

# Geriatric Medications – How Hard Is It?

Course ID: 1027 - Credit Hours: 1

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## ***Disclosures***

Insert any affiliations that should be disclosed here.

## ***Audience***

Please insert the target audience here.

## ***Accreditation***

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## ***Course Objectives***

Upon completion of this course participants will be able to:

1. Explain the physiological aspects of drug administration absorption and excretion.
2. List 2 effects of aging with medication absorption and excretion
3. Define adverse effects, side effects and off-label use

# So How Hard Is It?



# Physiological Aspects

- 3 components
  - Absorption
  - Distribution
  - Clearance
- Liver – metabolizes
- Kidneys - excrete

# Effects of Aging

- Absorption
  - Generally slower
  - Skin absorption
  - Nutritional status
  - Constipation/laxative use
  - Fat soluble
  - Water soluble
  - Cardiac output

# Effects of Aging

- Excretion
  - Function of the liver decreases
  - Decline in creatinine clearance

# Definitions

- Adverse effects – abnormal, harmful or undesirable effect resulting from a medication
- Side effects – an effect, whether therapeutic or adverse, that is secondary to the one intended
- Off-label use – drug prescribed specifically for its side effects; in that case, said side effect ceases to be a side effect, and is now an intended effect. Use of drugs for unapproved indications – for their side effects – is termed off-label use.

# Adverse Drug Reactions

- ADRs increase exponentially with 4 or more medications
- Some categories of drugs are especially at high risk for interactions. These categories include anticonvulsants, antibiotics, and certain cardiac drugs such as digoxin, warfarin, and amiodarone.
- One maxim of geriatric care is that it is often more effective to remove a medication than to add one. Make certain every medication has a current indication.

# ADR's

- An ***adverse drug reaction*** is “an injury resulting from the use of a drug. Under this definition, the term ADE includes harm caused by the drug (adverse drug reactions and overdoses) and harm from the use of the drug (including dose reductions and discontinuations of drug therapy).”
- Adverse Drug Reactions may results from medication errors but most do not.
- An ***adverse drug reaction*** is a “response to a drug which is noxious and unintended and which occurs at doses normally used in man for prophylaxis, diagnosis, or therapy of disease or for the modification of physiologic function.”



# Side Effects

- A ***side effect*** is an expected and well-known reaction/effect of a drug that is not the intended therapeutic outcome.
- A ***side effect*** occurs with a predictable frequency and may or may not constitute an adverse consequence.
- Example: **Anticholinergic Side Effect.** An effect of a medication that opposes or inhibits the activity of the parasympathetic (cholinergic) nervous system to the point of causing symptoms such as dry mouth, blurred vision, tachycardia, urinary retention, constipation, confusion, delirium, or hallucinations.

# Therapeutic Side-Effects (Off-label Use)

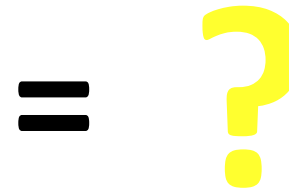
- Examples of therapeutic side-effects include:
  - Carbamazepine – used to treat bipolar depression and seizures can also be helpful in treating phantom limb syndrome and paroxysmal extreme pain disorder
  - Doxepin – can be helpful in treating angioedema and severe allergic reaction due to its strong antihistamine properties

# Therapeutic Side-Effects (Off-label Use)

- Gabapentin – approved for treatment of seizures and post herpetic neuralgia can also be helpful in the treatment of bipolar disease, essential tremor, migraine prophylaxis, neuropathic pain syndromes and restless leg syndrome

# Drug/Food Interactions

- Interactions between foods and drugs can have profound influence on the success of drug treatment and on the side effect profiles of many drugs. The interactions are not always detrimental to therapy, but can in some cases be used to improve drug absorption or to minimize adverse effects.



# Drug/Food Interactions

- In general, increased absorption
- In general, decreased absorption
- Stomach acid
- Fruit juices
- Fat and carbohydrates
- Caffeine
- Amino Acids

# MAO's and Food

Perhaps the most feared food-drug interaction is that between monoamine oxidase inhibitors (MAOIs) and the amino acid tyramine, which is found in a variety of aged, fermented, overripe or pickled foods and beverages and, to a lesser extent, chocolate and yeast-containing foods. Tyramine is indirectly sympathomimetic. When its metabolism is suppressed, as it is by MAOIs, it can cause a significant release of norepinephrine, resulting in markedly increased blood pressure, cardiac arrhythmias, hyperthermia and cerebral hemorrhage.

# Common Drug/Food Interactions

- **Ciprofloxacin** dairy products decrease absorption; food delays rate of absorption
- **Codeine** reduced side effects with food
- **Digoxin** decreased absorption with high-fiber foods
- **Doxycycline** reduced absorption with milk
- **Ferrous sulfate** maximal absorption on empty stomach; ascorbic acid increases absorption; tea, coffee and cocoa reduce absorption

# Common Drug/Food Interactions

- **Gabapentin** enhanced absorption with protein
- **Isoniazid** reduced absorption with food
- **Lithium** reduced side effects with food
- **Mag/Al/simethicone** high-protein foods decrease efficacy
- **Methotrexate** reduced absorption with food
- **Nitrofurantoin** increased absorption with food
- **Phenytoin** increased absorption with food



# Common Drug/Food Interactions

- **Rifabutin** high-fat meal delays absorption; food reduces side effects
- **Simvastatin** absorption may be reduced by high-fiber meal
- **Theophylline** high fat meal increases absorption; high carbohydrate diet reduces absorption; high caffeine intake inhibits metabolism
- **Triamterene** high-potassium foods or salt substitutes may cause hyperkalemia
- **Warfarin** large amounts of vitamin K-containing foods may reduce efficacy; garlic may increase anticoagulation

# Therapeutic Blood Levels

- Lab tests – look for the presence and the amount of specific drugs in the blood. Some medications are harmful if the level rises too high and do not work if the levels are too low.
- Examples of medications requiring therapeutic blood levels
  - Digoxin, dilantin, depakote, lithium, phenobarbital, theophylline, vancomycin, gentamicin

# Anticoagulants

- Why are anticoagulants important?
- It has been estimated that venous thromboembolism is responsible for more than 300,000 hospital admissions per year in the United States and that pulmonary embolism (PE) causes or contributes to death in  $\approx 12\%$  of hospitalized patients and is responsible for 50,000 to 250,000 deaths annually in the United States.

# Anticoagulants

## *Three Groups:*

***Antithrombotics*** – heparin and warfarin

- Interfere with the formation of clots

***Thrombolytics*** – streptokinase and urokinase

- Disintegrates thrombi that have already formed

***Antithrombolytics*** – Cycloxygenase, ADP inhibitors

- Prevent the clumping together of platelets

# Anticoagulants

- The effects of anticoagulants can be enhanced or inhibited by a variety of drugs and chemical compounds, especially the salicylates, barbiturates, and antibiotics. This includes nonprescription or “over-the-counter” drugs as well as prescription drugs.
- Dietary restrictions such as fasting diets or those that limit the intake or utilization of the fat-soluble Vitamin K can result in increased pharmacologic action of an anticoagulant.

# Anticoagulant Clinical Considerations

- Many prescription medications and over-the-counter remedies, including dietary supplements and herbs, may alter the effectiveness of warfarin or Vitamin K antagonists.
- Vitamin K may be used to reverse suprathreshold anticoagulation with warfarin.
- Regardless of the anticoagulant used, it is important that patients/residents know they must always inform their physician and other health care providers that they are on anticoagulation therapy, especially if they are undergoing an invasive procedure.



# Anticoagulant Clinical Considerations

Patients/residents should be encouraged and empowered to play an active role in the self-management of their treatment.

# Anticoagulant Adverse Effects

- Bruising
- Spontaneous internal or external bleeding
- Gastrointestinal bleeding
- Excessive bleeding from minor skin tears or injury
- Nose bleeds
- Fatigue
- Heartburn, nausea, vomiting



# Dosing Errors

Medication dosing errors are mishaps that occur during prescribing, transcribing, dispensing, administering, adherence, or monitoring of a drug.

# Risk Points for Dosing Errors

- Admission from home. Reconcile proposed new orders with past medication usage.
- Transfer between hospitals & facilities. Clarify any discrepancies or questionable orders with original source and reconcile. ***Do not administer previously ordered medications without a renewal order.***
- Transfer within facility. Include printed, up-to-date medication orders with related diagnosis (indications for use) and relevant laboratory data.
- Implement facility-defined protocols for assuring accurate monthly review of orders and MAR/TARs.

# Risk Points for Dosing Errors

- Discharge to home. Reconcile medications: Prior to discharge to home, family will bring all at-home medications (including OTC and herbal substances) to the facility/program for the physician/nurse/pharmacist to review along with current medications. Discharge orders, prescriptions, and instructions to resident/family should clearly identify which medication should be continued at home.
  - Send discharge medication and care plan information to community physician and/or home care program.
  - Provider pharmacy sends resident/medication specific drug information document to facility.
  - Facility gives drug information document to resident/family with list of medications to be taken at home.
  - Educate resident and family about therapeutic benefits, side effects and adverse consequences.

# Common Dosing Errors

- Medications given with or without food, ac or pc as ordered
- Timing errors
- Same name/similar name medications
- Multiple tablets and/or ½ tablets
- Dispensing based on vital signs or therapeutic drug levels

# Preventing Errors

- Strict compliance with established protocols
  - New medication order—first dose
  - Check POS to confirm accuracy of MAR/TAR before administering first dose
  - Read and compare MAR/TAR and medication labels three (3) times:
    - Initial view
    - At pouring
    - After pouring
  - Use two forms of resident identification
- Follow “like names alert” policy to avoid similar resident’s name errors. ***Do not use room or bed number.***

# Preventing Errors

- Observe for expected therapeutic effects, side effects, and adverse consequences. Communicate side effects and adverse consequences to supervisor and prescriber.
- “Hold” medication in accordance with professional standards.
- Follow precautions and assess and record clinical parameters.
- Administer and observe as resident takes medication.
- Document the process.
- Follow appropriate infection control standards.