



Top Dispensed Medication Review for Pharmacy Technicians

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Objectives

- Recognize labeled indications for common medications.
- Discuss adverse effects for common medications.
- Introduce mechanisms of action for medications.
- Summarize pharmacokinetic properties for common medications.
- Associate this information with patients' conditions.
- Explore additional learning independently.



Pharmacology

The scientific study of drugs and how they are used in medicine

<http://www.merriam-webster.com/dictionary/pharmacology>

Organization of Drug Education

- Pharmacologic Category (CAT)
- Indication (IND)
- Mechanism of Action (MOA)
- Pharmacokinetics (PK): Liver metabolism & urine excretion
- Adverse Effects (AE):

*GI effects: N/V, diarrhea, constipation, dyspepsia

PK: what the body does to the drug
GI: gastrointestinal

dyspepsia: upset stomach
N/V: nausea & vomiting



Anti-infective/Antibiotic

Medicines that prevent or inhibit/destroy
the growth of microorganisms

Anti-infective/Antibiotic

Flagyl (metronidazole)

- Anaerobic bacterial infections
- Abdominal infections
- Headache & GI effects

Zosyn (piperacillin/tazobactam)

- Piperacillin: a penicillin
Tazobactam: protector
- UTI, pneumonia, cellulitis, & abdominal infections.
- GI effects

Anaerobic: do not require oxygen to live/grow: amoeba, bacteroides, protozoa, Clostridium difficile
UTI: Urinary tract infections



Analgesics

Medications that relieve pain

Analgesics

Tylenol (acetaminophen/APAP)

- Fever, headache, mild/moderate pain, arthritis
- Believed to block pain impulses. Acts on heat-regulating center.
- GI effects, headache, insomnia, liver injury

Toradol (ketorolac)

- Moderate/severe pain & inflammation
- Inhibits enzymes thought to cause pain, fever, & inflammation
- GI effects/bleeding, headache, dizziness, edema

NSAID: non-steroidal anti-inflammatory drug
inflammation: swelling, redness, warmth



Analgesic:
Miscellaneous

Neurontin
(gabapentin)

- Nerve pain, seizures
- Appears to interact with neurons/nerve cells
- Not metabolized
- Dizziness, drowsiness, fatigue, GI effects

Opioid Analgesics

Lortab

(Hydrocodone/APAP)

Percocet

(oxycodone/APAP)

Dilaudid

(Hydromorphone)

MS Contin

(Morphine)

- Abused drugs
- Moderate to severe pain
- Alters perception & response to pain
- GI effects, headache, drowsiness, itching, dry mouth, urinary retention

Produces analgesia, euphoria, respiratory depression, miosis (excessive contraction of pupil), decreased GI motility, sedation, somnolence & physical dependence.



Anti-anxiety, Anesthesia & Amnesia Medications

Drugs that reduce anxiety, induce sleep & cause memory loss

Anti-anxiety, Anesthesia & Sedation

Xanax
(alprazolam)

Ativan
(lorazepam)

- Anxiety/panic or seizure disorders, insomnia; alcohol withdrawal
- Inhibits nerve excitation; causes CNS depression
- Confusion, depression, mood changes, fatigue, dizziness

anesthesia: induced loss of sensation & conscious awareness

CNS: central nervous system (brain & spinal cord)

CNS depression: sedation, hypnosis, skeletal muscle relaxation

Anesthesia/Amnesia

Diprivan (propofol)

- Induction & maintenance of anesthesia
- Causes CNS depression through nerve desensitization
- Hypotension, apnea, involuntary muscle movements


Amnesia: induced loss of memory

Hypotension: low blood pressure (less than 90/60)
Apnea: cessation of breathing



Cardiac Medications

Drugs that treat conditions of the heart & blood vessels



Antiarrhythmic

Cordarone
(amiodarone)

- Atrial fibrillation, other arrhythmias
- Acts directly on the heart muscle
- Bile excretion
- Hypotension, CNS & GI effects, visual disturbance

Antiarrhythmic: treatment or prevention of heart rhythm abnormality

Atrial fibrillation: abnormal heart rhythm; irregular; muscle fibers act without coordination

Bile: produced by the liver; stored in the gallbladder; helps digest fat

CNS effects: dizziness, fatigue, headache, altered memory, involuntary movement, insomnia, poor coordination, nerve pain

Beta-Blockers

Coreg
(carvedilol)

Lopressor
(metoprolol)

- AMI, CP, HF, HTN
- Works by blocking cells that increase heart rate & blood pressure
- Hypotension, bradycardia, dizziness, hyperglycemia, weight gain, GI effects

Beta-blocker: drugs used to reduce blood pressure, heart rate
AMI: acute myocardial infarction (heart attack)

CP: chest pain
HF: heart failure
HTN: hypertension (high blood pressure)

Calcium Channel Blocker

Norvasc
(amlodipine)

- HTN, CP
- Inhibits calcium transfer across muscle membranes & increases O₂ to heart muscle
- Peripheral & pulmonary edema

Calcium channel blocker: drugs used to reduce blood pressure, heart rate & chest pain

O₂: oxygen

Peripheral: lower extremities/legs, ankles, feet

Pulmonary: lungs




Anti-anginal

Nitro-BID
(nitroglycerin)

- AMI, angina, HF, HTN
- Relaxes smooth muscle, produces vasodilation, reduces O₂ demand & improves blood flow
- Headache, hypotension, dizziness, weakness

Angina: chest pain
Vasodilation: opens blood vessel



Statin

Lipitor
(atorvastatin)

- High cholesterol, AMI or stroke prevention
- Acts by reducing cholesterol
- Bile excretion
- Diarrhea/GI effects, muscle spasm/pain

Antiplatelet

Aspirin/ASA

Plavix
(clopidogrel)

- AMI, stroke or mini-stroke
- Inhibits platelet clumping
- Urine & fecal excretion
- Bleeding, rash, itching
- ASA: GI effects/ulcer, dizziness

platelets: blood cells that assist with blood clotting



Anticoagulation

Drugs that prevent or slow the process of blood clotting

Anticoagulants

Lovenox
(enoxaparin)

Heparin

- Treatment/prevention of blood clots
- Inhibits thrombin needed for blood clotting
- Bleeding, injection site bruising

Thrombin: enzyme in blood needed for clotting



Respiratory

Medications used to treat diseases of the lungs

Respiratory Medications


Humibid (guaifenesin)

- Cough
- Thin bronchial secretions
- Water breaks down the drug
- Rash, GI effects, headache, dizziness, drowsiness

Combivent (ipratropium/albuterol)

- COPD
- Stimulates receptors causing relaxation of bronchial smooth muscles
- Bronchitis, upper respiratory tract infection, headache, cough,

COPD: Chronic Obstructive Pulmonary Disease
bronchitis: inflammation of the lung bronchial tubes



Hormonal Agents

Drugs that regulate or stimulate cells in the body

Anti-diabetic Agents/Insulin

Novolog
(aspart)
Rapid-acting insulin

Levemir
(detemir)
Long-acting insulin

- Hyperglycemia, diabetes
- Regulates food metabolism & lowers glucose through different mechanisms
- Liver & kidney metabolism
- Hypoglycemia, headache, confusion, nausea



Immunosuppressants
(Corticosteroid)

Solu-Medrol
(methylprednisolone)

- Anti-inflammatory/immunosuppressant agent
- Suppression of inflammation & immune responses
- Edema, depression, euphoria, nervousness, impaired wound healing, rash, hyperglycemia, increased appetite, bleeding

Immunosuppressant: slows native immune reaction



Gastrointestinal (GI)

Drugs that treat conditions of the gastrointestinal tract

GERD

Pepcid (famotidine)

- Histamine H₂ Blocker
- Treatment/prophylaxis of ulcer, GERD
- Inhibits gastric acid secretion
- Headache, agitation, vomiting, dizziness

Protonix (pantoprazole)

- Proton Pump Inhibitor (PPI)
- Treatment/prophylaxis of erosive esophagitis
- Inhibits gastric acid secretion
- Headache

GERD: Gastro-esophageal reflux disease (stomach contents flows back into the esophagus - heartburn, acid indigestion)

Histamine: compound released in response to injury, inflammation &/or allergic reactions

Esophagitis: inflammation of esophagus

Prokinetic Agent

Reglan
(metoclopramide)

- Diabetic gastroparesis, GERD; nausea
- Blocks receptors that slow gastric emptying
- Tardive dyskinesia, drowsiness, restlessness

Prokinetic: enhances gastric motility, increases frequency of intestinal contractions & accelerates gastric emptying

Gastroparesis: delayed gastric emptying

Tardive dyskinesia: involuntary movements of lower face/mouth/tongue

Antiemetics

Phenergan (promethazine)

- N/V, motion sickness
- Blocks histamine (H₁ receptors)
- Fecal excretion
- Drowsiness, sedation, dizziness, confusion, urinary retention

Zofran (ondansetron)

- Chemotherapy or radiotherapy induced & post-operative N/V
- Blocks nausea through two different mechanisms
- Headache, fatigue, constipation

Antiemetic: prevents vomiting



Nutritional
Supplement

Florastor

(*saccharomyces boulardii*)

- Prevention or treatment of uncomplicated diarrhea caused by antibiotics
- Reestablishment of normal intestinal tract
- Unknown metabolism & excretion
- Constipation, fever, flatulence, N/V

Uncomplicated diarrhea: caused by destroying normal GI tract microorganisms
Flatulence: gas expelled through anus

Colonic Products

Colace (docusate sodium)


- Constipation
- Adds fat & water to the stool
- Local effects; fecal excretion
- Diarrhea, abdominal cramping

MiraLax (polyethylene glycol)


- Constipation
- Causes water to stay in the stool; increases stool frequency
- Acts locally; fecal excretion
- Abdominal bloating, cramping, diarrhea, flatulence, nausea



Clinical Example



Can you think of a scenario when a patient might be on many of these medications?




68yo M presents with severe pain in RUQ,
T 102, N/V diagnosed with cholecystitis.
PMH: IDDM type 2, diabetic gastroparesis,
HF, previous MI and stroke, CAD, PVD,
HTN, HLD, atrial fibrillation, GERD, COPD,
OA, chronic pain and constipation.

RUQ: right upper quadrant of abdomen
IDDM: insulin dependent diabetes mellitus
PVD: peripheral vascular disease

T: temperature
HF: heart failure
HLD: hyperlipidemia/high cholesterol

Cholecystitis: gallbladder inflammation
CAD: coronary artery disease
OA: osteoarthritis



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Free Drug Databases

- www.drugs.com
- www.rxlist.com
- www.dailymed.nlm.nih.gov/dailymed/about.cfm
- <http://www.nlm.nih.gov/medlineplus/druginformation.html>
- <http://www.fda.gov/Drugs>

Drug Database References

- Clinical Pharmacology
- Epocrates
- Lexicomp