

February 2014 Health Notes by Evelyn Ames

Medication Interactions: How Do They occur? What You Should Know?

“On average, seniors take six different medications, and more than 15% of seniors use at least 10 drugs at the same time. More often than not, this is polypharmacy: when patients are on multiple medications, more than are needed to improve and maintain their health. While there may be legitimate reasons for the use of multiple medications, it’s often the case that a number of the drugs are unnecessary and may even be harmful” <http://lab.express-scripts.com/adherence/polypharmacy-how-much-is-too-much/>.

“A drug interaction can be defined as an interaction between a drug and another substance that prevents the drug from performing as expected. This definition applies to interactions of drugs with other drugs (drug-drug interactions), as well as drugs with food (drug-food interactions) and other substances” (<http://www.rxlist.com/drug-interaction-checker.htm>).

Medicine (drug) interactions fall into three broad categories:

- **Drug-drug interactions** occur when two or more drugs react with each other. This may cause one to experience an unexpected side effect such as mixing a sedative to help one sleep with an antihistamine for allergies can slow reactions and make driving a car or operating machinery dangerous.
- **Drug-food/beverage interactions** result from drugs reacting with foods or beverages (e.g., mixing alcohol with some drugs may cause a feeling of tiredness and/or lightheadedness, slow reactions, and lead to falls). Also, eating grapefruit with a cholesterol-lowering drug may interfere the absorption or metabolism of the drug.
- **Drug-condition interactions** may occur when an existing medical condition makes certain drugs potentially harmful (e.g., a person with high blood pressure could experience an unwanted reaction if a nasal decongestant which contains a stimulant is taken. <http://www.fda.gov/drugs/resourcesforyou/ucm163354.htm>

How do drug interactions occur? The interaction mechanism can result when there is an increase or decrease in absorption of a drug into the body, when there is a change in the distribution of the drug within the body, when alterations are made to the metabolism of the drug by the body, and when changes occur in the elimination of the drug from the body. “Most of the important drug interactions result from a change in the absorption, metabolism, or elimination of a drug. Drug interactions also may occur when two drugs that have similar (additive) effects or opposite (canceling) effects on the body are administered together. For example, there may be major sedation when two drugs that have sedation as side effects are given, for example, narcotics and antihistamines. Another source of drug interactions occurs when one drug alters the concentration of a substance that is normally present in the body. The alteration of this substance reduces or enhances the effect of another drug that is being taken. The drug interaction between warfarin (Coumadin) and vitamin K-containing products is a good example of this type of interaction. Warfarin acts by reducing the concentration of the active form of vitamin K in the body. Therefore, when vitamin K is taken, it reduces the effect of warfarin” (<http://www.rxlist.com/drug-interaction-checker.htm>)

Cause and Effect of Polypharmacy: “One major factor behind polypharmacy is that most seniors are under the care of several different specialist physicians who may not be aware of or as

knowledgeable about medications the patient has been prescribed by other doctors. An Express Scripts study found that seniors who see two different doctors had an average of 27 prescription fills and were at risk for 10 medication errors each year. When the number of doctors caring for the senior increased to seven, prescription fills jumped to 52 and errors more than doubled (22) in a year.” See more at: <http://lab.express-scripts.com/adherence/polypharmacy-how-much-is-too-much/#sthash.agZWs3HO.dpuf>

Drug Interactions and Over-the-Counter Medicines. OTC labels include important information about possible drug interactions. It is recommended that one read information included under “active ingredients” and “purposes.” Drug labels may change as new information becomes known. <http://www.fda.gov/drugs/resourcesforyou/ucm163354.htm> Questions to ask doctor or pharmacist: Can I take it with other drugs? Should I avoid certain foods, beverages or other products? What are possible drug interaction signs I should know about? How will the drug work in my body? Is there more information available about the drug or my condition (in health and medical literature)?

Phytochemicals and medications. Diet is one of many factors that could alter the pharmacokinetics of drugs. An abstract from *J Food Sci.* 2011 May;76(4):R112-24. provides information about phytochemicals in fruits and vegetables and drugs: “It has been well established that complex mixtures of phytochemicals in fruits and vegetables can be beneficial for human health. Moreover, it is becoming increasingly apparent that phytochemicals can influence the pharmacological activity of drugs by modifying their absorption characteristics through interactions with drug transporters as well as drug-metabolizing enzyme systems. ... Alterations in cytochrome P450 and other enzyme activities may influence the fate of drugs subject to extensive first-pass metabolism.” “Many phytochemicals have been shown to have pharmacokinetic interactions with drugs.” This study looked at the phytochemistry and pharmacokinetic interactions of “grapefruit, orange, tangerine, grapes, cranberry, pomegranate, mango, guava, black raspberry, black mulberry, apple, cauliflower, watercress, spinach, tomato, carrot, and avocado.” The conclusion was that “our knowledge of the potential risk of nutrient-drug interactions is still limited. Therefore, efforts to elucidate potential risks resulting from food-drug interactions should be intensified in order to prevent undesired and harmful clinical consequences” <http://www.ncbi.nlm.nih.gov/m/pubmed/22417366/>. Several fruits and berries have recently been shown to contain agents that affect drug-metabolizing enzymes. Inhibiting cytochrome P450 3A4 (CYP3A4), which is the most important enzyme in drug metabolism, can “influence the pharmacological activity of drugs by modifying their absorption characteristics through interaction with drug transporters. Clearly, phytochemicals have the potential to alter the effectiveness of drugs, either impairing or exaggerating their pharmacological activity.” <http://www.ncbi.nlm.nih.gov/m/pubmed/18084364/?i=2&from=/22417366/related> and <http://www.ncbi.nlm.nih.gov/m/pubmed/15035733/?i=4&from=/22417366/related>.

This web site (<http://pubs.niaaa.nih.gov/publications/Medicine/medicine.htm>) provides information about alcohol interacting with popular painkillers and cough/cold/allergy remedies. Some medicines contain alcohol (a little bit of alcohol makes the medicine go down!) with some as much as 10 percent. Cough syrup and laxatives may have some of the highest alcohol concentrations.