Technician Training Tutorial:
Dispensing Meds that (Mostly) Go in the Mouth

There’s a wide variety of oral dosage forms available. Capsules, tablets, and liquids are likely to come to mind immediately. However, these categories can be broken down further based on a number of things. There are different kinds of tablets, such as immediate-release, controlled-release, chewable, orally disintegrating, effervescent, buccal, and sublingual. For capsules, there are immediate-release, controlled-release, and sprinkles and they can be filled with powders, beads, granules, or liquids. There are oral liquids such as syrups, suspensions, and elixirs, and also lozenges and troches, powders, sprays, and strips. And there are buccal and sublingual films. Adding a possibility for confusion, there are tablets and capsules that should NOT be taken orally.

Interestingly, the commonly referred to “pill” isn’t really available anymore. Pills, by definition, are rolled by hand from a paste. The preferred terms now are “capsule” or “tablet,” whichever is appropriate.

Any of the dosage forms mentioned can require special considerations when they’re prescribed and dispensed to patients, or when they’re purchased over-the-counter. We’ll review them in this Technician Training Tutorial.

Billy Reuben is a 25-year-old male patient. He was recently diagnosed with cancer, and has been getting treatment within the past few weeks. He comes in with this single Rx, and explains that his mouth is quite sore. Hopefully this Magic Mouthwash will really work some magic. You haven’t filled an Rx for Magic Mouthwash before, but you know that there are a lot of different recipes for it. You double-check with the pharmacist to see which one you should use.

How do oral dosage forms work?
Most oral dosage forms are meant for absorption into the bloodstream, where they are transported throughout the body to have their effect. Examples of this would be most oral tablets, capsules, and liquids. The drug is swallowed, travels down through the gastrointestinal (GI) tract, and is absorbed into the blood through the lining of the stomach or small intestine. The drug can then act on receptors in different parts of the body, to have its specific effect.
The difference between immediate-release tablets and capsules and controlled-release tablets and capsules is that controlled-release formulations have some sort of coating or other mechanism to help release the drug more slowly. Often, this can reduce the number of times a day that a patient needs to take a drug. For example, immediate-release diltiazem (Cardizem) is given three or four times a day. However, controlled-release formulations of diltiazem, like Cardizem CD, etc. can be given just once a day. (However, you can’t depend on suffixes to have uniform meanings. We have more information on drug names with suffixes in our Technician Training Tutorial, What Drug Names Really Mean.) Sprinkles, such as Depakote sprinkles, are capsules that can be opened, and the contents taken by mouth, usually with some food such as applesauce.

Some drugs, such as proton pump inhibitors (e.g., lansoprazole [Prevacid], esomeprazole [Nexium], etc), are formulated to delay the release of the drug. This helps ensure that the drug is released in a specific part of the GI tract so exposure to acid, which could destroy the drug, is reduced.

Most oral liquids can be thought of as similar to immediate-release tablets or capsules. Liquids can come as suspensions (cloudy), solutions or syrups (clear), and the less common elixirs (clear).

Buccal and sublingual tablets or films are also meant for absorption into the blood. However, the drug is actually absorbed into the blood through the lining of the mouth instead of the lining of the stomach or small intestine. So these don’t need to be swallowed to be absorbed. (If they are swallowed, they may take longer to work and/or be less effective). Buccal tablets such as Fentora (U.S. only), a formulation of fentanyl, are placed between the teeth and the cheek. Sublingual tablets, such as nitroglycerin (Nitrostat), go under the tongue. An advantage to these types of tablets is that they act quickly, since they skip steps such as moving down through the esophagus and into the stomach. So it makes sense that some meds for pain, like fentanyl, and meds for heart trouble, like nitroglycerin, are formulated in this way.

Orally disintegrating tablets (e.g., Maxalt-MLT-U.S. and Maxalt RPD-Canada [rizatriptan], Zyprexa Zydis [olanzapine], Zofran ODT [ondansetron], etc), sometimes called wafers, are kind of tricky. As the name implies, these dissolve in the mouth and should be placed on top of the tongue. However, they usually still need to be swallowed so that the drug can be absorbed through the stomach. The advantage of orally disintegrating tablets is that they just fall apart in the saliva, and can then be easily swallowed with or without taking a drink of liquid. They’re good because patients can’t hold them in their cheeks, fake swallowing them, and later spit them out. So it makes sense that some medications for psychiatric conditions, such as olanzapine, are formulated as orally disintegrating tablets. It also makes sense that anti-nausea medications and triptans for migraines are formulated in this manner, to provide an option for patients who are too nauseous to drink liquid or swallow a tablet or capsule.

Effervescent tablets (e.g., Airborne Effervescence [vitamin supplement]-U.S. only, Alka-Seltzer Original [antacid/aspirin], Binosto [alendronate]-U.S. only, K-Lyte [potassium citrate/potassium bicarbonate]-Canada only, Redoxon [vitamin supplement]) are typically placed in water to dissolve completely, then swallowed. The problem with effervescent tablets is that they can contain a lot of sodium since sodium bicarbonate is the ingredient that typically gives them their “fizz.” (Effervescent potassium supplements have potassium bicarbonate instead of sodium bicarbonate.) Consider that most people should limit their total sodium intake per day to about as much found in...
one teaspoon of table salt (about 2400 mg). One Alka-Seltzer Original tab alone has over 500 mg of sodium and one Airborne Effervesence tab has over 200 mg.

Powders are another dosage form that requires swallowing and for the drug to travel to the stomach for absorption. These can be mixed with liquid and swallowed, or placed on the tongue and washed down with a drink of liquid. Some examples of powders are Goody’s Headache Powders (U.S. only) and BC Powders (U.S. only), both OTC pain relievers.

Some thin strips, like Gas-X Thin Strips (U.S. only), dissolve in the mouth and help make drugs that need to be absorbed easier to swallow.

Do ALL oral dosage forms get absorbed into the blood?
No, not all oral dosage forms get absorbed into the blood. There are some medications that are swallowed, but have local effects in the gastrointestinal tract. Examples of this would include bismuth (Pepto-Bismol, etc) and sucralfate (Carafate [U.S.], Sulcrate [Canada]). These drugs are both used to coat the lining of the stomach to protect it from injury from acid. They are not meant to be absorbed into the blood.

Most lozenges, sprays, troches, and some liquids act locally in the mouth or throat. Think about Chloraseptic (benzocaine/menthol) lozenges and spray for numbing a sore throat. Or about nystatin suspension or clotrimazole lozenges-U.S., which treat fungal infections in the mouth and throat. (Some exceptions here include the fentanyl lozenge, Actiq [U.S. only], and nitroglycerin sprays, Nitrolingual, etc., which are absorbed into the blood stream and ARE NOT used for their local effects.)

What are the EXCEPTIONS, such as capsules or tablets that are not to be placed in the mouth at all?
Watch for capsules whose contents are meant to be inhaled with the use of an inhaler device to act in the lungs, such as Arcapta-U.S. only (indacaterol), Foradil (formoterol), or Spiriva (tiotropium), and tablets that are meant for vaginal use where they act locally, such as Vagifem (estradiol). These will require special attention to make sure patients understand how to use them. Since these are actually referred to as “capsules” and “tablets,” they can be especially tricky. If patients swallow them, they won’t have the desired effect.

You notice that the prescriber has not included directions for how Billy should actually use the Magic Mouthwash. You know it’s to help with his sore mouth. Since it is a “mouthwash” you know that you should include instructions to “swish.” However, you wonder if you should put “swish and spit” or “swish and swallow.” You ask the pharmacist, and he says that for this recipe to use “swish and spit.”

How can I help prevent errors with these dosage forms?
Errors with oral dosage forms can be very serious. Considering that oral dosage forms are so commonly used, the overall impact of errors with oral dosage forms is significant.

Make sure the directions for use are clear. For example, the directions on a label for nystatin suspension should clearly state to swish in the mouth before swallowing or spitting it out.
Otherwise, the drug may not be effective in clearing a yeast infection from the mouth. It’s also important for patients to know if these types of meds should be “swished and spit” or “swished and swallowed.”

The directions for effervescent tablets should indicate the amount of water the tab should be dissolved in, and it should be clear that the tabs must be fully dissolved in water prior to drinking. Swallowing effervescent tabs whole can lead to choking or irritation of the stomach and esophagus.

The directions for sublingual tabs (or films, such as Suboxone-U.S. [buprenorphine/naltrexone]) should state to place the dose under the tongue. The directions for buccal tablets (or films, such as Onsolis-U.S. [fentanyl]) should state to place the dose in-between the cheek and molar. Otherwise, the patient might simply swallow them.

The same is true for inhaled capsules and vaginal tablets. These should have explicit directions for use. Don’t assume that the patient knows what to do with different dosage forms. There are endless stories of patients who have used drugs incorrectly because they did not have proper information describing how to take them.

Watch that the product can be given as directed. For example, if you know that a patient cannot swallow a capsule or tablet, these might be inappropriate dosage forms unless they can be crushed (tablet) or opened (capsule). This is especially true in the hospital setting, where patients are more likely to have medications given through a feeding tube. Use our PL Chart, Meds That Should Not Be Crushed, to find this information.

If a dose is ordered that would necessitate the patient taking a fraction (usually half) of a tablet, it’s important to make sure that dividing the tablet is okay. Often, controlled-release tablets should NOT be split. We have a Technician Training Tutorial, Which Tablets and Capsules Can Be Crushed, Opened, or Split?, dedicated to this topic, and an algorithm called Tablet Splitting: “To Split or Not to Split.” If you notice that there are problems with the way a tablet or capsule is supposed to be given, alert the pharmacist.

Make sure that the patient has a good way to measure out the appropriate dose. For example, dispensing a measuring device with oral liquids (i.e., calibrated dosing cup, dropper, spoon, or oral syringe) is a good idea. Using a household teaspoon for measuring oral liquids is a bad idea, because the amount of liquid they hold can vary. Also, make sure that the dosing units on the Rx label match the dosing units on the measuring device to avoid confusion for the patient. Consider marking patients’ doses on the measuring device as well.

In the hospital setting, you’re likely to be packaging individualized doses of oral liquids for patients. Regardless of your practice setting, NEVER send oral meds in IV syringes. This could lead to administration of the oral med through an IV line, which is a potentially serious error. Always package oral liquids in ORAL syringes that can’t be connected to IV lines, or other packaging that is specific for oral liquids (e.g., amber bottles, etc).

Suggesting a pill splitter for patients who require a fraction of a tablet is also a good idea. For patients with poor coordination or eyesight, a special easy-to-use pill splitter might really help, or the pharmacist might prefer that the tablets be split BEFORE they are dispensed to the patient.
the hospital setting, you will usually dispense tabs that are already split, instead of whole tabs for the nurse to split. Double-check with the pharmacist if you’re not sure what to do. It’s important to help ensure that patients get the most accurate dose possible.

You make 240 mL of the Magic Mouthwash for Billy. (He could be using 5 mL up to six times each day, or 30 mL/day, for seven days, which would be a total of 210 mL.) He’s going to have a little bit extra, but you include a calibrated dosing cup with his Rx so that he gets an accurate measurement for each dose and doesn’t run out.

**Do any of these dosage forms require special labeling?**

Use auxiliary labels to indicate if a med should be taken with food or on an empty stomach. The contents of the stomach and changes in acidity caused by meals can cause more or less drug to be absorbed into the blood depending on the characteristics of the drug. For example, levothyroxine should be given first thing in the morning on an empty stomach, because calcium, fiber, iron, etc. found in food can reduce its absorption. On the other hand, the cholesterol-lowering drug lovastatin (Mevacor) should be taken with food, so that it is absorbed to the fullest extent. Still other drugs, like amoxicillin/clavulanate (Augmentin [U.S.], Clavulin [Canada]) and ibuprofen, should be given with food, not because stomach contents affect absorption, but because having food in the stomach can prevent stomach upset from the drug.

Put on labels that indicate proper storage. Liquids are more likely to require refrigeration than other oral dosage forms. In fact, they will often have a shorter beyond-use-date than other oral dosage forms. For more information, use our Technician Training Tutorial, Dispensing Pediatric Antibiotic Suspensions. We also have a PL Chart, Pediatric Oral Antibiotic and Antifungal Suspensions and Liquids (U.S. subscribers; Canadian subscribers), for more info on beyond-use-dates of oral suspensions, under refrigeration or at room temp.

It’s uncommon, but refrigeration may be recommended for some capsules or tablets, like some probiotics and ritonavir (Norvir) capsules. Refrigeration is recommended for ritonavir caps if they aren’t going to be used within 30 days.

For those meds that should not be taken orally, such as Arcapta, Foradil, and Spiriva capsules and Vagifem tablets, provide information for the patient to keep the med in its original packaging. Placing these in pill organizers can increase the risk that they will be taken orally and swallowed by mistake.

Effervescent tablets must also be kept in their original packaging until they are used. This helps keep them dry. If they are exposed to moisture during storage they might break down or start to dissolve on their own.

Use an auxiliary label to indicate tablets and capsules that should NOT be taken orally. Place an auxiliary label stating that meds such as inhaled capsules and vaginal tablets are not to be taken by mouth.

Use any other applicable auxiliary labels. Of course, any of the usual auxiliary labels should be used for oral dosage forms (e.g., “do not split, chew, or crush,” “may cause drowsiness,” “avoid
exposure to the sun,” etc) as appropriate. And liquid suspensions will require a “shake before using” label.

Billy’s Magic Mouthwash is a compounded prep, so you include an auxiliary label with the beyond-use-date for the recipe. You also include a “shake before using” auxiliary label on the bottle, since the recipe included Maalox, which is a suspension. Then you prepare the Rx for the pharmacist’s final check.

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