dexterity may struggle with splitting tablets. In these cases, the pharmacist can steer the patient towards an over-the-counter tablet splitting device to help them, or choose to split all of a patient’s tablets at once in the pharmacy at the point of dispensing. Any patient who will need to split tablets at home should purchase a tablet splitter. This is a helpful tool to use even with scored tablets to ensure an even cut and less variation in split tablet sizes.

What are some alternatives for patients who can’t take capsules or tablets?
Liquid medications and specifically designated sprinkle-type dosage forms are usually preferred for patients who can’t take tablets or capsules. In addition, dosage forms such as sublingual or buccal tablets that dissolve in the mouth and don’t need to be swallowed might be options. Using transdermal patches can also help avoid the problem of having to split or crush tablets or open capsules.

You are working in the pharmacy again the following Saturday when you receive a phone call from a nurse at a nearby long-term care facility. Your pharmacy has a contract to supply the facility with emergency medications at nights and on the weekend when their usual pharmacy is closed. The nurse says that their patient Emma Johns had an “NG tube” inserted this afternoon. She’d like to talk to the pharmacist about Mrs. Johns’ medication list and how her medications should be given tonight with the tube in place.

The pharmacist talks to the nurse and hangs up the phone with a list of medications in hand. She asks you to help her do some research to determine whether Mrs. Johns’ meds can be given through a nasogastric feeding tube or what other alternatives are available.

What is a nasogastric feeding tube? What are some other types of enteral feeding tubes commonly seen in practice?
A nasogastric (NG) tube is inserted through the nose and terminates (ends) in the stomach. However, feeding tubes can be inserted through the mouth, through the nose, or through the skin and they can terminate in different parts of the gastrointestinal tract, including the stomach, duodenum, or jejunum. You’ll hear lots of different terms referring to different types of tubes.
Another type of tube that is inserted through the nose is a Dobhoff tube. It’s a small-bore tube, which is narrow and can be clogged with medications easily. Only liquids should be given through this type of tube.

Some larger bore tubes, which are wider and less likely to clog, include orogastric (OG) tubes, gastrostomy (G) tubes, and jejunostomy (J) tubes. An orogastric tube is inserted through the mouth. Gastrostomy tubes and jejunostomy tubes are inserted directly through the skin and into the gastrointestinal tract.

What kinds of medications can be given through feeding tubes?
If a drug is required to be given through a feeding tube, a liquid dosage form is usually preferred. Sometimes, IV formulations can be used orally and administered through a feeding tube. Examples include vitamin K and acetylcysteine. For drugs that are not available in a liquid form, pharmacy staff may be asked to crush a tablet or the contents of a capsule into a fine powder and mix the powder with water to form a “slurry” that can be administered directly into the feeding tube. Or a nurse or caregiver may do this prior to administration of the med.

Again, it’s important to be aware of which tablets and capsules can’t be crushed or opened or given through feeding tubes. These include extended-release or delayed-release, enteric-coated, and microencapsulated products such as Tegretol XR-U.S., enteric-coated aspirin, Depakote-U.S., and others. Note that some extended- and delayed-release capsules (e.g., some pancreatic enzymes, Verelan-U.S., others) can be opened, and the pellets or granules can be administered down a feeding tube. The pellets or granules must be kept intact and not crushed so that they retain their modified-release quality.

Depending on where a feeding tube terminates, some drugs might not be appropriate at all. For example, sucralfate works by coating, or creating a physical barrier, in the stomach. Administering sucralfate through a tube that ends in the intestine, which is farther along in the GI tract than the stomach, completely bypasses sucralfate’s site of action.

Bulk-forming laxatives, like psyllium (Metamucil) should not be given through a feeding tube. They can form a semisolid mass that will clog a feeding tube, and require removal and replacement of the tube in about one out of three patients. Cholestyramine (Questran-U.S., Olestyr-Canada) is another drug prone to clogging feeding tubes.

What kinds of problems can come up when oral meds must be given through feeding tubes and how can they be avoided?
Administering medications through a feeding tube poses some risk to the patient. A tablet or other solid dosage form administered improperly through an enteral tube can result in toxicity if too much drug is absorbed in the GI tract, and loss of effectiveness if too little drug is given or if too little drug is absorbed in the GI tract.

Some medications can clog feeding tubes. Inadequate flushing is the most common cause of tube blockage. Generally, 15 to 30 mL of water should be used to flush a feeding tube before and after administration of a medication to avoid clogging the tube.

Medications should never be mixed together with “tube feeds” (liquid nutrition preparations given by a feeding tube) because the two might not be compatible. Problems include physical incompatibilities, like clumping, which can clog a tube, and reduced gastrointestinal absorption of a drug, which can lead to reduced drug effect. In some cases, tube feeds will need to be completely stopped for a period of time before a drug is given, and then started a couple of hours after the drug has been administered to prevent
mixing of the two. Examples of drugs that require this include phenytoin oral suspension and some antibiotics.

**What kinds of errors can occur when patients can’t take tablets or capsules intact and how can they be avoided?**

As mentioned, the inappropriate splitting or crushing of tablets, or opening of capsules with a controlled-release mechanism can cause “dose dumping,” which can lead to toxic effects of the drug. Or the drug’s effectiveness may be reduced.

A serious error that has been documented with oral liquids involves the administration of the liquid medication intravenously instead of via the feeding tube. This is very dangerous, and can cause death. For this reason, it’s recommended that oral liquid medications are never dispensed in IV syringes or syringes that resemble IV syringes. Amber oral syringes should always be used for dispensing oral medications that must be drawn up into a syringe and that aren’t already unit-dosed. The use of auxiliary labels, like “for oral use only” or “not for IV injection” should also be considered.

*Mrs. Johns is taking five medications: simvastatin 20 mg tablets, hydrochlorothiazide 25 mg tablets, extended-release oxycodone 20 mg tablets, aspirin 81 mg tablets, and docusate 100 mg capsules. As you look through the list, you know that the extended-release oxycodone tablets cannot be given through a feeding tube and that docusate also comes in a liquid form. You tell this to the pharmacist and she agrees that the other three meds are okay to be crushed and administered through the feeding tube. The pharmacist makes a phone call to the nurse to let her know that she will need an alternative to the extended-release oxycodone and that the docusate can be switched to a liquid formulation.*

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