

Primary Health Care Initiatives (PHCI) Project  
 Contract No. 278-C-00-99-00059-00  
 Abt. Associates Inc.

**COMMON DRUG and DISEASE INTERACTIONS**

**LEARNING OBJECTIVES**

- Identify the most common drug interactions that are clinically significant in the health center setting
- Determine the potential effects of clinically significant drug interactions
- Determine a suitable alternative drug if a drug interaction occurs
- Understand when a situation occurs that warrants referral due to the number or complexity of medications, and the potential for significant drug interactions
- Counsel patients to anticipate potential drug interactions

**TEACHING STRATEGIES**

- Case-based approach, involving scenarios likely to be encountered in the out-patient setting
- Minimal didactic lectures, to reinforce and emphasize the most important information

**LEARNING POINTS**

**Clinically Important Drug Interactions**

Precipitant Drug	Object drug* (level increased ↑ or decreased ↓)	
Acetaminophen	Warfarin	↑ ??
Beta-blockers	Digoxin	↑
Antacids	Fluoroquinolone antibiotics (Ciprofloxacin), May decrease absorption of a large number of drugs	↓
Antibiotics, Rifampin	Oral Contraceptives (several)	↓
Carbamazepine	Warfarin	↓
Cimetidine	Theophylline	↑
Fluoroquinolone antibiotics (ciprofloxacin)	Theophylline	↑
Erythromycin	Theophylline	↑
	Benzodiazepines (primarily diazepam, not lorazepam)	↑
	Carbamazepine	↑
	Digoxin	↑
Tetracyclines	Digoxin	↑
Anti-inflammatories (NSAIDs - ibuprofen, diclofenac, naproxen, aspirin)	Lithium	↑
	Thiazide Diuretics	↑
	Warfarin	↑
Potassium-Sparing Diuretics (Moduretic)	ACE Inhibitors	↑

Quinidine	Digoxin	↑
SSRIs (Fluoxetine, Sertraline, Paroxetine)	Carbamazepine	↑
	Warfarin	↑
Sulfonamides, Metronidazole	Warfarin	↑
Thiazide Diuretics, furosemide	Digoxin	↑
Thyroid Hormone (Synthroid)	Warfarin	↑
Verapamil, Diltiazem	Digoxin	↑
Warfarin	Phenytoin	↑
Phenytoin	Warfarin	↑

\* ↑ = object drug increased, ↓ = object drug decreased

- Medications to especially watch if prescribed, because of many interactions with other drugs:
  - Carbamazepine (Tegretol)
  - Erythromycin
  - Digoxin
  - Theophylline
  - Anti-inflammatories (NSAID, including aspirin, but NOT including paracetamol)
  - Warfarin

### Clinically Important Drug-Disease Interactions:

Drug	Disease	Interaction
B-Blocker (propranolol, atenolol)	Asthma	Can cause increased bronchospasm
B-Blocker (propranolol, atenolol)	Diabetes	May decrease the symptoms of hypoglycemia, so that patient does not recognize hypoglycemic attack
B-Blocker (propranolol, atenolol)	Heart Failure	May increase degree of heart failure
Thiazide diuretics (hydrochlorothiazide)	Diabetes	Can increase blood glucose, or decrease blood potassium
Anti-inflammatories (NSAID), ACE inhibitors (captopril, enalapril)	Moderate kidney disease	May cause increased kidney failure

- Medications to especially watch in the elderly, or chronically ill (ie, diabetes, heart failure, or kidney disease)
  - B-Blockers (propranolol, atenolol)
  - Thiazide diuretics
  - Anti-inflammatories (NSAID, aspirin)
  - ACE inhibitors (captopril, enalapril)

## Clinically Important Food-Drug Interactions:

Food	Drug	Interaction
Alcohol	Antihistamines (diphenhydramine)	Increased drowsiness and slowed reactions (example: leading to auto accidents)
	Oral corticosteroids	Increased stomach irritation
	Anti-inflammatories (ibuprofen, diclofenac, aspirin)	Increased stomach irritation
	Paracetamol (chronic use)	Increased risk of liver damage
	Metronidazole	Flushing, nausea and vomiting, lowered blood pressure
	Sulfa antibiotics (Co-trimoxazole)	Nausea and vomiting
Milk and dairy products	Tetracyclines (excluding doxycycline)	Decreased absorption and activity
Salty foods or added salt	Anti-hypertensives (all)	Decreased effectiveness in reducing blood pressure
Grapefruit juice	Erythromycin	Increased levels of erythromycin with increased nausea and vomiting
	Calcium channel blockers (nifedipine, verapamil)	Increased anti-hypertensive effect with possible dizziness or fainting
	Theophylline	Increased level and toxicity of theophylline

## CASE STUDIES

1. A 24 year old young man presents to the health center with a complaint of a dry cough for 2 weeks, low-grade fevers and general malaise. He is suspected of having pneumonia and prescribed a 10 day course of erythromycin. You glance at his chart and note that he has asthma, and is taking theophylline and an albuterol inhaler.
  - a. What potential drug interactions could occur?
  - b. Is there a better choice of antibiotics for this man?
2. A 60 year old gentleman is seen for followup of chronic asthma and hypertension. His current medications include an albuterol inhaler, a beclomethasone inhaler, and a thiazide diuretic (hydrochlorothiazide). He was recently prescribed propranolol to further control his hypertension. Today he tells you, "I feel like my breathing is worse lately. I've been using my inhaler twice a day. Before, it was only two times a week."
  - a. Why is his asthma worse?
  - b. What other drugs could he take for his hypertension?
3. A 23 year old married woman comes to the health center for treatment of her acne. She has moderately severe acne, and was prescribed oral doxycycline. She is also taking combined oral contraceptive pills.
  - a. Does she need to be on another form of birth control?

### **PREVENTION ISSUES AND PATIENT EDUCATION**

- To provide education to patients and families on the importance of reporting ALL medications to their physician at each visit
- To provide education to patients and families on the importance of discarding old medications and not taking any old medications without a physician's approval

### **CRITICAL ELEMENTS FOR REFERRAL**

- Any patient requiring multiple medications that could potentially produce significant drug interactions could benefit from a specialty referral

### **CRITICAL ELEMENTS FOR EVALUATION OF COMPETENCE**

- Able to identify the common drug interactions and their clinical significance
- Able to determine alternative drug therapies to avoid significant drug interactions
- Understanding of appropriate circumstances where referral is necessary
- Able to counsel and educate patient on the significance of drug-drug or drug-disease interactions and the necessity for vigilant reporting of the medications taken