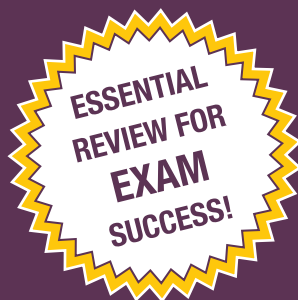


# PHARMACY TECHNICIAN



## FLASH REVIEW

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# PHARMACY TECHNICIAN

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## ***FLASH REVIEW***



# PHARMACY TECHNICIAN

## ***FLASH REVIEW***

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# **INTRODUCTION**

Pharmacy technicians are vital components of the healthcare team. They can work in a variety of settings, including hospitals, retail pharmacies, long-term care facilities, home healthcare and infusion pharmacies, and even nuclear and compounding pharmacies. Each setting offers a chance for a pharmacy technician to demonstrate different levels of abilities and knowledge. Regardless of the location, most states require pharmacy technicians to be certified. This book can help prepare you for the Pharmacy Technician Certification Exam (PTCE).

## ***About the Pharmacy Technician Certification Exam***

The PTCE is offered by the Pharmacy Technician Certification Board (PTCB) and is a nationally accredited exam. Applicants who pass the exam are then designated as certified pharmacy technicians (CPhT). The certification must be renewed every two years, and 20 hours of continuing education is required for renewal, with at least one of those hours being in the subject of pharmacy law.

The exam is comprised of 90 multiple-choice questions, 10 of which are questions that will not be scored and are placed randomly throughout the exam. These questions will not affect your score. The time allotted to complete the exam is one hour and fifty minutes, and the test is administered on a computer.

The PTCE has recently been updated after a job analysis study, with nine new knowledge domains that are organized to better assess technician competencies. The following table lists the new knowledge domains and shows the percentage of content of the PTCE devoted to each section.



<b>Knowledge Domain</b>	<b>Percent of PTCE Content</b>
Pharmacology for Technicians	13.75
Pharmacy Law and Regulations	12.5
Sterile and Nonsterile Compounding	8.75
Medication Safety	12.5
Pharmacy Quality Assurance	7.5
Medication Order Entry and Fill Process	17.5
Pharmacy Inventory Management	8.75
Pharmacy Billing and Reimbursement	8.75
Pharmacy Information Systems Usage and Application	10

### ***About the Exam for the Certification of Pharmacy Technicians***

The ExCPT is a nationally accredited exam offered by the National Healthcareer Association. Applicants who pass the exam are designated as certified pharmacy technicians (CPhT). This certification must be renewed every two years, and during this period the CPhT must complete at least 20 hours of continuing education, including at least one hour of Pharmacy Law.

The exam is taken on a computer and contains 110 questions, 10 of which are pre-test questions that will not be scored. You will have two hours to complete the test. The questions that are scored cover three general knowledge areas:

<b>Knowledge Area</b>	<b>Percent of ExCPT Content</b>
Regulations and Technician Duties <ul style="list-style-type: none"> <li>• General technician duties</li> <li>• Controlled substances</li> <li>• Laws and regulations</li> </ul>	25%
Drugs and Drug Therapy <ul style="list-style-type: none"> <li>• Drug classification</li> <li>• Most frequently prescribed medications</li> </ul>	23%
The Dispensing Process <ul style="list-style-type: none"> <li>• Prescription information</li> <li>• Preparing/dispensing prescriptions</li> <li>• Calculations</li> <li>• Sterile products, unit dose, and repackaging</li> </ul>	52%

## ***About the Book***

This book contains more than 600 concepts, terms, math equations, and skills to help prepare you for the PTCE. It is divided into sections that follow the new layout of the PTCE for easy studying. The top 200 drugs are included in easy-to-study chart format for easy learning, and sample math problems are included for extra practice.

This book should not be memorized in one sitting! Instead, set aside time each day to review and practice terms. Quiz yourself periodically, and move forward from concepts when you have mastered them. Keep a positive attitude, and stay focused. Becoming a certified pharmacy technician is not easy, but the end result is worth the hard work.

Good luck!



# PHARMACY TECHNICIAN

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## ***FLASH REVIEW***



**METRIC SYSTEM**

.....

**HOUSEHOLD SYSTEM**

.....

## MATH PRACTICE

Common metric conversions encountered for weight and volume:

**Weight:**

**Kilogram = kg**

**Gram = g**

**Milligram = mg**

**Microgram = mcg**

**Each row represents an equivalent weight (e.g., 1 kg = 1,000 g)**

1 kg	1,000 g	1,000,000 mg	1,000,000,000 mcg
	1 g	1,000 mg	1,000,000 mcg
		1 mg	1,000 mcg

**Volume:**

**Liter = L**

**Milliliter = mL**

**Each row represents an equivalent volume (e.g., 1 L = 1,000 mL)**

1 L	1,000 mL
-----	----------

.....

Common household conversions encountered for volume and weight:

**Volume:**

**Tablespoon = T**

**Teaspoon = tsp**

**Each row represents an equivalent volume (e.g., 1 gallon = 128 fl oz)**

1 gallon	4 quarts	8 pints	16 cups	128 fl oz	256 T	768 tsp
	1 quart	2 pints	4 cups	32 fl oz	64 T	192 tsp
		1 pint	2 cups	16 fl oz	32 T	96 tsp
			1 cup	8 fl oz	16 T	48 tsp
				1 fl oz	2 T	6 tsp
					1 T	3 tsp

**Each row represents an equivalent weight**

1 pound	16 ounces
---------	-----------

.....

**APOTHECARY SYSTEM**

.....

**CONVERSIONS BETWEEN AND WITHIN  
MEASUREMENT SYSTEMS**

.....



## MATH PRACTICE

The apothecary system is an older, less frequently used, system of measurement. The most common units in this system are:

1 grain	65 mg
1 dram	5 mL

.....

Household Measurement	Metric Measurement
1 oz	30 g
1 lb	454 g
2.2 lb	1 kg
1 tsp	5 mL
1 T	15 mL
1 fl oz	30 mL
1 cup (8 fl oz)	240 mL
1 pint (16 fl oz)	480 mL
1 quart (32 fl oz)	960 mL

When converting between metric units align your units from biggest to smallest.

kg	g	mg	mcg
----	---	----	-----

When you move from a unit that is bigger (kg) to smaller (g), you will always move the decimal point to the right. When you move from a unit that is smaller (g) to bigger (kg), you will move the decimal point to the left. In the chart above, each unit is separated by three decimal places. To convert from kg to g, move the decimal point to the right three places. To convert from mcg to g, move the decimal point to the left six places.

Example: Convert 5 kg into mg: Look at the chart—mg is 2 blocks to the right of kg, which means we will move our decimal point 6 places to the right: 5 kg = 5,000,000 mg.

.....

**ROMAN NUMERALS**

.....

**MILITARY TIME**

.....

## MATH PRACTICE

Roman Numeral	Value	Roman Numeral	Value	Roman Numeral	Value
I	1	VI	6	XX	20
II	2	VII	7	L	50
III	3	VIII	8	C	100
IV	4	IX	9	D	500
V	5	X	10	M	1,000

Three main rules for Roman numerals:

1. A letter repeated once or twice is added that many times, but never more than 3 (XXX = 30, MM = 2,000).
2. When a letter placed after another letter is smaller than the previous letter, the two are added together (VII = 7, XI = 11, LV = 55).
3. When a letter placed before another letter is smaller than the following letter, the value of the first letter is subtracted from the value of the second letter (IV = 4, IX = 9, XL = 40).

.....

**Military time is used frequently in the hospital system for calculation of administration times.**

Standard Time	Military Time	Standard Time	Military Time	Standard Time	Military Time
1:00 A.M.	0100 hours	9:00 A.M.	0900 hours	5:00 P.M.	1700 hours
2:00 A.M.	0200 hours	10:00 A.M.	1000 hours	6:00 P.M.	1800 hours
3:00 A.M.	0300 hours	11:00 A.M.	1100 hours	7:00 P.M.	1900 hours
4:00 A.M.	0400 hours	12:00 P.M.	1200 hours	8:00 P.M.	2000 hours
5:00 A.M.	0500 hours	1:00 P.M.	1300 hours	9:00 P.M.	2100 hours
6:00 A.M.	0600 hours	2:00 P.M.	1400 hours	10:00 P.M.	2200 hours
7:00 A.M.	0700 hours	3:00 P.M.	1500 hours	11:00 P.M.	2300 hours
8:00 A.M.	0800 hours	4:00 P.M.	1600 hours	12:00 A.M.	0000 hours

.....

**DOSAGE CALCULATION EXAMPLE**

.....

**DAY SUPPLY**

.....

## MATH PRACTICE

One way to solve dosage calculations is to use the **ratio-proportion** method to calculate the amount of medication to give. This method requires two ratios that are set to an equal proportion.

- Example: A patient needs to take a 250 mg dose of a medication, and the pharmacy stocks 125 mg/5 mL. How much volume should be dispensed?

Start with what you are looking for and make this your  $x$ . We are looking for volume, which in this case equals mL. Now put this unknown over your dose—we are trying to find the volume that goes with the dose that was ordered.

$$\frac{x \text{ mL}}{250 \text{ mg}}$$

We now have our first ratio, and we can set it equal to our second ratio, which is the stock concentration of the drug, 125 mg/5 mL. It is important that the same units are in the numerator (top of the ratio) and in the denominator (bottom of the ratio).

$$\frac{x \text{ mL}}{250 \text{ mg}} = \frac{5 \text{ mL}}{125 \text{ mg}}$$

To solve, we simply cross-multiply and divide. To do this, multiply the two diagonal values from the  $x$  (250 and 5) and then divide by the last value (125):

$$(250) \times (5) \div (125) = 10 \text{ mL or 2 teaspoons dose}$$

.....

The number of days a medication should last when used correctly is important to determine for insurance purposes and refill restrictions.

Steps to solve:

1. First, determine how much will be taken in one day.
  - a. Calculate this step by multiplying the dose by the frequency of administration.
2. Next, divide the total quantity being dispensed by the amount taken in one day.

Example: Take 1 tab PO TID dispense #30

Step 1. Determine how much in one day:  $1 \text{ tab} \times 3 = 3 \text{ tabs}$

Step 2. Divide the quantity dispensed by the amount taken in one day:  
 $30 \div 3 = 10$

This prescription is a 10-day supply.

.....

**PERCENT ERROR**

.....

**UNITS**

.....

## MATH PRACTICE

Used in compounding to determine the amount of error when a substance may have been weighed or measured inaccurately.

Calculated as follows:

Step 1. Calculate the amount of error by subtracting the two values (ignore if a negative number results).

Step 2. Divide this amount by the exact value, or the value expected to be obtained.

Step 3. Convert this to a percentage by multiplying this decimal by 100 or moving the decimal place two places to the right.

Example: You are to dispense 500 mg of a powder. The first measurement taken is 500 mg, but when a more accurate balance is used, you determine the measurement to be 505 mg. What is the percentage of error?

Step 1. Find the amount of error =  $505 - 500 = 5$

Step 2. Divide this by the exact value (500) =  $5 \div 500 = 0.01$

Step 3. Convert to percent by multiplying by 100 =  $0.01 \times 100 = 1\%$  error

.....

Examples of medications measured in units:

- insulin
- heparin
- penicillin

**Insulin is always 100 units in 1 mL and generally comes in a 10 mL vial.**

Calculations are completed in the same manner.

Example: If a patient requires 35 units of insulin, how many mL will be injected?

Set up the ratio. We are looking for mL, so that is our x.

$$\frac{x \text{ mL}}{35 \text{ units}} = \frac{1 \text{ mL}}{100 \text{ units}}$$

Cross-multiply and divide:  $(35)(1) \div 100 = 0.35$  mL to be injected

.....

**MILLIEQUIVALENTS (mEq)**

.....

**CONCENTRATIONS AND DILUTIONS**

.....



## MATH PRACTICE

Units used to measure electrolytes—the strength of an ion in a medication

Examples of medications measured in milliequivalents:

- potassium chloride
- sodium
- phosphate

Calculations are completed in the same manner.

Example: If a patient is to get 25 mEq of potassium, and the pharmacy stocks a 40 mEq/mL vial, how much should be injected into the patient?

$$\frac{x \text{ mL}}{25 \text{ mEq}} = \frac{1 \text{ mL}}{40 \text{ mEq}}$$

Cross-multiply and divide:  $(25)(1) \div 40 = 0.625$  mL to be injected

.....

A concentrate is a drug that must be diluted prior to administration. A diluent is an inactive substance added to the concentrate to lower the concentration of the final solution.

To calculate, use a simple formula:  $C_1V_1 = C_2V_2$

$C_1$  = the concentration of the stock

$V_1$  = the volume of the stock used

$C_2$  = the concentration of the final product

$V_2$  = the volume of the final product

Example: You are making 1 L of a 0.7% solution. You have a stock of 15% solution to use. How much stock will you need to make this product?

$C_1$  = the concentration of the stock = 15%

$V_1$  = the volume of the stock used = x

$C_2$  = the concentration of the final product = 0.7%

$V_2$  = the volume of the final product = 1,000 mL

Multiply the two known values and divide by the remaining value to solve for the unknown.

$(0.7)(1,000) \div 15 = 46.7$  mL of stock

To determine the amount of diluent you will need, simply subtract this value from the final volume:

$1,000 \text{ mL} - 46.7 \text{ mL} = 953.3$  mL of diluent

.....

**TEMPERATURE CONVERSIONS**

.....

**PERCENT STRENGTH**

.....

## MATH PRACTICE

When converting from Celsius temperature to Fahrenheit, use the following formula:

$$^{\circ}\text{F} = (1.8 \times ^{\circ}\text{C}) + 32$$

When converting from Fahrenheit temperature to Celsius, use the following formula:

$$^{\circ}\text{C} = \frac{^{\circ}\text{F} - 32}{1.8}$$

.....

The concentration of a drug or active ingredient (**solute**) dissolved in a vehicle (solvent) expressed as a fraction, ratio, or percentage.

Example: A 5% solution can be written as 5/100, 5:100 or 0.05.

.....

**ALLIGATIONS**



## MATH PRACTICE

Alligations are used when a prescriber orders a medication in a strength that the pharmacy does not have, and the pharmacy must compound the order from two stocks—one of higher strength and one of lower strength than the desired concentration.

Example: Make 200 mL of a 5% solution using 2.5% and 10% stock solutions. How much of each will you need?

Start with a tic-tac-toe.

10		
	5	
2.5		

Place the highest concentration (10) in the upper left square, the desired concentration (5) in the middle square, and the lowest concentration (2.5) in the lower left square, keeping the values in their percentage form.

10		2.5
	5	
2.5		5

Next, subtract the center number from the upper left value (10 – 5) and place this value in the lower right square. Then subtract the lower left square from the center (5 – 2.5), and place this value in the upper right square.

2.5		2.5
	5	
2.5		5

Next, add the upper and lower right (2.5 + 5) corners to determine total parts.  
2.5 + 5 = 7.5 total parts

To determine how much of each strength, read across from the percentage:

For the 10%: read across to 2.5, so there are 2.5 parts out of 7.5 total.

To determine what quantity of the total volume this is, set up a ratio-proportion:

$$\frac{x \text{ mL}}{200 \text{ mL}} = \frac{2.5}{7.5} = 66.7 \text{ mL}$$

Do the same process for the 2.5% stock solution. Read across to the 5 = 5 parts out of 7.5 total. To determine what quantity of the total volume this is, set up a ratio-proportion:

$$\frac{x \text{ mL}}{200 \text{ mL}} = \frac{5}{7.5} = 133.3 \text{ mL}$$

.....

**WEIGHT/WEIGHT (W/W)**

.....

**WEIGHT/VOLUME (W/V)**

.....

**VOLUME/VOLUME (V/V)**

## MATH PRACTICE

The number of grams of a drug in 100 g of final product.

Example: A 2.5% cream has 2.5 g of drug in 100 g of product.

We can use this ratio to determine how much active ingredient would be in a given quantity.

Example: How much active ingredient is in a 45 g tube of 2.5% cream?

Remember: 2.5% w/w = 2.5 g/100 g

$$\frac{x \text{ g}}{45 \text{ g}} = \frac{2.5 \text{ g}}{100 \text{ g}}$$

Cross-multiply and divide:  $(45)(2.5) \div 100 = 1.125$  g of drug in a 45 g tube of 2.5% w/w cream

.....

The number of grams of a drug in 100 mL of final product.

Example: A 2.5% solution has 2.5 g of drug in 100 mL of product.

We can use this ratio to determine how much active ingredient would be in a given quantity.

Example: How many grams of active ingredient are in 500 mL of a 23% solution?

Remember: 23% w/v = 23 g/100 mL

$$\frac{x \text{ g}}{500 \text{ g}} = \frac{23 \text{ g}}{100 \text{ mL}}$$

Cross-multiply and divide:  $(500)(23) \div 100 = 115$  g of drug in 500 mL of 23% w/v solution

.....

The number of milliliters of a drug in 100 mL of final product.

Example: A 2.5% solution has 2.5 mL of drug in 100 mL of solution.

We can use this ratio to determine how much active ingredient would be in a given quantity.

Example: How many milliliters of IPA are in 250 mL of a 70% solution?

Remember: 70% v/v = 70 mL/100 mL

$$\frac{x \text{ mL}}{250 \text{ g}} = \frac{70 \text{ mL}}{100 \text{ mL}}$$

Cross-multiply and divide:  $(250)(70) \div 100 = 175$  mL of IPA in 250 mL of 70% v/v solution

**IV FLOW RATES**

.....

**IV DRIP RATES**

.....



## MATH PRACTICE

IV flow rates are based on a measured amount given per unit of time. To calculate, the volume of the infusion and the amount of time of the infusion must be known. Simply divide the volume by the infusion time to determine the rate:

$$\frac{\text{Volume of infusion}}{\text{Infusion time}} = \text{infusion rate}$$

Example: If a 1,500 mL IV is infused over 5 hours, what is the infusion rate?

$$\frac{1,500 \text{ mL}}{5 \text{ hours}} = 300 \text{ mL/hr}$$

To calculate the time of infusion when the rate and volume are known, simply take the volume of the infusion and divide it by the rate:

$$\frac{\text{Volume of infusion}}{\text{Infusion rate}} = \text{infusion time}$$

Example: If a 1,500 mL IV is infused at a rate of 300 mL/hr, what is the time of infusion?

$$\frac{1,500 \text{ mL}}{300 \text{ mL/hr}} = 5 \text{ hours}$$

.....

Drip rates are calculated in drops per minute. There are different **drop factors** that each IV set will be labeled with. Some examples are 15 gtt/mL or 20 gtt/mL, and a microdrip comes as 60 gtt/mL.

To calculate gtt/min:

$$\frac{(\text{Total volume}) \times (\text{drop factor})}{\text{Total minutes}}$$

Example: If a patient has a 500 mL order for 4 hours and a drop factor of 20 gtt/mL, what is the drip rate?

First, convert hours to minutes: 4 hours  $\times$  60 minutes = 240 minutes.

$$(500)(20) \div 240 \text{ min} = 4 \text{ gtt/min}$$

.....

**BUSINESS MATH**



## MATH PRACTICE

### **Discount: a reduced price**

To calculate: purchase price  $\times$  discount rate (percent as a decimal) = discount

Purchase price – discount = new discounted price

Example: Discount = 25%, purchase price = \$100,  $\$100 \times 0.25 = \$25$

$\$100 - \$25 = \$75 =$  **new discounted price**

### **Markup: the difference between the selling price and the purchase price**

To calculate: Find difference between selling price and purchase price.

To calculate the markup rate, divide the markup by the purchase price (cost) and multiply by 100 to get a percent.

Example: Purchase price = \$10, selling price = \$22, difference =  $22 - 10 =$  **\$12 = markup**

Markup rate =  $12 \div 10 \times 100 =$  **120% markup rate**

**Overhead: the sum of all expenses of running a pharmacy, including utilities, drugs, salaries, and so on.**

.....

**MEDICATION ORDER**

.....

**ADMISSION ORDER**

.....

**STAT ORDER**

## MEDICATION ORDER ENTRY AND FILL PROCESS

An order written by a prescriber for a patient in a hospital or other inpatient setting.

.....

A type of medication order written by a physician if a patient should be admitted into the hospital; this order is sometimes written when a patient has visited the emergency room and, after a physician's assessment, it is decided he or she should be admitted into the facility.

Will contain:

- drugs the patient is currently taking
- drugs the patient should continue taking
- new medications the physician has ordered for the patient
- lab tests ordered, and any results obtained while in the ER
- suspected diagnosis
- any allergies
- weight and height of patient (for dosing)
- medical record number
- room number

.....

A type of medication order sent to the pharmacy that must be filled immediately.

**DISCHARGE ORDER**

.....

**PRN ORDER**

.....

**UNIT DOSE**

## MEDICATION ORDER ENTRY AND FILL PROCESS

A medication order that gives instructions for a patient who is being discharged from the hospital; it should include all at-home information and prescription instructions for the patient until follow-up with a primary care physician can occur.

.....

A medication order given on an "as needed" basis for specific signs and symptoms exhibited by a patient; some examples of symptoms requiring a PRN medication could be:

- fever
  - pain
  - anxiety or restlessness
  - itching
  - coughing
  - sneezing
- .....

A drug used in a hospital or other inpatient setting that is prepackaged from bulk for a single administration for one patient.

Benefits of unit dose are:

- easy for nurse dispensing to patients
- cuts down on medication errors (each unit dose may be bar-coded)
- less waste of medication

**UNIT DOSE LABELS**

.....

**FLOOR STOCK**

.....

**AUTOMATED DISPENSING CABINETS**



## MEDICATION ORDER ENTRY AND FILL PROCESS

To be repackaged from bulk, the labeling of unit doses must contain specific information:

- drug name (generic or brand)
- strength of medication
- name of original manufacturer
- original lot number and expiration date of manufacturer (for tracking in the event of a recall)
- bar code
- facility expiration date—cannot exceed date given by manufacturer

.....

Drugs that are stored on each unit of the hospital that are frequently prescribed for that unit; most floor stocks are stored in automated dispensing cabinets.

.....

A secure storage device that contains medications used by specific patient care units; access is limited to authorized individuals who have patient orders that need to be filled.

Examples of ADCs:

- Pyxis® (Cardinal Health)
- AcuDose-Rx® (McKesson)
- Omnicell®
- Rx-Station® (Cerner)
- Med Select® (Amerisource Bergen)

**PRESCRIPTION**

.....

**INSCRIPTION**

.....

**SIGNA**

## MEDICATION ORDER ENTRY AND FILL PROCESS

An order written for a patient by a licensed practitioner to be filled by a pharmacist.

Parts of the prescription:

- inscription
  - signa
  - subscription
  - superscription
- .....

Part of the prescription that includes the name and strength of the medication prescribed and the amount to be dispensed.

Example: Lipitor (atorvastatin) 10 mg #30

.....

Also known as the sig; directions to the patient.

Example: Take 1 tablet by mouth daily

**SUBSCRIPTION**

.....

**SUPERSSCRIPTION**

.....

**DISPENSE AS WRITTEN (DAW)**

## MEDICATION ORDER ENTRY AND FILL PROCESS

Part of the prescription that includes directions to the pharmacist for dispensing the medication.

Example: Number of refills permitted

.....

Part of the prescription that includes the information at the top: the patient's name and address, date of birth, date the prescription was written, and Rx symbol.

.....

A part of a prescription that when checked indicates that the generic of a drug must *not* be dispensed; brand name is required.

**DAW CODES**

.....

**PATIENT PROFILE**

.....

## MEDICATION ORDER ENTRY AND FILL PROCESS

Submitted to the insurance company to determine if the proper brand name or generic medication is being dispensed.

DAW Code	Meaning
DAW 0	Default used when dispensing a generic drug or when dispensing a brand name product that does not have a generic available
DAW 1	<i>Prescriber</i> indicates dispense as written
DAW 2	<i>Patient</i> requests brand name product
DAW 3	<i>Pharmacist</i> requests brand name product be dispensed
DAW 4	Generic is not in stock, so the brand name product must be dispensed
DAW 5	Brand dispensed but priced as generic
DAW 6	Brand name is necessary: used for <b>prior authorization</b> cases
DAW 7	Substitution not allowed; brand mandated by law
DAW 8	Generic is not currently available: either not being manufactured or not being distributed
DAW 9	Other

.....  
A database of information stored in a pharmacy system for each patient; should be continually updated by the pharmacy technician.

Contains the following information:

- name
  - address
  - phone number
  - birth date
  - gender
  - allergy information
  - medical information (preexisting conditions or diagnoses)
  - insurance information
  - prescriptions filled
  - preference for child-resistant containers
  - may contain other preferences, such as generic substitution or large-print labels
- .....

**ALLERGIES**

.....

**AUXILIARY LABEL**

.....

**PRESCRIPTION CONTAINER LABEL**



## MEDICATION ORDER ENTRY AND FILL PROCESS

Hypersensitivity of the immune system that may begin immediately after taking a medication or take weeks to show symptoms.

Examples of allergy indicators:

- rash
- watery eyes
- swelling
- itching
- wheezing

More severe allergic reactions can result in **anaphylaxis**, which leads to swelling of the airways and difficulty breathing; can lead to death if not immediately treated.

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Bright, colorful label placed on a bottle label to provide information in addition to what is on the bottle label; alerts patients to specific information to which careful attention should be paid.

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Label should be affixed to the medication container and match the prescription exactly. Specific information is required to be printed on the label, including:

- pharmacy name, address, and telephone number
- patient's name
- date prescription was filled
- prescriber's name
- prescription Rx number (unique to pharmacy)
- medication name and strength
- directions for use
- quantity of medication (if controlled, should be spelled out)
- expiration date
- refills allowed (if any)
- initials of pharmacist dispensing prescription

**COUNTING TRAY**

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**TABLET SPLITTER**

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**SCORED TABLETS**

## MEDICATION ORDER ENTRY AND FILL PROCESS

A device used to count tablets, capsules, or other solid oral medications and transfer these dosage forms from the stock bottle to the patient's medication bottle.

- A spatula is used to count in quantities of **five**.
- A tray should be cleaned with 70% IPA after medications with a powdery residue to prevent cross-contamination of medications.
- Pharmacies may have separate trays for counting penicillin derivatives and chemotherapy agents.

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A device used to split tablets in half.

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Tablets that have a line or crevice to make splitting easier.

**FILL PROCESS**



## MEDICATION ORDER ENTRY AND FILL PROCESS

Process of filling prescriptions for patients in an outpatient setting:

1. Obtain prescription from the patient.
  - a. if new patient, add her or him into the system
  - b. if current patient, update profile with current information
2. Enter prescription information into the computer.
3. Obtain a prescription label and compare it to the original prescription to check accuracy.
4. Pull the appropriate medication from the shelf using the NDC number to confirm the correct medication was selected.
5. If medication is capsules or tablets, a counting tray will be used, and then they will be poured into an amber vial.
6. If medication is a liquid, an appropriately sized bottle should be used to pour the liquid to the proper level.
7. After proper filling, the prescription label is then affixed to the medication container.
8. The prescription must then be checked by a pharmacist for **final verification** or the **final check** before being dispensed to the patient
9. If the patient is coming back to pick up the prescription later, the medication will be filed alphabetically in a specific area of the pharmacy.
10. If the patient is waiting, the pharmacy technician can ask the patient whether he or she has any questions for the pharmacist and whether counseling is required.

**Remember: A pharmacy technician must never counsel patients.**

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**REFILLS**

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**UNIT-OF-USE**

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**EXPIRATION DATE**

## MEDICATION ORDER ENTRY AND FILL PROCESS

Refills can be easily handled by a technician when a patient calls in and refills remain on the patient profile for that medication.

Some situations require more attention:

- Early refill
  - Dosage may have changed or patient may be requiring a vacation fill—insurance company may need to be contacted
- No refills
  - A patient may be out of refills and the physician must be called for a refill authorization request
  - The prescription may be older than 12 months
- Controlled substance
  - C-II cannot be refilled
  - C-III and C-IV can only be refilled five times within a 6-month period

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Packaging provided by the manufacturer in the most commonly-dispensed unit.

Examples:

- a package of 30 tablets of a medication taken every day
- a monthly pack of birth control
- a four-pack of a medication taken once a week for one month

Pharmacy technicians can place the label directly on these packages and help minimize the case of medication errors and counting mistakes.

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The date at which a drug is no longer effective or safe to use.

**PATIENT PACKAGE INSERT**

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**MEDICATION GUIDE**

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**INSTITUTE FOR SAFE MEDICATION PRACTICES (ISMP)**



## MEDICATION SAFETY

Required by the FDA for all medications dispensed; provides information about the drug for the patient, including:

- how the drug works
- what to do if a dose is missed
- contraindications
- warnings
- side effects
- overdose information
- dosages and packing information
- indications and use

.....

Supplemental information required by the FDA to be included in addition to the patient package insert for specific drugs.

Examples of some medications requiring a **MedGuide** are:

- Accutane
- antidepressants
- birth control
- NSAIDs
- medications for ADD including Adderall®, Concerta®, Ritalin®, and Strattera®

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An organization whose mission is to investigate medication errors and help provide error-reduction strategies to the medical community.

Has created:

- Medication Errors Reporting Program (MERP)—a voluntary reporting program
- list of unsafe abbreviations
- list of look-alike/sound-alike drugs to be dispensed carefully

**LOOK-ALIKE/SOUND-ALIKE (LASA)**

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**TALL MAN LETTERING**

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**HIGH-ALERT MEDICATIONS**

## MEDICATION SAFETY

A list of medications developed by the ISMP that have the potential to be confused with other drugs.

An example of some are in the table that follows, the rest can be found at <http://www.ismp.org/tools/confuseddrugnames.pdf>.

Drug Name	Confused Drug Name
Celexa®	Celebrex®
Lamisil®	Lamictal®
Novolog®	Humalog®
Paxil®	Plavix®
Prednisone	Prednisolone
Tramadol®	Trazodone®
Viagra®	Allegra®
Xanax®	Zantac®

.....

Lettering used to help distinguish drug names that may otherwise be confused.

Example: **SERO**quel® and **SINE**quan®

For a complete list, visit <http://www.ismp.org/tools/confuseddrugnames.pdf>.

.....

Medications that if used in error carry a greater risk of causing patient harm.

The ISMP created a list of medications considered high risk. This can be found at <http://www.ismp.org/tools/highalertmedications.pdf>.

**ERROR-PRONE ABBREVIATIONS**

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**LEADING ZERO**

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**TRAILING ZERO**

## MEDICATION SAFETY

The ISMP has created a list of abbreviations that are frequently misinterpreted. The use of these abbreviations should be limited, and if a technician encounters one in practice, he or she should always verify the correct meaning.

Abbreviation	Meaning	Mistaken for
QOD	Every other day	QD (once daily), QID (four times daily)
AD, AS, AU	Right ear, left ear, each ear	OD, OS, OU (right eye, left eye, each eye)
U or u	Unit	The number 0 or 4
MgSO <sub>4</sub>	Magnesium sulfate	MSO <sub>4</sub> (morphine sulfate)
BT	Bedtime	BID (twice daily)

For a complete list, visit <http://www.ismp.org/tools/errorproneabbreviations.pdf>.

.....

The zero placed before the decimal point: **0.7**

A leading zero is required and should always be included in dosing.

.....

The zero placed after or to the right of the decimal point: **7.0**

A trailing zero is unnecessary and, if misinterpreted, could cause a tenfold increase in a medication to be incorrectly dispensed.

**PATIENT IDENTIFIER**

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**MEDICATION ERROR**

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**PHARMACIST INTERVENTION**

## MEDICATION SAFETY

Anything that can identify the patient when administering his or her medication.

Examples include:

- name
  - identification number
  - telephone number
  - date of birth
  - social security number
  - address
- .....

Any preventable event that may cause or lead to inappropriate medication use or patient harm.

Can be broken down into different types of errors:

- **Omissions Error**—a prescribed dose is due to be given but not administered
  - **Wrong Time Error**—a prescribed dose is given out of the designated range of the hospital time guidelines
  - **Wrong Dose Error**—a dose is given above or below the prescribed dose
- .....

Some issues require the decision making and clinical knowledge of a pharmacist. The following should be done by a pharmacist and never a technician:

- counseling a patient
- OTC product recommendation
- therapeutic substitution
- discussing with patients what to do in the event of a missed dose or misuse of the medication
- final verification of medications

**SYSTEMIC EFFECT**

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**LOCALIZED EFFECT**

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**ROUTE OF ADMINISTRATION**



An effect of a drug that involves the entire body; for example, a blood pressure lowering agent.

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An effect of a drug that involves a specific part of the body only; for example, using a numbing agent on an injured area.

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The way by which a drug enters into the body; selected based on several factors, including:

- speed of onset required
- patient status (for example, ability to swallow a tablet)
- drug's absorption characteristics

**ORAL (PO)**

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**TABLET**

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**CAPLET**

## PHARMACOLOGY—DOSAGE FORMS

Most common route of administration—giving a medication by mouth.

- least expensive and most convenient route
- not the quickest method because medication must be absorbed into the bloodstream from the GI tract
- achieves best rates of patient's compliance to drug therapy

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A solid dosage form made by compression.

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A solid tablet dosage form shaped like a capsule; can assist in easier swallowing of large tablets.

**CHEWABLE TABLET**

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**DELAYED RELEASE (DR)**

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**ENTERIC COATED (EC)**

## PHARMACOLOGY—DOSAGE FORMS

A tablet that is to be chewed and swallowed, not swallowed whole; ideal for children and patients who have difficulty swallowing tablets; has a faster onset of action than regular tablets.

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Tablets that are specially coated and designed to delay absorption and dissolving until after the drug has bypassed the stomach.

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A tablet that is specially coated to aid in swallowing and to bypass the stomach so that it will not dissolve until it reaches the small intestine; designed for medications that may be harsh on the stomach (aspirin).

**EXTENDED RELEASE (XR, XL)**

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**CONTROLLED RELEASE (CR)**

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**SUSTAINED RELEASE (SR)**

## PHARMACOLOGY—DOSAGE FORMS

A type of medication that allows a reduced frequency in dosing.

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A type of extended-release formulation that delivers the drug at a certain rate for a specific period of time.

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A type of extended-release formulation that releases the medication slowly over a specific period of time.

**CAPSULE**

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**SOLUTION**

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**SOLUTE**



A container, usually made of gelatin, that contains a medication to be dissolved in the GI tract; easier to swallow than a tablet and generally has a slightly faster onset of action.

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A liquid in which the active ingredient is completely dissolved.

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The part of the solution that is dissolved in the liquid, that is, the active ingredient.

**SOLVENT**

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**ELIXIR**

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**SYRUP**

## PHARMACOLOGY—DOSAGE FORMS

The part of the solution that is composed of the liquid portion; the liquid that does the dissolving (water when mixed with Kool-Aid).

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A liquid dosage form that is sweetened and usually contains alcohol.

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A thick solution made with water and a large amount of sugar.

**SUSPENSION**

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**EMULSION**

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**LOZENGE/TROCHE**

## PHARMACOLOGY—DOSAGE FORMS

A liquid dosage form that is composed of undissolved particles of active ingredient suspended in a liquid; patients must be told to shake well when given a suspension.

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A mixture of two substances that normally would not mix together; must be shaken well prior to use.

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A solid oral dosage form that usually has localized effects; proper use is to suck or chew lozenges (for example, troches for thrush treatment, and nicotine gum).

**OINTMENT**

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**PASTE**

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**CREAM**

## PHARMACOLOGY—DOSAGE FORMS

Topical dosage form that contains more oil than water and tends to have a greasy or oily feel; a water-in-oil preparation (W/O): Neosporin®.

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Topical dosage form similar to an ointment, but it creates a heavier consistency, and thus the application is thicker than an ointment or cream: sunscreen.

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Topical dosage form that contains more water than oil; an oil-in-water preparation (O/W): hydrocortisone cream for itching.

**LOTION**

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**TRANSDERMAL PATCH**

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**INTRAUTERINE DEVICE (IUD)**



## PHARMACOLOGY—DOSAGE FORMS

Topical dosage form composed of an oil-in-water base and thinner in a consistency lighter than cream, which helps them to absorb faster and be lighter on the skin: OTC moisturizers.

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Topical dosage form designed to deliver a drug enclosed within a patch to the body through skin absorption: Nitroglycerin (angina) and Duragesic® (pain—C-II).

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Small device inserted into the uterus to prevent pregnancy; effective means of birth control for several years.

**ANTIBIOTICS**

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**BROAD SPECTRUM**

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**PENICILLIN**

## PHARMACOLOGY—DRUG CLASSES

Drugs used to kill or inhibit growth of certain types of bacteria.

Two types:

- bacteriostatic—an antibiotic that inhibits the growth of bacteria
- bactericidal—an antibiotic that kills bacteria

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Antibiotics that are effective against a wide variety of bacteria, and effectiveness is not limited to one specific type of bacteria (gram positive or gram negative).

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<b>Drug Class</b>	<b>Penicillin</b>
<b>Mechanism of Action</b>	Prevents bacteria from forming cell wall
<b>Indication</b>	Otitis media, strep throat, respiratory infections, gonorrhea, and syphilis
<b>Side Effects</b>	Diarrhea (most common), allergy in approximately 10% of the population
<b>Examples</b>	<ul style="list-style-type: none"><li>• penicillin</li><li>• amoxicillin</li><li>• ampicillin</li></ul>
<b>Hint</b>	- <i>cillin</i> ending for penicillins

**CEPHALOSPORIN**

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**SULFONAMIDES**

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**TETRACYCLINES**

## PHARMACOLOGY—DRUG CLASSES

<b>Drug Class</b>	<b>Cephalosporin</b>
<b>Mechanism of Action</b>	Prevents bacteria from forming cell wall (similar to penicillin)
<b>Indication</b>	Upper respiratory infections, sinus infections, pneumonia
<b>Side Effects</b>	Diarrhea, 1% chance of cross allergies if allergic to penicillin
<b>Examples</b>	<ul style="list-style-type: none"> <li>• cephalexin (Keflex<sup>®</sup>)</li> <li>• cefdinir (Omnicef<sup>®</sup>)</li> </ul>
<b>Hint</b>	<i>cef/ceph-</i> beginning for cephalosporins

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<b>Drug Class</b>	<b>Sulfonamides</b>
<b>Mechanism of Action</b>	Disrupts the pathway for producing folic acid in bacteria
<b>Indication</b>	UTIs, otitis media
<b>Side Effects</b>	Rash, photosensitivity
<b>Examples</b>	<ul style="list-style-type: none"> <li>• sulfasalazine</li> <li>• sulfamethoxazole with trimethoprim (Bactrim<sup>®</sup>)</li> </ul>
<b>Hint</b>	<i>sulfa-</i> beginning for sulfonamides
<b>Special Considerations</b>	Can cause Stevens-Johnson syndrome, a potentially fatal reaction marked by large red blotches of the skin; should take with plenty of water to avoid crystallization in urine

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<b>Drug Class</b>	<b>Tetracyclines</b>
<b>Mechanism of Action</b>	Inhibits protein synthesis in bacteria
<b>Indication</b>	Acne, chronic bronchitis, walking pneumonia, Lyme disease
<b>Side Effects</b>	Rash, photosensitivity
<b>Examples</b>	<ul style="list-style-type: none"> <li>• doxycycline hyclate (Vibramycin<sup>®</sup>)</li> <li>• tetracycline (Sumycin<sup>®</sup>)</li> <li>• minocycline (Minocin<sup>®</sup>)</li> </ul>
<b>Hint</b>	<i>-cycline</i> ending for tetracyclines
<b>Special Considerations</b>	Antacids interfere with absorption and will render medication ineffective when taken concurrently; should not be given to children or pregnant women; taking expired tetracycline can cause a fatal renal disease

**MACROLIDES**

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**FLUOROQUINOLONES**

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## PHARMACOLOGY—DRUG CLASSES

<b>Drug Class</b>	<b>Macrolides</b>
<b>Mechanism of Action</b>	Inhibits protein synthesis in bacteria
<b>Indication</b>	Respiratory infections, chlamydia
<b>Side Effects</b>	GI distress
<b>Examples</b>	<ul style="list-style-type: none"><li>• azithromycin (Z-Pak<sup>®</sup>)</li><li>• clarithromycin (Biaxin<sup>®</sup>)</li><li>• erythromycin (E-mycin<sup>®</sup>, Ery-Tab<sup>®</sup>)</li></ul>
<b>Hint</b>	- <i>mycin</i> ending for macrolides

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<b>Drug Class</b>	<b>Fluoroquinolones</b>
<b>Mechanism of Action</b>	Inhibits bacterial DNA replication, causing bacterial cell death
<b>Indication</b>	UTIs, upper respiratory infections, infectious diarrhea, bone/joint infections
<b>Side Effects</b>	Nausea/vomiting, dizziness
<b>Examples</b>	<ul style="list-style-type: none"><li>• ciprofloxacin (Cipro<sup>®</sup>)</li><li>• levofloxacin (Levaquin<sup>®</sup>)</li></ul>
<b>Hint</b>	- <i>floxacin</i> ending for fluoroquinolones
<b>Special Considerations</b>	Antacids interfere with absorption and will render medication ineffective when taken concurrently; should not be given to children or pregnant women

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**AMINOGLYCOSIDES**

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**VANCOMYCIN**

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## PHARMACOLOGY—DRUG CLASSES

<b>Drug Class</b>	<b>Aminoglycosides</b>
<b>Mechanism of Action</b>	Inhibits bacterial protein synthesis
<b>Indication</b>	Life-threatening infections
<b>Side Effects</b>	Nephrotoxicity and ototoxicity
<b>Examples</b>	<ul style="list-style-type: none"><li>• gentamicin (Garamycin®)</li><li>• amikacin (Amikin®)</li></ul>
<b>Special Considerations</b>	Doses are adjusted on a patient-specific basis and measured daily to ensure no toxicity is occurring

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<b>Drug Class</b>	<b>Vancomycin</b>
<b>Mechanism of Action</b>	Inhibits cell wall synthesis
<b>Indication</b>	Life-threatening infections, such as MRSA, <i>Clostridium difficile</i> ( <i>C. Diff</i> ), or endocarditis
<b>Side Effects</b>	Nephrotoxicity and ototoxicity
<b>Examples</b>	<ul style="list-style-type: none"><li>• Vancomycin HCl</li></ul>
<b>Special Considerations</b>	Doses are adjusted on a patient-specific basis and measured daily to ensure no toxicity is occurring (trough and peak measuring); if infused too quickly, patient will flush—known as red man syndrome

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**METRONIDAZOLE**

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**ANTIFUNGAL**

.....

**ANTIVIRAL**

## PHARMACOLOGY—DRUG CLASSES

<b>Drug Class</b>	<b>Metronidazole (Flagyl®)</b>
<b>Indication</b>	Bacterial infections caused by anaerobic bacteria, protozoa infections, gynecologic infections, and as part of a multidrug regimen for <i>H. Pylori</i>
<b>Special Considerations</b>	Patient must be counseled to <b>not drink alcohol</b> while taking this medication—if taken with alcohol, patient will develop severe nausea and vomiting

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<b>Drug Class</b>	<b>Antifungal</b>
<b>Mechanism of Action</b>	Kill fungal cells by exploiting key differences between fungal and human cells
<b>Indication</b>	Infections caused by fungus including athlete's foot, ringworm, oral candidiasis (thrush), and vaginal yeast infections
<b>Examples</b>	<ul style="list-style-type: none"> <li>• nystatin (Mycostatin®)</li> <li>• amphotericin B (Fungizone®)</li> <li>• clotrimazole (Lotrimin®)</li> </ul>
<b>Hint</b>	Many antifungal agents end in <i>-zole</i>

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<b>Drug Class</b>	<b>Antiviral</b>
<b>Mechanism of Action</b>	Inactivate enzymes needed for viral replication
<b>Indication</b>	Used to treat infections caused by viruses including herpes, hepatitis, and influenza
<b>Examples</b>	<ul style="list-style-type: none"> <li>• acyclovir (Zovirax®)</li> <li>• valacyclovir (Valtrex®)</li> <li>• famciclovir (Famvir®)</li> </ul>
<b>Hint</b>	Many antiviral agents end in <i>-vir</i>

**ANTIRETROVIRAL**

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**ANTIHISTAMINES**

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**ANTITUSSIVES**

## PHARMACOLOGY—DRUG CLASSES

<b>Drug Class</b>	<b>Antiretroviral</b>
<b>Indication</b>	Used to treat infections caused by HIV/AIDS
<b>Classes of Antiretrovirals</b>	<ul style="list-style-type: none"> <li>• Nucleoside Reverse Transcriptase Inhibitors (NRTIs)</li> <li>• Nonnucleoside Reverse Transcriptase Inhibitors (NNRTIs)</li> <li>• Protease Inhibitors (PIs)</li> <li>• Fusion Inhibitors</li> </ul>

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<b>Drug Class</b>	<b>Antihistamines</b>
<b>Mechanism of Action</b>	Block histamine from working on the H <sub>1</sub> in the respiratory system
<b>Indication</b>	Used to provide relief of allergy symptoms caused by the release of histamine
<b>Examples</b>	<ul style="list-style-type: none"> <li>• diphenhydramine (Benadryl®)</li> <li>• fexofenadine (Allegra®)</li> <li>• loratadine (Claritin®)</li> </ul>
<b>Special Considerations</b>	Can cause drowsiness and should not be taken by pregnant women (crosses placenta)

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<b>Drug Class</b>	<b>Antitussives</b>
<b>Mechanism of Action</b>	Suppression of the cough reflex in the brain or nerve receptors along the respiratory system
<b>Indication</b>	Used to provide relief of cough, especially dry or non-productive coughs
<b>Examples</b>	<ul style="list-style-type: none"> <li>• codeine</li> <li>• dextromethorphan (Delsym®)</li> <li>• benzonatate (Tessalon Perles®)</li> </ul>
<b>Special Considerations</b>	Codeine is a very effective antitussive agent, but is a controlled substance for its abuse potential

**DECONGESTANTS**

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**EXPECTORANTS**

.....

**ANTIDEPRESSANTS**

## PHARMACOLOGY—DRUG CLASSES

Drug Class	Decongestants
Mechanism of Action	Constrict the blood vessels in the nasal passages so mucous and fluid can drain and thus alleviate the feeling of stuffiness
Indication	Used to provide relief of nasal congestion from allergies, sinusitis, and the common cold
Examples	<ul style="list-style-type: none"> <li>pseudoephedrine (Sudafed<sup>®</sup>)</li> <li>phenylephrine (Sudafed PE<sup>®</sup>)</li> </ul>
Special Considerations	Can increase blood pressure and heart rate, so should be avoided in patients with hypertension; can cause CNS stimulation. Pseudoephedrine is regulated under the Combat Methamphetamine Act, and its sale is limited to a certain quantity per month.

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Drug Class	Expectorants
Mechanism of Action	Decrease thickness of mucous in lungs
Indication	Used to decrease thickness and break up fluid in the lungs so that a cough will become productive and allow the patient to expel mucous
Examples	<ul style="list-style-type: none"> <li>guaifenesin (Robitussin<sup>®</sup>, Mucinex<sup>®</sup>)</li> </ul>
Special Considerations	Drinking water helps rid the lungs of mucous naturally

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Drug Class	Antidepressants
Description of Condition	Depression is characterized by feelings of intense sadness, problems eating and sleeping, lack of self-worth, and pessimistic behavior and thoughts.
Indication	Used to treat depression
Classes of Antidepressants	<ul style="list-style-type: none"> <li>Selective Serotonin Reuptake Inhibitors (SSRIs)</li> <li>Serotonin and Norepinephrine Reuptake Inhibitors (SNRIs)</li> <li>Monoamine Oxidase Inhibitors (MAOIs)</li> <li>Tricyclic Antidepressants (TCAs)</li> </ul>
Special Considerations	Antidepressants have a delay of onset (usually 10–21 days) as the patient's neurotransmitters are modified from the medication, so these drugs should never be taken on an "as needed" basis; a <b>medication guide</b> must always be dispensed with all antidepressants.

**SELECTIVE SEROTONIN REUPTAKE INHIBITORS (SSRI)**

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**SEROTONIN NOREPINEPHRINE REUPTAKE  
INHIBITORS (SNRI)**

.....

**MONOAMINE OXIDASE INHIBITORS (MAOI)**



## PHARMACOLOGY—DRUG CLASSES

<b>Drug Class</b>	<b>Selective Serotonin Reuptake Inhibitors (SSRI)</b>
<b>Mechanism of Action</b>	Block the reuptake of serotonin, which increases serotonin levels in the brain
<b>Indication</b>	Used to treat depression and obsessive-compulsive disorders
<b>Examples</b>	<ul style="list-style-type: none"> <li>• citalopram (Celexa<sup>®</sup>)</li> <li>• escitalopram (Lexapro<sup>®</sup>)</li> <li>• fluoxetine (Prozac<sup>®</sup>)</li> <li>• paroxetine (Paxil<sup>®</sup>)</li> <li>• sertraline (Zoloft<sup>®</sup>)</li> </ul>
<b>Special Considerations</b>	Serotonin syndrome can occur if an SSRI is taken with another drug that increases serotonin levels in the brain—rare, but can be fatal

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<b>Drug Class</b>	<b>Serotonin Norepinephrine Reuptake Inhibitors (SNRI)</b>
<b>Mechanism of Action</b>	Block the reuptake of both serotonin and norepinephrine, which increases levels of both neurotransmitters in the brain
<b>Indication</b>	Used to treat depression and pain
<b>Examples</b>	<ul style="list-style-type: none"> <li>• duloxetine (Cymbalta<sup>®</sup>)</li> <li>• venlafaxine (Effexor<sup>®</sup>)</li> <li>• desvenlafaxine (Pristiq<sup>®</sup>)</li> </ul>
<b>Special Considerations</b>	Generally used in patients when SSRIs are not effective

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<b>Drug Class</b>	<b>Monoamine Oxidase Inhibitors (MAOI)</b>
<b>Mechanism of Action</b>	Block the enzyme that breaks down serotonin and norepinephrine
<b>Indication</b>	Used to treat depression
<b>Examples</b>	<ul style="list-style-type: none"> <li>• selegiline (Eldepryl<sup>®</sup>)</li> <li>• phenelzine (Nardil<sup>®</sup>)</li> </ul>
<b>Special Considerations</b>	Have many drug interactions: should not take with ephedrine, amphetamine, methylphenidate, levodopa, or meperidine; patients need to avoid aged cheeses and certain meats and vegetables; patients require a 2-week washout period after discontinuing medication before a new therapy begins.

**TRICYCLIC ANTIDEPRESSANT (TCA)**

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**ANTIANSIETY AGENTS**

.....

**BENZODIAZEPINES**

## PHARMACOLOGY—DRUG CLASSES

<b>Drug Class</b>	<b>Tricyclic Antidepressant (TCA)</b>
<b>Mechanism of Action</b>	Blocks the reuptake of serotonin or norepinephrine
<b>Indication</b>	Used to treat depression and bedwetting in children
<b>Examples</b>	<ul style="list-style-type: none"> <li>• amitriptyline (Elavil<sup>®</sup>)</li> <li>• doxepin (Sinequan<sup>®</sup>)</li> <li>• imipramine (Tofranil<sup>®</sup>)</li> </ul>
<b>Special Considerations</b>	Has even longer delay of onset—results may not show for weeks; anticholinergic side effects = urinary retention, dry mouth, constipation; cardiotoxic in higher doses and must be monitored

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<b>Drug Class</b>	<b>Antianxiety Agents</b>
<b>Description of Condition</b>	Anxiety is characterized by a state of uneasiness and apprehension about possible events
<b>Indication</b>	Used to treat anxiety resulting from either external events or internal neurological imbalance
<b>Examples of Antianxiety Agents</b>	<ul style="list-style-type: none"> <li>• benzodiazepines</li> <li>• buspirone (Buspar<sup>®</sup>)</li> </ul>
<b>Special Considerations</b>	Some antianxiety agents may cause dependence and are abused—many are controlled substances

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<b>Drug Class</b>	<b>Benzodiazepines</b>
<b>Mechanism of Action</b>	Enhance the effect of the neurotransmitter gamma amino butyric acid (GABA), which results in sedation and relaxing properties
<b>Indication</b>	Used to treat anxiety
<b>Examples</b>	<ul style="list-style-type: none"> <li>• alprazolam (Xanax<sup>®</sup>)</li> <li>• diazepam (Valium<sup>®</sup>)</li> <li>• lorazepam (Ativan<sup>®</sup>)</li> </ul>
<b>Special Considerations</b>	Are all schedule IV controlled substances; cause drowsiness and sedation
<b>Hint</b>	-am ending for benzodiazepines

**HYPNOTICS AND SEDATIVES**

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**ANTIPSYCHOTICS**

.....

**ANALGESICS**

## PHARMACOLOGY—DRUG CLASSES

<b>Drug Class</b>	<b>Hypnotics and Sedatives</b>
<b>Mechanism of Action</b>	Enhance the effect of the neurotransmitter GABA, which results in sedation
<b>Indication</b>	Used to treat insomnia and sleep disorders
<b>Examples</b>	<ul style="list-style-type: none"> <li>• eszopiclone (Lunesta<sup>®</sup>)</li> <li>• zaleplon (Sonata<sup>®</sup>)</li> <li>• zolpidem (Ambien<sup>®</sup>)</li> </ul>
<b>Special Considerations</b>	Work the same way as the benzodiazepines, but quicker and have a shorter half-life; benzodiazepines can also be used to treat sleep disorders, especially when insomnia is driven by anxiety-related issues

<b>Drug Class</b>	<b>Antipsychotics</b>
<b>Description of Condition</b>	Schizophrenia is a chronic psychiatric illness that may include delusions, hallucinations, and bizarre behavior
<b>Indication</b>	Used to treat schizophrenia
<b>Mechanism of Action</b>	Block dopamine receptors in the brain, which helps control emotions
<b>Examples of Antipsychotics</b>	<p><b>Atypical</b></p> <ul style="list-style-type: none"> <li>• aripiprazole (Abilify<sup>®</sup>)</li> <li>• clozapine (Clozaril<sup>®</sup>)</li> <li>• olanzapine (Zyprexa<sup>®</sup>)</li> <li>• quetiapine (Seroquel<sup>®</sup>)</li> <li>• risperidone (Risperdal<sup>®</sup>)</li> <li>• ziprasidone (Geodon<sup>®</sup>)</li> </ul> <p><b>Typical</b></p> <ul style="list-style-type: none"> <li>• prochlorperazine (Compazine<sup>®</sup>)</li> <li>• haloperidol (Haldol<sup>®</sup>)</li> </ul>
<b>Special Considerations</b>	Antipsychotics have very undesirable side effects, including tardive dyskinesia, which involves involuntary movements of the mouth, lips, and sometimes limbs; atypical antipsychotics are newer drugs that tend to have fewer side effects than typical antipsychotics.

Drugs that relieve pain; can be non-narcotic or narcotic (derived from opioid).

**NARCOTIC ANALGESIC**

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**NON-NARCOTIC ANALGESIC**

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**OPIOIDS**

## PHARMACOLOGY—DRUG CLASSES

<b>Drug Class</b>	<b>Narcotic Analgesic</b>
<b>Mechanism of Action</b>	Activate opiate receptors, which helps inhibit the pain pathway
<b>Indication</b>	Used to treat moderate to severe pain
<b>Examples</b>	<ul style="list-style-type: none"> <li>• fentanyl (Duragesic<sup>®</sup>)</li> <li>• hydromorphone (Dilaudid<sup>®</sup>)</li> <li>• meperidine (Demerol<sup>®</sup>)</li> <li>• morphine (Kadian<sup>®</sup>, Avinza<sup>®</sup>, MS Contin<sup>®</sup>, MSIR<sup>®</sup>)</li> <li>• oxycodone (Oxycontin<sup>®</sup>)</li> <li>• oxycodone with acetaminophen (Percocet<sup>®</sup>)</li> </ul>
<b>Special Considerations</b>	All are controlled substances and have high abuse potential

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<b>Drug Class</b>	<b>Non-Narcotic Analgesic</b>
<b>Indication</b>	Used to treat mild to moderate pain
<b>Examples</b>	<ul style="list-style-type: none"> <li>• non-steroidal anti-inflammatory drugs (NSAIDs)</li> <li>• cyclooxygenase-2 inhibitors (COX-2 inhibitors)</li> <li>• aspirin</li> <li>• acetaminophen (Tylenol<sup>®</sup>)</li> </ul>

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One of the oldest natural drugs; found in the poppy plant

- Produces a feeling of euphoria and is therefore useful in treating pain
- Can also be used for cough suppression
- Common side effects are constipation and nausea/vomiting

**ANTIPYRETICS**

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**ANTI-INFLAMMATORY**

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**NON-STEROIDAL ANTI-INFLAMMATORY DRUGS  
(NSAIDs)**



## PHARMACOLOGY—DRUG CLASSES

Medication that lowers a fever.

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Medication that decreases inflammation.

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<b>Drug Class</b>	<b>Non-Steroidal Anti-Inflammatory Drugs (NSAIDs)</b>
<b>Mechanism of Action</b>	Inhibit prostaglandin synthesis, which helps prevent inflammation from occurring
<b>Indication</b>	Used to lower inflammation and fever, and for mild to moderate pain relief
<b>Examples</b>	<ul style="list-style-type: none"><li>• ibuprofen (Advil<sup>®</sup>, Motrin<sup>®</sup>)</li><li>• naproxen (Aleve<sup>®</sup>, Naprosyn<sup>®</sup>)</li><li>• diclofenac (Voltaren<sup>®</sup>)</li><li>• ketorolac (Toradol<sup>®</sup>)</li><li>• indomethacin (Indocin<sup>®</sup>)</li></ul>
<b>Special Considerations</b>	Can cause GI distress due to the inhibition of prostaglandin synthesis

**COX-2 INHIBITORS**

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**ASPIRIN**

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**ACETAMINOPHEN (TYLENOL)**

## PHARMACOLOGY—DRUG CLASSES

<b>Drug Class</b>	<b>COX-2 Inhibitors</b>
<b>Mechanism of Action</b>	Inhibit cyclooxygenase-2 (COX-2) enzymes that are produced during inflammation
<b>Indication</b>	Used to help treat the symptoms of rheumatoid arthritis and osteoarthritis, and other mild to moderate pain
<b>Examples</b>	<ul style="list-style-type: none"> <li>• celecoxib (Celebrex<sup>®</sup>)</li> </ul>
<b>Special Considerations</b>	All other COX-2 inhibitors have been withdrawn from the market except celecoxib.

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<b>Drug Class</b>	<b>Aspirin</b>
<b>Mechanism of Action</b>	Inhibit prostaglandin synthesis
<b>Indication</b>	Can be used for mild pain, fever reduction, and inflammation
<b>Special Considerations</b>	<ul style="list-style-type: none"> <li>• Should not be given to children who have been exposed to the chickenpox—can cause <b>Reye’s syndrome</b></li> <li>• Should not be given to patients on warfarin (Coumadin<sup>®</sup>)</li> <li>• Should not be taken by pregnant women</li> </ul>

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<b>Drug Class</b>	<b>Acetaminophen (Tylenol)</b>
<b>Mechanism of Action</b>	Elevate the pain threshold and suppress prostaglandin synthesis
<b>Indication</b>	Can be used for mild to moderate pain and fever reduction
<b>Special Considerations</b>	<ul style="list-style-type: none"> <li>• <b>Can</b> be taken during pregnancy</li> <li>• Does not cause GI problems, but can cause liver damage if taking over 3 g (3,000 mg) per day</li> </ul>

**ACETYLCYSTEINE (MUCOMYST, ACETADOTE)**

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**MUSCLE RELAXANTS**

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**DISEASE-MODIFYING ANTIRHEUMATIC AGENTS  
(DMARDs)**

## PHARMACOLOGY—DRUG CLASSES

<b>Drug Class</b>	<b>Acetylcysteine (Mucomyst, Acetadote)</b>
<b>Mechanism of Action</b>	Attach to acetaminophen and detoxifies the metabolite
<b>Indication</b>	Antidote for acetaminophen overdose
<b>Special Considerations</b>	Can also be used for some bronchial diseases

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<b>Drug Class</b>	<b>Muscle Relaxants</b>
<b>Indication</b>	To reduce muscle tension
<b>Examples</b>	<ul style="list-style-type: none"> <li>• baclofen (Lioresal<sup>®</sup>)</li> <li>• carisoprodol (Soma<sup>®</sup>)</li> <li>• cyclobenzaprine (Flexeril<sup>®</sup>)</li> </ul>
<b>Special Considerations</b>	Carisoprodol (Soma <sup>®</sup> ) is a schedule IV controlled substance

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<b>Drug Class</b>	<b>Disease-Modifying Antirheumatic Agents (DMARDs)</b>
<b>Indication</b>	To treat rheumatoid arthritis
<b>Examples</b>	<ul style="list-style-type: none"> <li>• abatacept (Orencia<sup>®</sup>)</li> <li>• adalimumab (Humira<sup>®</sup>)</li> <li>• etanercept (Enbrel<sup>®</sup>)</li> <li>• methotrexate (Rheumatrex<sup>®</sup>)</li> </ul>
<b>Special Considerations</b>	Helps slow the progression of the disease, but use is limited by side effects

**ANTIEPILEPTIC/ANTICONVULSANT**

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**ANTI-PARKINSON'S AGENTS**

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**ANTI-ALZHEIMER'S DISEASE AGENTS**

## PHARMACOLOGY—DRUG CLASSES

<b>Drug Class</b>	<b>Antiepileptic/Anticonvulsant</b>
<b>Description of Condition</b>	Epilepsy is a disorder characterized by recurrent seizures.
<b>Indication</b>	Used to treat epilepsy
<b>Examples of Antiepileptic/Anticonvulsant Agents</b>	<ul style="list-style-type: none"> <li>• carbamazepine (Tegretol<sup>®</sup>)</li> <li>• clonazepam (Klonopin<sup>®</sup>)</li> <li>• divalproex (Depakote<sup>®</sup>)</li> <li>• lamotrigine (Lamictal<sup>®</sup>)</li> <li>• levetiracetam (Keppra<sup>®</sup>)</li> <li>• pregabalin (Lyrica<sup>®</sup>)</li> <li>• topiramate (Topamax<sup>®</sup>)</li> <li>• phenytoin sodium (Dilantin<sup>®</sup>)</li> </ul>
<b>Special Considerations</b>	Can cause sedation and loss of cognition, so poor compliance is an issue; large number of drug interactions can occur

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<b>Drug Class</b>	<b>Anti-Parkinson's Agents</b>
<b>Description of Condition</b>	Parkinson's disease is characterized by muscular difficulties, including tremors and loss of muscle control; generally affects patients over age 60
<b>Indication</b>	Used to treat symptoms of Parkinson's disease
<b>Examples of Anti-Parkinson's Agents</b>	<ul style="list-style-type: none"> <li>• levodopa-carbidopa (Sinemet<sup>®</sup>)</li> <li>• amantadine (Symmetrel<sup>®</sup>)</li> <li>• benzotropine (Cogentin<sup>®</sup>)</li> <li>• ropinirole (Requip<sup>®</sup>)</li> </ul>
<b>Special Considerations</b>	Side effects are a problem and sometimes require constant change in medication.

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<b>Drug Class</b>	<b>Anti-Alzheimer's Disease Agents</b>
<b>Description of Condition</b>	Alzheimer's disease is a neurodegenerative disease that leads to dementia.
<b>Indication</b>	Used to treat symptoms of Alzheimer's disease
<b>Examples of Anti-Alzheimer's Disease Agents</b>	<ul style="list-style-type: none"> <li>• donepezil (Aricept<sup>®</sup>)</li> <li>• ginkgo</li> <li>• memantine (Namenda<sup>®</sup>)</li> <li>• rivastigmine (Exelon<sup>®</sup>)</li> </ul>
<b>Special Considerations</b>	Drugs can slow disease, but not cure or reverse effects

**ADD/ADHD AGENTS**

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**ANTIASTHMATICS**

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**BRONCHODILATORS**



## PHARMACOLOGY—DRUG CLASSES

<b>Drug Class</b>	<b>ADD/ADHD Agents</b>
<b>Description of Condition</b>	Attention deficit disorder (ADD) and attention deficit hyperactivity disorder (ADHD) are characterized by hyperactivity and distractibility.
<b>Indication</b>	Used to treat attention disorders such as ADD/ADHD
<b>Examples of ADD/ADHD Agents</b>	<p><b>Stimulants</b></p> <ul style="list-style-type: none"> <li>• amphetamine with dextroamphetamine salts (Adderall®)</li> <li>• methylphenidate (Concerta®, Ritalin®, Metadate CD®)</li> </ul> <p><b>Nonstimulants</b></p> <ul style="list-style-type: none"> <li>• atomoxetine (Strattera®)</li> <li>• guanfacine (Intuniv®)</li> </ul>
<b>Special Considerations</b>	Stimulants are schedule II controlled substances because of their amphetamine derivative.

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<b>Drug Class</b>	<b>Antiasthmatics</b>
<b>Description of Condition</b>	Asthma is an inflammatory condition of the lungs that causes airway constriction; characterized by wheezing, coughing, and difficulty breathing
<b>Indication</b>	Used to treat asthma and breathing disorders
<b>Drug Classes</b>	<ul style="list-style-type: none"> <li>• bronchodilators</li> <li>• corticosteroids</li> <li>• leukotriene inhibitors</li> <li>• mast cell stabilizers</li> <li>• xanthine derivatives</li> </ul>

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<b>Drug Class</b>	<b>Bronchodilators</b>
<b>Mechanism of Action</b>	Relaxes smooth muscle cells of the bronchioles, resulting in an increase in airway diameter
<b>Indication</b>	Used to treat asthma, COPD, and chronic bronchitis
<b>Examples</b>	<ul style="list-style-type: none"> <li>• albuterol (Proventil HFA®, Proair HFA®, Ventolin HFA®)</li> <li>• ipratropium (Atrovent®)</li> <li>• salmeterol (Serevent®)</li> <li>• tiotropium (Spiriva®)</li> </ul>

**CORTICOSTEROIDS**

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**LEUKOTRIENE INHIBITORS**

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**MAST CELL STABILIZERS**

## PHARMACOLOGY—DRUG CLASSES

<b>Drug Class</b>	<b>Corticosteroids</b>
<b>Mechanism of Action</b>	Inhibit the immune system to suppress inflammation
<b>Indication</b>	Used to treat inflammatory conditions, and suppresses the immune response
<b>Examples</b>	<ul style="list-style-type: none"> <li>• prednisone (Deltasone<sup>®</sup>)</li> <li>• prednisolone (Orapred<sup>®</sup>)</li> <li>• methylprednisolone (Medrol<sup>®</sup>)</li> <li>• triamcinolone (Azmacort<sup>®</sup>)</li> <li>• fluticasone (Flovent<sup>®</sup>, Flonase<sup>®</sup>)</li> <li>• fluticasone and salmeterol (Advair<sup>®</sup>)</li> </ul>
<b>Special Considerations</b>	<p><b>Inhaled corticosteroids</b></p> <ul style="list-style-type: none"> <li>• patients must rinse mouth after use to prevent thrush</li> </ul> <p><b>Oral corticosteroids</b></p> <ul style="list-style-type: none"> <li>• long-term use can cause weight gain, buffalo hump, and moon face or facial hair in females, and breast development in males</li> </ul>

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<b>Drug Class</b>	<b>Leukotriene Inhibitors</b>
<b>Mechanism of Action</b>	Block leukotrienes, which results in the blocking of inflammatory responses
<b>Indication</b>	Used for prophylactic treatment of asthma
<b>Example</b>	<ul style="list-style-type: none"> <li>• montelukast (Singulair<sup>®</sup>)</li> </ul>
<b>Special Considerations</b>	Singulair <sup>®</sup> can be used in patients as young as 12 months old

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<b>Drug Class</b>	<b>Mast Cell Stabilizers</b>
<b>Mechanism of Action</b>	Inhibit inflammatory cells
<b>Indication</b>	Used for prophylactic treatment of asthma
<b>Examples</b>	<ul style="list-style-type: none"> <li>• cromolyn (Intal<sup>®</sup>, NasalCrom<sup>®</sup>)</li> <li>• nedocromil (Tilade<sup>®</sup>)</li> </ul>
<b>Special Considerations</b>	A bronchodilator is used first so that airways are opened prior to use, which may cause poor compliance; also has unpleasant taste and can cause hoarseness and dry mouth

**XANTHINE DERIVATIVES**

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**SMOKING CESSATION AGENTS**

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**TUBERCULOSIS AGENTS**

## PHARMACOLOGY—DRUG CLASSES

<b>Drug Class</b>	<b>Xanthine Derivatives</b>
<b>Mechanism of Action</b>	Relax airway smooth muscle, leading to opening of airways and increased air movement
<b>Indication</b>	Used for treatment of lung diseases unresponsive to other treatments
<b>Examples</b>	<ul style="list-style-type: none"> <li>• aminophylline</li> <li>• theophylline</li> </ul>
<b>Special Considerations</b>	Theophylline has many interactions and is used only if asthma or other lung disease is unresponsive to other treatments.

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<b>Drug Class</b>	<b>Smoking Cessation Agents</b>
<b>Description of Condition</b>	Smoking can increase risk of cancer, COPD, heart disease, and stroke
<b>Examples</b>	<ul style="list-style-type: none"> <li>• bupropion (Wellbutrin<sup>®</sup>, Zyban<sup>®</sup>)</li> <li>• nicotine (Nicoderm<sup>®</sup>, Nicotrol<sup>®</sup>, Nicorette<sup>®</sup>)</li> <li>• varenicline (Chantix<sup>®</sup>)</li> </ul>

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<b>Drug Class</b>	<b>Tuberculosis Agents</b>
<b>Description of Condition</b>	Disease of the respiratory tract caused by a bacteria; patients have a long drug therapy consisting of many medications, which leads to poor compliance
<b>Indication</b>	Used for treatment of tuberculosis
<b>Examples</b>	<ul style="list-style-type: none"> <li>• isoniazid (INH)</li> <li>• rifampin (Rifadin<sup>®</sup>)</li> <li>• ethambutol (Myambutol<sup>®</sup>)</li> </ul>
<b>Special Considerations</b>	<ul style="list-style-type: none"> <li>• Patients should avoid alcohol with all drugs.</li> <li>• Rifampin causes discoloration of urine, tears, sweat and any body fluids—turns all fluids a reddish orange</li> </ul>

**ANTACIDS**

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**H<sub>2</sub> RECEPTOR BLOCKERS**

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**PROTON PUMP INHIBITORS**

## PHARMACOLOGY—DRUG CLASSES

<b>Drug Class</b>	<b>Antacids</b>
<b>Mechanism of Action</b>	Neutralize stomach acid
<b>Indication</b>	Used for treatment of gastroesophageal reflux disease (GERD) and heartburn
<b>Examples</b>	<ul style="list-style-type: none"> <li>• aluminum hydroxide-magnesium hydroxide-simethicone (Mylanta<sup>®</sup>, Maalox<sup>®</sup>)</li> <li>• magnesium hydroxide (Milk of Magnesia<sup>®</sup>)</li> <li>• calcium carbonate (Tums<sup>®</sup>)</li> </ul>
<b>Special Considerations</b>	Available OTC

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<b>Drug Class</b>	<b>H<sub>2</sub> Receptor Blockers</b>
<b>Mechanism of Action</b>	Block gastric acid and secretion from histamine through blockage at the H <sub>2</sub> receptor
<b>Indication</b>	Used for treatment of gastroesophageal reflux disease (GERD) and heartburn
<b>Examples</b>	<ul style="list-style-type: none"> <li>• cimetidine (Tagamet<sup>®</sup>)</li> <li>• nizatidine (Axid<sup>®</sup>)</li> <li>• ranitidine (Zantac<sup>®</sup>)</li> <li>• famotidine (Pepcid<sup>®</sup>)</li> </ul>
<b>Special Considerations</b>	All are available OTC; important to take at bedtime
<b>Hint</b>	<i>-tidine</i> ending for H <sub>2</sub> Receptor Blockers

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<b>Drug Class</b>	<b>Proton Pump Inhibitors</b>
<b>Mechanism of Action</b>	Block the proton pump, which normally pumps acidic ions into the stomach—this reduces stomach acidity
<b>Indication</b>	Used for treatment of gastroesophageal reflux disease (GERD) and heartburn; can also be used in ulcer therapy
<b>Examples</b>	<ul style="list-style-type: none"> <li>• esomeprazole (Nexium<sup>®</sup>)</li> <li>• lansoprazole (Prevacid<sup>®</sup>)</li> <li>• omeprazole (Prilosec<sup>®</sup>)</li> <li>• pantoprazole (Protonix<sup>®</sup>)</li> </ul>
<b>Special Considerations</b>	Must be taken on a daily basis for effectiveness
<b>Hint</b>	<i>-prazole</i> ending for Proton Pump Inhibitors (PPIs)

**ANTIDIARRHEALS**

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**LAXATIVES**

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**BULK-FORMING LAXATIVES**



## PHARMACOLOGY—DRUG CLASSES

<b>Drug Class</b>	<b>Antidiarrheals</b>
<b>Mechanism of Action</b>	Decrease bowel motility and act as a water adsorbent
<b>Indication</b>	Used for symptomatic relief of diarrhea
<b>Examples</b>	<ul style="list-style-type: none"> <li>• diphenoxylate with atropine (Lomotil® C-V)</li> <li>• loperamide (Imodium®)</li> <li>• bismuth subsalicylate (Pepto Bismol®)</li> </ul>
<b>Special Considerations</b>	Diarrhea can lead to dehydration and should be monitored.

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<b>Drug Class</b>	<b>Laxatives</b>
<b>Description of Condition</b>	Constipation is the difficulty or inability to pass bowel movements.
<b>Indication</b>	Used for treatment of constipation
<b>Types of Laxatives</b>	<ul style="list-style-type: none"> <li>• bulk-forming</li> <li>• saline</li> <li>• stimulant</li> <li>• stool softeners</li> <li>• bowel evacuates</li> </ul>

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<b>Drug Class</b>	<b>Bulk-Forming Laxatives</b>
<b>Mechanism of Action</b>	Increase stool size, which promotes intestinal movement and bowel movement
<b>Indication</b>	Used for the treatment of constipation
<b>Examples</b>	<ul style="list-style-type: none"> <li>• psyllium hydrophilic mucilloid (Metamucil®)</li> </ul>
<b>Special Considerations</b>	Patient must drink plenty of water to avoid further constipation, can be taken on a daily basis

**SALINE LAXATIVES**

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**STIMULANT LAXATIVES**

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**STOOL SOFTENERS**

## PHARMACOLOGY—DRUG CLASSES

<b>Drug Class</b>	<b>Saline Laxatives</b>
<b>Mechanism of Action</b>	Draw water into the colon to promote bowel evacuation
<b>Indication</b>	Used for the treatment of constipation
<b>Examples</b>	<ul style="list-style-type: none"> <li>• lactulose (Enulose<sup>®</sup>)</li> <li>• magnesium hydroxide (Milk of Magnesia<sup>®</sup>)</li> <li>• sodium phosphate (Fleet Phospho-Soda<sup>®</sup>)</li> </ul>
<b>Special Considerations</b>	Patient must drink plenty of water to avoid further constipation

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<b>Drug Class</b>	<b>Stimulant Laxatives</b>
<b>Mechanism of Action</b>	Stimulate the gut through irritation of the lining, which increases contractions and bowel movements
<b>Indication</b>	Used for the treatment of constipation
<b>Examples</b>	<ul style="list-style-type: none"> <li>• bisacodyl (Dulcolax<sup>®</sup>)</li> <li>• senna (Senokot<sup>®</sup>)</li> </ul>
<b>Special Considerations</b>	Be careful of overuse—can cause the bowel to become dependent on laxative use

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<b>Drug Class</b>	<b>Stool Softeners</b>
<b>Mechanism of Action</b>	Allow fluids to mix into the bowel and stool, which creates a softer and easier-to-pass stool
<b>Indication</b>	Used for the treatment of constipation
<b>Example</b>	<ul style="list-style-type: none"> <li>• docusate (Colace<sup>®</sup>)</li> </ul>

**BOWEL EVACUANT LAXATIVES**

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**ANTIEMETICS**

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**WEIGHT-LOSS MEDICATIONS**

## PHARMACOLOGY—DRUG CLASSES

<b>Drug Class</b>	<b>Bowel Evacuant Laxatives</b>
<b>Mechanism of Action</b>	Draw a large amount of water into the bowels, which creates watery stools
<b>Indication</b>	Used for the treatment of nausea
<b>Example</b>	<ul style="list-style-type: none"> <li>polyethylene glycol-electrolyte solution (GoLYTELY®)</li> </ul>
<b>Special Considerations</b>	Eight ounces is taken every 10 minutes until 4 liters can be consumed; food should not be eaten at least 3 hours prior to administration

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<b>Drug Class</b>	<b>Antiemetics</b>
<b>Mechanism of Action</b>	Inhibit the impulse that goes from the chemoreceptor trigger zone (CTZ), or part of the brain that induces vomiting to the stomach
<b>Indication</b>	Used for the treatment of nausea
<b>Examples</b>	<ul style="list-style-type: none"> <li>metoclopramide (Reglan®)</li> <li>ondansetron (Zofran®)</li> <li>promethazine (Phenergan®)</li> </ul>
<b>Side Effects</b>	Dizziness, drowsiness

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<b>Drug Class</b>	<b>Weight-Loss Medications</b>
<b>Indication</b>	Used for the treatment of obesity
<b>Examples</b>	<ul style="list-style-type: none"> <li>orlistat (Xenical®)</li> <li>phentermine (Ionamin®)</li> <li>siburtramine (Meridia®)</li> </ul>
<b>Special Considerations</b>	Some are stimulants and controlled substances

**DIURETICS**

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**LOOP DIURETICS**

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**THIAZIDE DIURETICS**

## PHARMACOLOGY—DRUG CLASSES

<b>Drug Class</b>	<b>Diuretics</b>
<b>Indication</b>	Used to maintain the balance of water, electrolytes, and acids and bases
<b>Types of Diuretics</b>	<ul style="list-style-type: none"> <li>• loop</li> <li>• potassium sparing</li> <li>• thiazides</li> <li>• combination</li> </ul>
<b>Special Considerations</b>	Diuretics should be avoided at bedtime to prevent frequent urination at night

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<b>Drug Class</b>	<b>Loop Diuretics</b>
<b>Mechanism of Action</b>	Inhibit the reabsorption of sodium and chloride in the loop of Henle, which results in excretion of water
<b>Indication</b>	Used for the treatment of hypertension, edema, and congestive heart failure (CHF)
<b>Examples</b>	<ul style="list-style-type: none"> <li>• furosemide (Lasix<sup>®</sup>)</li> <li>• bumetanide (Bumex<sup>®</sup>)</li> <li>• torsemide (Demadex<sup>®</sup>)</li> </ul>

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<b>Drug Class</b>	<b>Thiazide Diuretics</b>
<b>Mechanism of Action</b>	Inhibit reabsorption of sodium and chloride ions in the distal convoluted tubule of the kidney, which promotes water excretion
<b>Indication</b>	Used for the treatment of hypertension, edema, and congestive heart failure (CHF)
<b>Example</b>	<ul style="list-style-type: none"> <li>• hydrochlorothiazide (Hydrodiuril<sup>®</sup>)</li> </ul>
<b>Special Considerations</b>	May cause hypokalemia (low potassium)

**POTASSIUM-SPARING DIURETICS**

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**ALPHA BLOCKERS**

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**ANTIHYPERTENSIVES**



## PHARMACOLOGY—DRUG CLASSES

<b>Drug Class</b>	<b>Potassium-Sparing Diuretics</b>
<b>Mechanism of Action</b>	Block sodium and potassium exchange at the distal convoluted tubule, or competitively inhibit aldosterone
<b>Indication</b>	Used for adjunctive treatment of hypertension and edema
<b>Examples</b>	<ul style="list-style-type: none"> <li>• spironolactone (Aldactone<sup>®</sup>)</li> <li>• triamterene (Dyrenium<sup>®</sup>)</li> </ul>
<b>Special Considerations</b>	Should be avoided in patients taking ACE inhibitors (both have potassium-sparing effect and can cause hyperkalemia—excessive potassium in the blood)
<b>Combination Diuretics</b>	Triamterene can be given with hydrochlorothiazide for an added effect <ul style="list-style-type: none"> <li>• triamterene with hydrochlorothiazide—tablet (Maxzide<sup>®</sup>)</li> <li>• triamterene with hydrochlorothiazide—capsule (Dyazide<sup>®</sup>)</li> </ul>

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<b>Drug Class</b>	<b>Alpha Blockers</b>
<b>Mechanism of Action</b>	Block peripheral alpha receptors, which relaxes smooth muscle, especially in the prostate—this helps reduce urinary symptoms associated with benign prostatic hyperplasia (BPH)
<b>Indication</b>	Used for the treatment of prostate disease
<b>Examples</b>	<ul style="list-style-type: none"> <li>• alfuzosin (Uroxatral<sup>®</sup>)</li> <li>• doxazosin (Cardura<sup>®</sup>)</li> <li>• dutasteride (Avodart<sup>®</sup>)</li> <li>• tamsulosin (Flomax<sup>®</sup>)</li> <li>• terazosin (Hytrin<sup>®</sup>)</li> </ul>

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<b>Drug Class</b>	<b>Antihypertensives</b>
<b>Description of Condition</b>	Hypertension is high blood pressure, which consists of pressure at least 140/90 mmHg or higher on a consistent basis
<b>Indication</b>	Used for the treatment of hypertension
<b>Types of Antihypertensives</b>	<ul style="list-style-type: none"> <li>• diuretics</li> <li>• angiotensin-converting enzyme (ACE) inhibitors</li> <li>• angiotensin-II receptor blockers (ARBs)</li> <li>• beta blockers</li> <li>• calcium channel blockers</li> <li>• combination products</li> </ul>

**ANGIOTENSIN CONVERTING ENZYME (ACE)  
INHIBITORS**

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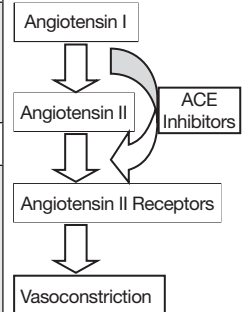
**ANGIOTENSIN II RECEPTOR BLOCKERS (ARBs)**

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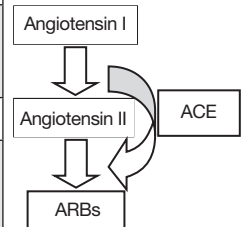
**BETA BLOCKERS**

## PHARMACOLOGY—DRUG CLASSES

<b>Drug Class</b>	<b>Angiotensin Converting Enzyme (ACE) Inhibitors</b>
<b>Mechanism of Action</b>	Block angiotensin converting enzyme (ACE), which prevents the conversion of angiotensin I to angiotensin II, and thus reduces vasoconstriction and blood pressure (see picture)
<b>Indication</b>	Used for the treatment of hypertension
<b>Examples</b>	<ul style="list-style-type: none"> <li>• benazepril (Lotensin<sup>®</sup>)</li> <li>• enalapril (Vasotec<sup>®</sup>)</li> <li>• lisinopril (Prinivil<sup>®</sup>, Zestril<sup>®</sup>)</li> <li>• quinapril (Accupril<sup>®</sup>)</li> <li>• ramipril (Altace<sup>®</sup>)</li> </ul>
<b>Special Considerations</b>	Should be avoided in patients taking potassium-sparing diuretics
<b>Hint</b>	<i>-pril</i> ending for generic ACE inhibitors



<b>Drug Class</b>	<b>Angiotensin II Receptor Blockers (ARBs)</b>
<b>Mechanism of Action</b>	Block angiotensin II receptors and vasoconstriction from occurring, thus lowering blood pressure (see picture)
<b>Indication</b>	Used for the treatment of hypertension
<b>Examples</b>	<ul style="list-style-type: none"> <li>• irbesartan (Avapro<sup>®</sup>)</li> <li>• losartan (Cozaar<sup>®</sup>)</li> <li>• olmesartan (Benicar<sup>®</sup>)</li> <li>• valsartan (Diovan<sup>®</sup>)</li> </ul>
<b>Hint</b>	<i>-sartan</i> ending for generic ARBs



<b>Drug Class</b>	<b>Beta Blockers</b>
<b>Mechanism of Action</b>	Block beta receptors, which decreases heart rate and lowers blood pressure
<b>Indication</b>	Used for the treatment of hypertension
<b>Examples</b>	<ul style="list-style-type: none"> <li>• atenolol (Tenormin<sup>®</sup>)</li> <li>• carvedilol (Coreg<sup>®</sup>)</li> <li>• propranolol (Inderal<sup>®</sup>)</li> </ul>
<b>Hint</b>	<i>-lol</i> ending for generic beta blockers
<b>Special Considerations</b>	Contraindicated in patients with asthma

**CALCIUM CHANNEL BLOCKERS**

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**ANTIARRHYTHMICS**

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**ANTIANGINAL AGENTS**

## PHARMACOLOGY—DRUG CLASSES

<b>Drug Class</b>	<b>Calcium Channel Blockers</b>
<b>Mechanism of Action</b>	Inhibit calcium ions from entering channels of the heart muscle, resulting in relaxation of smooth muscle and vasodilation
<b>Indication</b>	Used for the treatment of hypertension
<b>Examples</b>	<ul style="list-style-type: none"> <li>• amlodipine (Norvasc<sup>®</sup>)</li> <li>• diltiazem (Cardizem<sup>®</sup>)</li> <li>• nifedipine (Procardia<sup>®</sup>)</li> <li>• verapamil (Calan<sup>®</sup>, Isoptin<sup>®</sup>)</li> </ul>

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<b>Drug Class</b>	<b>Antiarrhythmics</b>
<b>Description of Condition</b>	Arrhythmias result when the ventricular and atrial contractions are not synchronized; can include tachycardia, atrial flutter, and fibrillation
<b>Indication</b>	Used for the treatment of arrhythmias
<b>Types of Antiarrhythmics</b>	<ul style="list-style-type: none"> <li>• channel blockers</li> <li>• membrane-stabilizing agents</li> <li>• potassium channel blockers</li> </ul>

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<b>Drug Class</b>	<b>Antianginal Agents</b>
<b>Description of Condition</b>	Angina is a disease marked by severe chest pain due to an insufficient amount of blood carrying oxygen.
<b>Indication</b>	Used for the treatment of angina
<b>Types of Antianginal Agents</b>	<ul style="list-style-type: none"> <li>• beta blockers</li> <li>• calcium channel blockers</li> <li>• nitrates</li> </ul>
<b>Special Considerations</b>	Treatment aimed at reducing angina attacks and preventing a heart attack.

**NITRATES**

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**ANTICOAGULANT**

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**ANTIPLATELET**

## PHARMACOLOGY—DRUG CLASSES

<b>Drug Class</b>	<b>Nitrates</b>
<b>Mechanism of Action</b>	Relax the smooth muscle of the heart and dilate the surrounding blood vessels to increase blood flow
<b>Indication</b>	Used for the treatment of angina
<b>Examples</b>	<ul style="list-style-type: none"> <li>• isosorbide dinitrate (Isordil®)</li> <li>• isosorbide mononitrate (Imdur®)</li> <li>• nitroglycerin (Nitroquick®, Nitrostat®)</li> </ul>
<b>Special Considerations</b>	Nitroglycerin is used sublingually as the drug of choice for an acute attack of angina; nitrates should not be used if taking specific medications for erectile dysfunction—can cause an unsafe drop in blood pressure

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<b>Drug Class</b>	<b>Anticoagulant</b>
<b>Mechanism of Action</b>	Prevent the formation of clots by inhibiting clotting factors in the blood
<b>Indication</b>	Used for the prevention of blood clots
<b>Examples</b>	<ul style="list-style-type: none"> <li>• heparin (not available orally)</li> <li>• warfarin (Coumadin®)</li> </ul>
<b>Special Considerations</b>	Patients should avoid foods with Vitamin K when taking warfarin; heparin is always given via IV or subcutaneously; patients must always be monitored while on anticoagulant therapy
<b>Remember</b>	Anticoagulant drugs cannot dissolve clots that are already present, but only prevent others from occurring.

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<b>Drug Class</b>	<b>Antiplatelet</b>
<b>Mechanism of Action</b>	Interfere with reactions that cause platelets to clot
<b>Indication</b>	Used for the prevention of blood clots
<b>Examples</b>	<ul style="list-style-type: none"> <li>• aspirin</li> <li>• clopidogrel (Plavix®)</li> </ul>
<b>Special Considerations</b>	Patients should not start aspirin therapy without first consulting their doctors.
<b>Remember</b>	Antiplatelet drugs cannot dissolve clots that are already present, but only prevent others from occurring.

**FIBRINOLYTICS**

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**ANTIHYPERTENSIVES**

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**HMG-CoA REDUCTASE INHIBITORS**



## PHARMACOLOGY—DRUG CLASSES

<b>Drug Class</b>	<b>Fibrinolytics</b>
<b>Mechanism of Action</b>	Dissolve clots by binding to clotting agent and preventing it from holding the clot together
<b>Indication</b>	Used to dissolve preexisting blood clots
<b>Examples</b>	<ul style="list-style-type: none"> <li>• alteplase (Activase<sup>®</sup>)</li> <li>• reteplase (Retavase<sup>®</sup>)</li> <li>• renecteplase (TNKase<sup>®</sup>)</li> </ul>
<b>Special Considerations</b>	All fibrinolytics are in powder form and must be reconstituted.
<b>Remember</b>	Fibrinolytics are the only type of drug that can dissolve a preexisting clot.

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<b>Drug Class</b>	<b>Antihyperlipidemics</b>
<b>Description of Condition</b>	Elevation of cholesterol levels; above 240 mg per 100 mL of blood is “at risk”
<b>Indication</b>	Used for the treatment of high cholesterol
<b>Types of Antihyperlipidemics</b>	<ul style="list-style-type: none"> <li>• bile acid sequestrants</li> <li>• fibric acid derivatives</li> <li>• HMG-CoA reductase inhibitors</li> <li>• combination drugs</li> </ul>

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<b>Drug Class</b>	<b>HMG-CoA Reductase Inhibitors</b>
<b>Mechanism of Action</b>	Inhibit the enzyme that is required for cholesterol production
<b>Indication</b>	Used to lower cholesterol
<b>Examples</b>	<ul style="list-style-type: none"> <li>• atorvastatin (Lipitor<sup>®</sup>)</li> <li>• lovastatin (Mevacor<sup>®</sup>)</li> <li>• pravastatin (Pravachol<sup>®</sup>)</li> <li>• rosuvastatin (Crestor<sup>®</sup>)</li> <li>• simvastatin (Zocor<sup>®</sup>)</li> </ul>
<b>Special Considerations</b>	Most work better when taken at night; patients should avoid drinking grapefruit juice
<b>Hint</b>	Also known as “statins” because generics end in <i>-statin</i>

**HYPOTHYROIDISM**

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**HYPERTHYROIDISM**

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**HORMONE REPLACEMENT THERAPY**

## PHARMACOLOGY—DRUG CLASSES

<b>Drug Class</b>	<b>Hypothyroidism</b>
<b>Description of Condition</b>	Underactive thyroid, which produces insufficient amounts of thyroid hormones; characterized by weight gain and decreased heart rate in adults
<b>Treated with</b>	Thyroid replacement therapy
<b>Examples</b>	<ul style="list-style-type: none"> <li>• levothyroxine (Levothroid<sup>®</sup>, Levoxyl<sup>®</sup>, Synthroid<sup>®</sup>)</li> <li>• thyroid (Armour Thyroid<sup>®</sup>)</li> </ul>

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<b>Drug Class</b>	<b>Hyperthyroidism</b>
<b>Description of Condition</b>	Overactive thyroid, which produces excessive amounts of thyroid hormones; may be caused by a tumor or excessive iodine intake
<b>Treated with</b>	Surgery or drug treatment
<b>Examples</b>	<ul style="list-style-type: none"> <li>• methimazole (Tapazole<sup>®</sup>)</li> <li>• propylthiouracil (PTU<sup>®</sup>)</li> <li>• radioactive iodine <sup>131</sup>I</li> </ul>

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<b>Drug Class</b>	<b>Hormone Replacement Therapy</b>
<b>Description of Condition</b>	Treatment helps relieve symptoms of estrogen deficiency resulting from menopause
<b>Symptoms</b>	<ul style="list-style-type: none"> <li>• severe hot flashes</li> <li>• vaginal atrophy</li> <li>• insomnia</li> <li>• irritability</li> </ul>
<b>Examples</b>	<ul style="list-style-type: none"> <li>• conjugated estrogen (Premarin<sup>®</sup>)</li> <li>• conjugated estrogen-medroxyprogesterone (Prempro<sup>®</sup>, Premphase<sup>®</sup>, estradiol-levonorgestrel (Climara<sup>®</sup>)</li> </ul>

**ORAL CONTRACEPTIVES**

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**OSTEOPOROSIS AGENTS**

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**BISPHOSPHONATES**

## PHARMACOLOGY—DRUG CLASSES

<b>Drug Class</b>	<b>Oral Contraceptives</b>
<b>Mechanism of Action</b>	Suppress ovulation by interfering with hormone production
<b>Indication</b>	Used to prevent pregnancy
<b>Examples</b>	<ul style="list-style-type: none"> <li>• ethinyl estradiol with levonorgestrel (Triphasil<sup>®</sup>)</li> <li>• ethinyl estradiol with norgestimate (Ortho Tri-Cyclen<sup>®</sup>)</li> <li>• ethinyl estradiol with norgestrel (Lo-Ovral<sup>®</sup>)</li> <li>• ethinyl estradiol with drospirinone (Yasmin<sup>®</sup>)</li> </ul>
<b>Special Considerations</b>	Most are a combination of estrogen (ethinyl estradiol) and progesterone
<b>Emergency Contraceptive</b>	Levonorgestrel (Plan B <sup>®</sup> ) available OTC

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<b>Drug Class</b>	<b>Osteoporosis Agents</b>
<b>Description of Condition</b>	Decreased bone density resulting from a deficiency in estrogen, calcium, and/or vitamin D
<b>Examples of Osteoporosis Agents</b>	<ul style="list-style-type: none"> <li>• bisphosphonates</li> <li>• OTC calcium</li> <li>• calcitonin-salmon (Miacalcin<sup>®</sup>) nasal spray</li> <li>• raloxifene (Evista<sup>®</sup>)</li> </ul>

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<b>Drug Class</b>	<b>Bisphosphonates</b>
<b>Mechanism of Action</b>	Prevent the bone from being reabsorbed and broken down by osteoclasts
<b>Indication</b>	Used to treat osteoporosis
<b>Examples</b>	<ul style="list-style-type: none"> <li>• alendronate (Fosamax<sup>®</sup>)</li> <li>• ibandronate (Boniva<sup>®</sup>)</li> <li>• risedronate (Actonel<sup>®</sup>)</li> </ul>
<b>Special Considerations</b>	Should be taken before the first meal of the day and with six to eight ounces of water—patient must also remain upright for at least half an hour after taking to prevent heartburn
<b>Hint</b>	-dronate ending for generic bisphosphonates

**ANTIDIABETICS**

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**INSULIN**

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**ORAL HYPOGLYCEMIC AGENTS**

## PHARMACOLOGY—DRUG CLASSES

<b>Drug Class</b>	<b>Antidiabetics</b>
<b>Description of Condition</b>	Type 1 diabetes <ul style="list-style-type: none"> <li>• patient is unable to produce any insulin, requires insulin therapy</li> </ul> Type 2 diabetes <ul style="list-style-type: none"> <li>• patient's body does not respond to insulin secretion, or has impaired insulin secretion</li> </ul> Gestational diabetes <ul style="list-style-type: none"> <li>• results from pregnancy</li> </ul> Secondary diabetes <ul style="list-style-type: none"> <li>• results from another medication</li> </ul>
<b>Treatment Methods</b>	Depends on type of diabetes; can be treated with insulin or oral hypoglycemic medications

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<b>Drug Class</b>	<b>Insulin</b>
<b>Mechanism of Action</b>	Lowers blood sugar in patients who are unable to make insulin
<b>Indication</b>	Used to treat diabetes
<b>Examples</b>	<b>Rapid</b> <ul style="list-style-type: none"> <li>• lispro (Humalog<sup>®</sup>), aspart (Novolog<sup>®</sup>), regular (Humulin-R<sup>®</sup>, Novolin-R<sup>®</sup>)</li> </ul> <b>Intermediate</b> <ul style="list-style-type: none"> <li>• Humulin N, Humulin 70/30</li> </ul> <b>Long</b> <ul style="list-style-type: none"> <li>• detemir (Levemir<sup>®</sup>), glargine (Lantus<sup>®</sup>)</li> </ul>
<b>Special Considerations</b>	Must be given subcutaneously; injection site should be rotated

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<b>Drug Class</b>	<b>Oral Hypoglycemic Agents</b>
<b>Mechanism of Action</b>	Improve response to insulin and glucose
<b>Indication</b>	Used to treat non-insulin dependent diabetes
<b>Examples</b>	<ul style="list-style-type: none"> <li>• glimepiride (Amaryl<sup>®</sup>)</li> <li>• glipizide (Glucotrol<sup>®</sup>)</li> <li>• glyburide (DiaBeta<sup>®</sup>, Micronase<sup>®</sup>)</li> <li>• metformin (Glucophage<sup>®</sup>)</li> <li>• pioglitazone (Actos<sup>®</sup>)</li> </ul>
<b>Special Considerations</b>	Because they improve the response of the body to insulin, and Type I diabetics do not produce insulin, these drugs are not indicated for Type I diabetes; changing of diet and increasing exercise (lifestyle change) should also be included in therapy.

**ANTINEOPLASTICS**

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**GLAUCOMA AGENTS**

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**ANTI-ACNE AGENTS**



## PHARMACOLOGY—DRUG CLASSES

<b>Drug Class</b>	<b>Antineoplastics</b>
<b>Description of Condition</b>	Cancer is a disease of uncontrolled abnormal cellular growth.
<b>Indication</b>	Used for the treatment of cancer
<b>Examples of Antineoplastics</b>	<ul style="list-style-type: none"> <li>• alkylating agents</li> <li>• antibiotics</li> <li>• antimetabolites</li> <li>• hormones</li> <li>• nitrogen mustards</li> <li>• plant alkaloids</li> </ul>
<b>Special Considerations</b>	Chemotherapy drugs must never be handled by technicians who are pregnant.

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<b>Drug Class</b>	<b>Glaucoma Agents</b>
<b>Description of Condition</b>	Glaucoma is a disorder of the eye characterized by intraocular pressure that can destroy nerves and lead to vision loss.
<b>Mechanism of Action</b>	Lower pressure by increasing drainage or decreasing production of aqueous humor
<b>Indication</b>	Used for the treatment of glaucoma
<b>Examples of Glaucoma Agents</b>	<ul style="list-style-type: none"> <li>• bimatoprost (Lumigan<sup>®</sup>)</li> <li>• brimonidine (Alphagan P<sup>®</sup>)</li> <li>• dorzolamidine (Trusopt<sup>®</sup>)</li> <li>• latanoprost (Xalatan<sup>®</sup>)</li> <li>• timolol (Timoptic<sup>®</sup>)</li> </ul>

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<b>Drug Class</b>	<b>Anti-Acne Agents</b>
<b>Description of Condition</b>	Acne vulgaris generally starts at puberty due to an increase in sebum secretion from sebaceous glands.
<b>Indication</b>	Used for the treatment of acne
<b>Examples of Glaucoma Agents</b>	<ul style="list-style-type: none"> <li>• adapalene (Differin<sup>®</sup>)</li> <li>• clindamycin with benzyl peroxide (BenzaClin<sup>®</sup>)</li> <li>• isotretinoin (Accutain<sup>®</sup>)</li> </ul>
<b>Special Considerations</b>	Products can come in many different dosage forms; isotretinoin patients must participate in the iPLEDGE program, which requires females to undergo pregnancy testing and be on oral contraceptives prior to use.

**VITAMIN**

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**FAT SOLUBLE VITAMINS**

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**WATER SOLUBLE VITAMINS**

## PHARMACOLOGY—DRUG CLASSES

Essential organic compounds required by an organism in a limited amount for necessary functions.

May be either:

**Fat soluble:** excessive intake can result in toxicity, as these vitamins can accumulate and are stored in the body – Vitamins A, D, E, and K

**Water soluble:** eliminated by the kidneys, so overdosing is less likely to be as dangerous as a fat-soluble overdose – Vitamins B Complex and C

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Fat soluble vitamins

Vitamin	Generic Name	Function in the Body
A	Retinol	Bone health and growth, eyes (retina function), and reproduction
D	Ergocalciferol	Bone health
E	Tocopherol	Antioxidant and enhances immune response
K	Phytonadione	Blood clotting

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Water soluble vitamins

Vitamin	Generic Name	Function in the Body
B <sub>1</sub>	Thiamine	Important for energy production and heart and muscle function
B <sub>2</sub>	Riboflavin	Important for energy production and hair, skin, and nails
B <sub>3</sub>	Nicotinic Acid	Involved in fat synthesis and protein metabolism, also called <b>niacin</b>
B <sub>5</sub>	Pantothenic Acid	Important for energy and normal growth
B <sub>6</sub>	Pyridoxine	Helps in metabolism and red blood cell production
B <sub>7</sub>	Biotin	Necessary for cell growth, may strengthen nails
B <sub>9</sub>	Folic Acid	Essential for healthy fetal development in pregnant women
B <sub>12</sub>	Cyanocobalamin	Important for red blood cell production
C	Ascorbic Acid	Helps in the immune process and promotes healing

**ERECTILE DYSFUNCTION (ED) MEDICATIONS**

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**ALTERNATIVE SUPPLEMENTS**

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## PHARMACOLOGY—DRUG CLASSES

<b>Drug Class</b>	<b>Erectile Dysfunction (ED) Medications</b>
<b>Description of Condition</b>	Occurs when a man cannot keep an erection long enough or firm enough for sexual intercourse
<b>Indication</b>	Used for the treatment of ED
<b>Examples of ED Agents</b>	Phosphodiesterase Inhibitors <ul style="list-style-type: none"> <li>• sildenafil (Viagra<sup>®</sup>)</li> <li>• tadalafil (Cialis<sup>®</sup>)</li> <li>• vardenafil (Levitra<sup>®</sup>, Staxyn<sup>®</sup>)</li> </ul>
<b>Special Considerations</b>	These products should never be used in patients taking nitrates for chest pain—can cause an unsafe drop in blood pressure

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<b>Alternative Supplement</b>	<b>Common Use</b>
<b>Chondroitin</b>	Osteoarthritis
<b>Cranberry</b>	Urinary health
<b>Echinacea</b>	Colds
<b>Evening primrose</b>	Premenstrual symptoms
<b>Fish oil</b>	Blood pressure and cholesterol
<b>Garlic</b>	Cholesterol and cardiovascular health
<b>Ginger</b>	Nausea, GI upset
<b>Ginkgo biloba</b>	Improve memory and prevent dementia
<b>Ginseng</b>	Fatigue
<b>Glucosamine</b>	Osteoarthritis
<b>Grape seed</b>	Allergies
<b>Green tea</b>	Metabolic syndromes
<b>Kava kava</b>	Stress and anxiety, sedative effects
<b>Melatonin</b>	Insomnia, jet lag
<b>Milk thistle</b>	Liver disease
<b>St. John's Wort</b>	Depression
<b>Saw palmetto</b>	Prostate disorders
<b>Soy</b>	Menopausal symptoms
<b>Valerian</b>	Anxiety

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## MINERALS

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## PHARMACOLOGY—DRUG CLASSES

<b>Mineral</b>	<b>Chemical Symbol</b>	<b>Use in the Body</b>
Calcium	Ca	Nerve and muscle function, bone and tooth formation
Copper	Cu	Blood formation
Iodine	I	Thyroid function
Iron	Fe	Red blood cell formation
Magnesium	Mg	Muscle function
Potassium	K	Heart and nerve function, cellular balance
Sodium	Na	Nerve and muscle function, cellular balance
Sulfur	S	Energy production and cellular function
Zinc	Zn	Immunity

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**ADVERSE DRUG REACTION (ADR)**

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**THERAPEUTIC EQUIVALENCE**

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**THERAPEUTIC EQUIVALENCY CODES**

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**ORANGE BOOK**



When a patient receives a medication at a normal dosage range but experiences a harmful reaction as a result of the medication.

.....

When two drugs can be substituted and have the same affect both clinically and in safety profiles; they must be the same dosage form, strength, route of administration, and contain the same active ingredient.

.....

Also known as TE codes; coding process the FDA uses to determine whether a product is therapeutically equivalent.

- A drug is given a rating of **A** if the FDA can demonstrate through studies that it is therapeutically equivalent.
  - A drug is given a rating of **B** if it is not therapeutically equivalent.
- .....

An online resource published by the FDA that provides information on therapeutic equivalencies and TE Codes.

**DRUG INTERACTION**

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**DRUG-DRUG INTERACTION**

.....

**DRUG-DISEASE INTERACTION**

When a drug interacts with another substance when taken concurrently.

.....

The interaction of two drugs when taken together that differs in the response that would occur if each were taken alone; can usually be classified as one of the following types of interactions:

- Synergy—when two drugs taken together have a more intense effect than when each would be taken separately
- Antagonism—when two drugs are taken together, and one drug negates the effect of the other drug

.....

An effect a drug has on the disease state or pathological condition of a patient; can be either a positive or negative effect.

**DRUG-FOOD INTERACTION**

.....

**DRUG**

.....

**ACTIVE INGREDIENT**

## PHARMACOLOGY—GENERAL

When the effect of a drug is altered due to the consumption of a particular food or drink; this could prevent the drug from working, enhance or decrease side effects, or cause the development of a new side effect.

.....

A substance that alters the body in a specific way and is used in the treatment, prevention, or diagnosis of a disease.

Can be:

- Therapeutic—relieves symptoms of a disease
- Prophylactic—prevents or decreases severity of a disease

Names of drugs:

- Chemical Name—describes the chemical makeup of a drug
- Generic Name—name given to drug that is not protected by a trademark, also known as the United States Adopted Name (USAN)
- Brand/Trade Name—name by which the manufacturer markets the drug, is protected by a trademark

.....

The part of the drug that alters the body to produce the desired effect.

**INACTIVE INGREDIENT**

.....

**PLACEBO**

.....

**DOSAGE FORM**

Has no effect on the therapeutic action of a drug; also known as excipient or inert ingredients.

Examples:

- colorings
- flavorings
- preservatives
- fillers

.....

A substance that has no medicinal treatment value, often used in medical research for studies.

.....

The physical form the drug is dispensed as.

Example: tablet, capsule, liquid

**PRODUCT PACKAGE INSERT (PPI)**

.....

**BLACK BOX WARNING**

.....



**PHARMACOLOGY—GENERAL**

Information sent from the wholesaler on a medication for the pharmacy to utilize for any material needed regarding a specific drug; written for the pharmacist and technician—not for the patient.

.....

A warning communicated to medical personnel through product package inserts that alerts physicians to serious adverse reaction potential of specific medications.

Example:

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**HIGHLIGHTS OF PRESCRIBING INFORMATION**

**These highlights do not include all the information needed to use LEVAQUIN<sup>®</sup> safely and effectively. See full prescribing information for LEVAQUIN<sup>®</sup>.**

- LEVAQUIN<sup>®</sup> (levofloxacin) Tablets
  - LEVAQUIN<sup>®</sup> (levofloxacin) Oral Solution
  - LEVAQUIN<sup>®</sup> (levofloxacin) Injection, for Intravenous Use
  - LEVAQUIN<sup>®</sup> (levofloxacin in 5% dextrose) Injection, for Intravenous Use
- Initial U.S. Approval: 1996

**WARNING:**  
**Fluoroquinolones, including LEVAQUIN<sup>®</sup>, are associated with an increased risk of tendinitis and tendon rupture in all ages. This risk is further increased in older patients usually over 60 years of age, in patients taking corticosteroid drugs, and in patients with kidney, heart or lung transplants [See *Warnings and Precautions (5.1)*].**

.....

**HALF-LIFE**

.....

**ADME**

.....

## PHARMACOLOGY—GENERAL

The amount of time it takes the body to eliminate half of a specific drug.

Example: The half-life of a drug is 5 hours, and the original dose is 20 mg—it will take 15 hours for this drug to be eliminated down to 2.5 mg:

$$20/2 = 10 \text{ mg over 5 hours}$$

$$10/2 = 5 \text{ mg over 5 hours}$$

$$\underline{5/2 = 2.5 \text{ mg over 5 hours}}$$

15 hours total to eliminate the drug down to 2.5 mg

.....

**Absorption**—the process of a drug entering the bloodstream

**Distribution**—the process of a drug moving from the blood into the tissues and cells to elicit the action of the drug

**Metabolism**—the process of a drug being converted to a form that is easily eliminated from the body

**Excretion/Elimination**—the process of removing a drug from the body, usually through urine (kidneys)

.....

**ORAL SYRINGE**

.....

**SUBLINGUAL**

.....

**BUCCAL**

A syringe used to measure liquids to be given orally to pediatric patients. Comes with a cap so that doses can be dispensed for individual patients.

.....

A method of drug delivery that involves placing a tablet under the tongue to be dissolved; the tablet can be absorbed quickly into the bloodstream through the blood vessels under the tongue.

- A common sublingual medication is nitroglycerin, used for angina attacks.
- .....

A method of drug delivery in which a medication is placed into the cheek pouch and absorbed through the blood vessels of the cheek.

**OPHTHALMIC**

.....

**OTIC**

.....

**NASAL**

Application of a drug into the eye; **must be a sterile solution.**

.....

Application of a drug into the ear; medications used for the ear **can never be used in the eye**; however, if necessary **eye drops can be used in the ear.**

.....

Application of a drug into the nose; most often given in spray form.

**SUPPOSITORY**

.....

**ENEMA**

.....

**VAGINAL**



A dosage form in a semi-solid state that is solid at room temperature but designed to melt at body temperature; usually inserted rectally, can also be inserted vaginally or into the urethra.

.....

A solution that is administered rectally for bowel cleansing and evacuation; given prior to a procedure or for a specific treatment.

.....

Application of a drug into the vagina; used mostly for local effects such as the treatment of yeast infections.

**RECTAL**

.....

**URETHRAL**

.....

**TOPICAL**

## PHARMACOLOGY—ROUTES OF ADMINISTRATION

Administration of a drug into the rectum; usually given via suppositories, but also may be given through an enema.

.....

Administration of a drug through the urethra, the tube that carries the urine from the bladder to the outside of the body; usually used for cancer or incontinence treatment.

.....

Any medication that is applied directly to the surface of the skin for localized effects.

**INHALATION**

.....

**METERED-DOSE INHALER (MDI)**

.....

**NEBULIZER**

## PHARMACOLOGY—ROUTES OF ADMINISTRATION

Administration of a drug through inhalation into the lungs, used mostly for asthma and COPD treatment methods.

.....

Propellant inhaler used by asthma patients that delivers a specific amount of medication through compressed gas.

.....

A machine used for administering medication into the lungs of children or other patients requiring a breathing treatment; patient will wear a mask, and the medication is delivered as a fine mist that the patient breathes in to make sure it reaches the lungs.

**SPACER**

.....

**PARENTERAL**

.....

**INTRAVENOUS**

A tubelike attachment to an MDI inhaler that helps patients, typically children, inhale the medication more easily and effectively.

.....

Administration of a drug that involves any type of injection that bypasses the stomach; because it enters the bloodstream directly, it must be a sterile dosage form.

.....

Also known as IV, administration of a drug directly into the bloodstream through a vein.

Examples of medications given intravenously:

- antibiotics
- analgesics
- anticoagulants such as heparin

**IV BOLUS**

.....

**IV INFUSION**

.....

**LOADING DOSE**



## PHARMACOLOGY—ROUTES OF ADMINISTRATION

Used when rapid administration of a drug is required; medication is pushed all at once, such as when patients receive epinephrine during cardiac arrest; also known as IV push.

.....

Used to provide administration of an intravenous drug over a longer period of time; medication is hung in bags, and the infusion rate is calculated to determine the quantity needed for the entire duration of therapy.

.....

A larger dose of a medication given to a patient to bring the concentration of drug in the blood to a therapeutic level more rapidly than a single dose; maintained at therapeutic level with a maintenance dose.

**IV PIGGYBACK**

.....

**INTRAMUSCULAR**

.....

**SUBCUTANEOUS**

.....

**INTRADERMAL**

## PHARMACOLOGY—ROUTES OF ADMINISTRATION

Used for administration of an intravenous medication using the primary IV line already being used for IV infusion; a second bag is hung with the medication needed to be infused simultaneously as the main infusion.

.....

Administration of medication injected into the muscle; typically no more than 2 mL of liquid can be injected, but can go up to 5 mL; common injection sites are gluteus maximus (butt) and deltoid (shoulder); inject at 90-degree angle.

.....

Administration of medication directly below the skin into the subcutaneous tissue; example of a medication administered via this route is insulin; inject at a 45-degree angle.

.....

Administration of medication given just below the epidermis (top layer of the skin); must only inject a small amount of medication—will raise the skin to form a wheal. Example: tuberculosis skin tests are administered intradermally.

**HYDROCODONE WITH ACETAMINOPHEN**

.....

**LISINOPRIL**

.....

**LEVOTHYROXINE SODIUM**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Hydrocodone with Acetaminophen</b>
<b>Brand Name</b>	Lorcet <sup>®</sup> , Lortab <sup>®</sup> , Norco <sup>®</sup> , Vicodin <sup>®</sup>
<b>Drug Class</b>	Opioid analgesic
<b>Indication</b>	Relief of moderate to moderately severe pain
<b>Controlled Substance</b>	C-III

.....

<b>Generic Name</b>	<b>Lisinipril</b>
<b>Brand Name</b>	Prinivil <sup>®</sup> , Zestril <sup>®</sup>
<b>Drug Class</b>	Antihypertensive: ACE inhibitor
<b>Indication</b>	Treatment of high blood pressure (hypertension)
<b>Hint</b>	ACE Inhibitor generic names end in <i>-pril</i>

.....

<b>Generic Name</b>	<b>Levothyroxine</b>
<b>Brand Name</b>	Levoxyl <sup>®</sup> , Synthroid <sup>®</sup> , Unithroid <sup>®</sup> , Levothroid <sup>®</sup>
<b>Drug Class</b>	Thyroid hormone
<b>Indication</b>	Treatment of hypothyroidism

**SIMVASTATIN**

.....

**OMEPRAZOLE**

.....

**METFORMIN HYDROCHLORIDE**

**PHARMACOLOGY—TOP 200 DRUGS**

<b>Generic Name</b>	<b>Simvastatin</b>
<b>Brand Name</b>	Zocor®
<b>Drug Class</b>	Antihyperlipidemic—HMG-CoA Reductase Inhibitor (statin)
<b>Indication</b>	Treatment of high cholesterol
<b>Hint</b>	- <i>statin</i> ending for HMG-CoA Reductase Inhibitors for high cholesterol

.....

<b>Generic Name</b>	<b>Omeprazole</b>
<b>Brand Name</b>	Prilosec®
<b>Drug Class</b>	Antiulcer agent—Proton Pump Inhibitor (PPI)
<b>Indication</b>	Treatment of Gastroesophageal Reflux Disease (GERD), ulcers, acid reflux, and other hypersecretory conditions
<b>Hint</b>	- <i>prazole</i> generic ending for Proton Pump Inhibitors

.....

<b>Generic Name</b>	<b>Metformin Hydrochloride</b>
<b>Brand Name</b>	Glucophage®, Glucophage XR®
<b>Drug Class</b>	Antidiabetic
<b>Indication</b>	Used for lowering of blood sugar in Type II diabetes, sometimes used in combination with insulin or non-insulin dependent diabetes mellitus (NIDDM)

**FUROSEMIDE**

.....

**POTASSIUM CHLORIDE (ORAL)**

.....

**GABAPENTIN**



## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Furosemide</b>
<b>Brand Name</b>	Lasix®
<b>Drug Class</b>	Diuretic—loop
<b>Indication</b>	Treatment of edema and hypertension

.....

<b>Generic Name</b>	<b>Potassium Chloride</b>
<b>Brand Name</b>	K-Dur®, Klor-Con®, Micro-K®, many others
<b>Drug Class</b>	Potassium supplement (oral)
<b>Indication</b>	Treatment and prevention of potassium deficiency (hypokalemia)

.....

<b>Generic Name</b>	<b>Gabapentin</b>
<b>Brand Name</b>	Neurontin®
<b>Drug Class</b>	Antiepileptic
<b>Indication</b>	Used as an adjunct in the treatment of partial seizures; can also be used for neuralgia (nerve pain) and restless leg syndrome (RLS)

**AMLODIPINE BESYLATE**

.....

**ALBUTEROL SULFATE**

.....

**ALPRAZOLAM**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Amlodipine Besylate</b>
<b>Brand Name</b>	Norvasc®
<b>Drug Class</b>	Antihypertensive—calcium channel blocker
<b>Indication</b>	Treatment of hypertension, can also be used for treatment of angina

.....

<b>Generic Name</b>	<b>Albuterol Sulfate</b>
<b>Brand Name</b>	Proair HFA®, Proventil HFA®, Ventolin HFA®
<b>Drug Class</b>	Bronchodilator, antiasthmatic (inhalation)
<b>Indication</b>	Treatment of asthma and bronchospasms

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<b>Generic Name</b>	<b>Alprazolam</b>
<b>Brand Name</b>	Xanax®, Xanax XR®
<b>Drug Class</b>	Antianxiety—benzodiazepine
<b>Indication</b>	Treatment of anxiety and panic disorders
<b>Controlled Substance</b>	C-IV

**CITALOPRAM HYDROBROMIDE**

.....

**RANITIDINE HYDROCHLORIDE**

.....

**ZOLPIDEM TARTRATE**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Citalopram Hydrobromide</b>
<b>Brand Name</b>	Celexa®
<b>Drug Class</b>	Antidepressant—Selective Serotonin Reuptake Inhibitor (SSRI)
<b>Indication</b>	Treatment of depression

.....

<b>Generic Name</b>	<b>Ranitidine Hydrochloride</b>
<b>Brand Name</b>	Zantac®
<b>Drug Class</b>	Antiulcer agent—H <sub>2</sub> receptor blocker
<b>Indication</b>	Treatment of Gastroesophageal Reflux Disease (GERD), ulcers, and other hypersecretory conditions.
<b>Hint</b>	- <i>tidine</i> ending for H <sub>2</sub> receptor blockers

.....

<b>Generic Name</b>	<b>Zolpidem Tartrate</b>
<b>Brand Name</b>	Ambien®, Ambien CR®
<b>Drug Class</b>	Sedative, hypnotic
<b>Indication</b>	Treatment of insomnia
<b>Controlled Substance</b>	C-IV

**ATORVASTATIN CALCIUM**

.....

**HYDROCHLOROTHIAZIDE (HCTZ)**

.....

**TRAMADOL HYDROCHLORIDE**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Atorvastatin Calcium</b>
<b>Brand Name</b>	Lipitor®
<b>Drug Class</b>	Antihyperlipidemic—HMG-CoA Reductase Inhibitor (statin)
<b>Indication</b>	Treatment of high cholesterol
<b>Hint</b>	- <i>statin</i> ending for HMG-CoA Reductase Inhibitors

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<b>Generic Name</b>	<b>Hydrochlorothiazide (HCTZ)</b>
<b>Brand Name</b>	HydroDiuril®, Esidrix®
<b>Drug Class</b>	Diuretic—thiazide
<b>Indication</b>	Treatment of edema and hypertension

.....

<b>Generic Name</b>	<b>Tramadol Hydrochloride</b>
<b>Brand Name</b>	Ultram®, Ryzolt®, Ultram ER®
<b>Drug Class</b>	Analgesic
<b>Indication</b>	Management of moderate to moderately severe pain

**METOPROLOL TARTATE**

.....

**TRAZODONE HYDROCHLORIDE**

.....

**DULOXETINE HYDROCHLORIDE**



## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Metoprolol Tartate</b>
<b>Brand Name</b>	Lopressor®
<b>Drug Class</b>	Antihypertensive—beta blocker
<b>Indication</b>	Treatment of hypertension (high blood pressure) and angina
<b>Hint</b>	-lol ending for beta blockers

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<b>Generic Name</b>	<b>Trazodone Hydrochloride</b>
<b>Brand Name</b>	Desyre!®
<b>Drug Class</b>	Antidepressant
<b>Indication</b>	Treatment of depression

.....

<b>Generic Name</b>	<b>Duloxetine Hydrochloride</b>
<b>Brand Name</b>	Cymbalta®
<b>Drug Class</b>	Antidepressant—Selective Serotonin and Norepinephrine Reuptake Inhibitor (SNRI)
<b>Indication</b>	Treatment of depression; also used for treatment of fibromyalgia, diabetic neuropathy, and other chronic pain

**CARVEDILOL**

.....

**WARFARIN SODIUM**

.....

**CLOPIDOGREL BISULFATE**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Carvedilol</b>
<b>Brand Name</b>	Coreg®, Coreg CR®
<b>Drug Class</b>	Antihypertensive—beta blocker
<b>Indication</b>	Treatment of hypertension (high blood pressure)
<b>Hint</b>	- <i>lol</i> ending for beta blockers

.....

<b>Generic Name</b>	<b>Warfarin Sodium</b>
<b>Brand Name</b>	Coumadin®, Jantoven®
<b>Drug Class</b>	Anticoagulant
<b>Indication</b>	Prevention of blood clots

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<b>Generic Name</b>	<b>Clopidogrel Bisulfate</b>
<b>Brand Name</b>	Plavix®
<b>Drug Class</b>	Platelet inhibitor
<b>Indication</b>	Prevention of blood clots

**CLONAZEPAM**

.....

**MONTELUKAST SODIUM**

.....

**CYCLOBENZAPRINE HYDROCHLORIDE**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Clonazepam</b>
<b>Brand Name</b>	Klonopin®
<b>Drug Class</b>	Antiepileptic (benzodiazepine)
<b>Indication</b>	Treatment of seizures
<b>Controlled Substance</b>	C-IV
<b>Hint</b>	Most benzodiazepines end in <i>-am</i> .

.....

<b>Generic Name</b>	<b>Montelukast Sodium</b>
<b>Brand Name</b>	Singulair®
<b>Drug Class</b>	Antiasthmatic—Leukotriene Inhibitor
<b>Indication</b>	Treatment of asthma, bronchospasms, and seasonal allergies

.....

<b>Generic Name</b>	<b>Cyclobenzaprine Hydrochloride</b>
<b>Brand Name</b>	Flexeril®, Amrix®, Fexmid®
<b>Drug Class</b>	Muscle relaxant
<b>Indication</b>	Treatment of muscle spasms

**SERTRALINE HYDROCHLORIDE**

.....

**INSULIN GLARGINE**

.....

**METOPROLOL SUCCINATE**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Sertraline Hydrochloride</b>
<b>Brand Name</b>	Zoloft®
<b>Drug Class</b>	Antidepressant—Selective Serotonin Reuptake Inhibitor (SSRI)
<b>Indication</b>	Treatment of depression

.....

<b>Generic Name</b>	<b>Insulin Glargine</b>
<b>Brand Name</b>	Lantus®
<b>Drug Class</b>	Antidiabetic
<b>Indication</b>	Treatment of insulin-dependent (type I) diabetes or type II diabetes not properly controlled

.....

<b>Generic Name</b>	<b>Metoprolol Succinate</b>
<b>Brand Name</b>	Toprol XL®
<b>Drug Class</b>	Antihypertensive—beta blocker
<b>Indication</b>	Treatment of hypertension (high blood pressure) and angina
<b>Hint</b>	-lol ending for beta blockers

**QUETIAPINE FUMERATE**

.....

**LOVASTATIN**

.....

**ESOMEPRAZOLE MAGNESIUM**



## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Quetiapine Fumerate</b>
<b>Brand Name</b>	Seroquel®
<b>Drug Class</b>	Antipsychotic—atypical
<b>Indication</b>	Treatment of schizophrenia and bipolar disorder

.....

<b>Generic Name</b>	<b>Lovastatin</b>
<b>Brand Name</b>	Mevacor®
<b>Drug Class</b>	Antihyperlipidemic—HMG-CoA Reductase Inhibitor (statin)
<b>Indication</b>	Treatment of high cholesterol
<b>Hint</b>	- <i>statin</i> ending for HMG-CoA Reductase Inhibitors for high cholesterol

.....

<b>Generic Name</b>	<b>Esomeprazole Magnesium</b>
<b>Brand Name</b>	Nexium®
<b>Drug Class</b>	Antiulcer agent—Proton Pump Inhibitor (PPI)
<b>Indication</b>	Treatment of Gastroesophageal Reflux Disease (GERD), ulcers, and other hypersecretory conditions
<b>Hint</b>	- <i>prazole</i> ending for generic Proton Pump Inhibitors

**FLUTICASONE PROPIONATE WITH SALMETEROL  
XINAFOATE**

.....

**FLUOXETINE HYDROCHLORIDE**

.....

**PROMETHAZINE HYDROCHLORIDE WITH CODEINE  
PHOSPHATE**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Fluticasone Propionate with Salmeterol Xinafoate</b>
<b>Brand Name</b>	Advair®
<b>Drug Class</b>	Antiasthmatic (inhalation)
<b>Indication</b>	Treatment of asthma and COPD

.....

<b>Generic Name</b>	<b>Fluoxetine Hydrochloride</b>
<b>Brand Name</b>	Prozac®, Sarafem®
<b>Drug Class</b>	Antidepressant—Selective Serotonin Reuptake Inhibitor (SSRI)
<b>Indication</b>	Treatment of depression disorders (Sarafem® used to treat PMDD)

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<b>Generic Name</b>	<b>Promethazine Hydrochloride with Codeine Phosphate</b>
<b>Brand Name</b>	Phenergan® with codeine
<b>Drug Class</b>	Antitussive
<b>Indication</b>	Treatment of cough
<b>Controlled Substance</b>	C-V

**FLUTICASONE PROPIONATE**

.....

**BUPROPION HYDROCHLORIDE**

.....

**AMITRIPTYLINE HYDROCHLORIDE**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Fluticasone Propionate</b>
<b>Brand Name</b>	Flonase <sup>®</sup> , Veramyst <sup>®</sup>
<b>Drug Class</b>	Antiallergy-steroid (nasal spray)
<b>Indication</b>	Treatment of seasonal allergies and rhinitis

.....

<b>Generic Name</b>	<b>Bupropion Hydrochloride</b>
<b>Brand Name</b>	Wellbutrin <sup>®</sup> , Wellbutrin SR <sup>®</sup> , and Wellbutrin XL <sup>®</sup> , Zyban <sup>®</sup>
<b>Drug Class</b>	Antidepressant
<b>Indication</b>	Treatment of depression; Zyban <sup>®</sup> is for smoking cessation

.....

<b>Generic Name</b>	<b>Amitriptyline Hydrochloride</b>
<b>Brand Name</b>	Elavil <sup>®</sup> (brand name not available in the United States)
<b>Drug Class</b>	Tricyclic antidepressant (TCA)
<b>Indication</b>	Treatment of depression

**LORAZEPAM**

.....

**MELOXICAM**

.....

**OXYCODONE HYDROCHLORIDE WITH  
ACETAMINOPHEN**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Lorazepam</b>
<b>Brand Name</b>	Ativan®
<b>Drug Class</b>	Antianxiety—benzodiazepine
<b>Indication</b>	Treatment of anxiety
<b>Hint</b>	Most benzodiazepines end in <i>-am</i> .

.....

<b>Generic Name</b>	<b>Meloxicam</b>
<b>Brand Name</b>	Mobic®
<b>Drug Class</b>	NSAID (Nonsteroidal anti-inflammatory drug)
<b>Indication</b>	Relief of symptoms associated with arthritis

.....

<b>Generic Name</b>	<b>Oxycodone Hydrochloride with Acetaminophen</b>
<b>Brand Name</b>	Percocet®, Roxicet®, Endocet®, Tylox®, Xolox®, Primalev®
<b>Drug Class</b>	Opioid analgesic
<b>Indication</b>	Relief of moderate to moderately severe pain
<b>Controlled Substance</b>	C-II

**DILTIAZEM HYDROCHLORIDE**

.....

**ATENOLOL**

.....

**ESCITALOPRAM OXALATE**



**PHARMACOLOGY—TOP 200 DRUGS**

<b>Generic Name</b>	<b>Diltiazem Hydrochloride</b>
<b>Brand Name</b>	Cardizem <sup>®</sup> , Cardizem SR <sup>®</sup> , Cardizem CD <sup>®</sup> , Cardizem LA <sup>®</sup> , Cartia XT <sup>®</sup> , Dilacor XR <sup>®</sup> , Dilt-CD <sup>®</sup> , Dilt-XR <sup>®</sup> , Diltia XT <sup>®</sup> , Diltzac <sup>®</sup> , Taztia XT <sup>®</sup> , Tiazac <sup>®</sup>
<b>Drug Class</b>	Antihypertensive—calcium channel blocker
<b>Indication</b>	Treatment of hypertension; can also be used for treatment of angina

.....

<b>Generic Name</b>	<b>Atenolol</b>
<b>Brand Name</b>	Tenormin <sup>®</sup>
<b>Drug Class</b>	Antihypertensive—beta blocker
<b>Indication</b>	Treatment of hypertension (high blood pressure)
<b>Hint</b>	- <i>lol</i> ending for beta blockers

.....

<b>Generic Name</b>	<b>Escitalopram Oxalate</b>
<b>Brand Name</b>	Lexapro <sup>®</sup>
<b>Drug Class</b>	Antidepressant—Selective Serotonin Reuptake Inhibitor (SSRI)
<b>Indication</b>	Treatment of depression

**OXYCODONE HYDROCHLORIDE**

.....

**TOPIRAMATE**

.....

**IPRATROPIUM BROMIDE WITH ALBUTEROL SULFATE**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Oxycodone Hydrochloride</b>
<b>Brand Name</b>	Oxycontin <sup>®</sup> , Roxicodone <sup>®</sup>
<b>Drug Class</b>	Opioid analgesic
<b>Indication</b>	Relief of moderate to moderately severe pain
<b>Controlled Substance</b>	C-II

.....

<b>Generic Name</b>	<b>Topiramate</b>
<b>Brand Name</b>	Topamax <sup>®</sup>
<b>Drug Class</b>	Antiepileptic, anticonvulsant
<b>Indication</b>	Treatment of seizures, also used for prophylaxis of migraines

.....

<b>Generic Name</b>	<b>Ipratropium Bromide with Albuterol Sulfate</b>
<b>Brand Name</b>	Combivent <sup>®</sup> (MDI Inhaler) and Duoneb <sup>®</sup> (solution for inhalation)
<b>Drug Class</b>	Antiasthmatic—combination bronchodilator
<b>Indication</b>	Treatment of COPD
<b>Special Considerations</b>	Contraindicated in patients with peanut allergies

**TIOTROPIUM BROMIDE**

.....

**PREDNISONE**

.....

**VENLAFAXINE HYDROCHLORIDE**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Tiotropium Bromide</b>
<b>Brand Name</b>	Spiriva®
<b>Drug Class</b>	Antiasthmatic (inhalation)
<b>Indication</b>	Treatment of COPD, including chronic bronchitis and emphysema

.....

<b>Generic Name</b>	<b>Prednisone</b>
<b>Brand Name</b>	Deltasone®
<b>Drug Class</b>	Anti-inflammatory (corticosteroid)
<b>Indication</b>	Treatment of inflammatory conditions

.....

<b>Generic Name</b>	<b>Venlafaxine Hydrochloride</b>
<b>Brand Name</b>	Effexor®
<b>Drug Class</b>	Antidepressant—SNRI
<b>Indication</b>	Treatment of depression

**CLONIDINE HYDROCHLORIDE**

.....

**ARIPIPIRAZOLE**

.....

**LISINOPRIL WITH HYDROCHLOROTHIAZIDE**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Clonidine Hydrochloride</b>
<b>Brand Name</b>	Catapres®
<b>Drug Class</b>	Antihypertensive
<b>Indication</b>	Treatment of hypertension

.....

<b>Generic Name</b>	<b>Aripiprazole</b>
<b>Brand Name</b>	Abilify®
<b>Drug Class</b>	Antipsychotic—atypical
<b>Indication</b>	Treatment of schizophrenia and bipolar disorder

.....

<b>Generic Name</b>	<b>Lisinipril with Hydrochlorothiazide</b>
<b>Brand Name</b>	Prinizide®, Zestoretic®
<b>Drug Class</b>	Antihypertensive—combination ACE inhibitor and diuretic
<b>Indication</b>	Treatment of hypertension

**MORPHINE SULFATE**

.....

**FENOFIBRATE**

.....

**ROSUVASTATIN CALCIUM**



## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Morphine Sulfate</b>
<b>Brand Name</b>	MS Contin <sup>®</sup> , Kadian <sup>®</sup> , Avinza <sup>®</sup> , Oramorph SR <sup>®</sup> , MSIR <sup>®</sup>
<b>Drug Class</b>	Opioid analgesic
<b>Indication</b>	Management of moderate to severe pain
<b>Controlled Substance</b>	C-II

.....

<b>Generic Name</b>	<b>Fenofibrate</b>
<b>Brand Name</b>	Tricor <sup>®</sup>
<b>Drug Class</b>	Antihyperlipidemic
<b>Indication</b>	Treatment of high cholesterol

.....

<b>Generic Name</b>	<b>Rosuvastatin Calcium</b>
<b>Brand Name</b>	Crestor <sup>®</sup>
<b>Drug Class</b>	Antihyperlipidemic—HMG-CoA Reductase Inhibitor (statin)
<b>Indication</b>	Treatment of high cholesterol
<b>Hint</b>	- <i>statin</i> ending for HMG-CoA Reductase Inhibitors

**AZITHROMYCIN DIHYDRATE**

.....

**PRAVASTATIN SODIUM**

.....

**NAPROXEN**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Azithromycin Dihydrate</b>
<b>Brand Name</b>	Zithromax <sup>®</sup> , Z-Pak <sup>®</sup> , Z-max <sup>®</sup>
<b>Drug Class</b>	Antibiotic—macrolide
<b>Indication</b>	Treatment of lower and upper respiratory tract infections, bacterial sinusitis, acute otitis media, and other bacterial infections
<b>Hint</b>	-mycin ending for macrolide antibiotics

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<b>Generic Name</b>	<b>Pravastatin Calcium</b>
<b>Brand Name</b>	Pravachol <sup>®</sup>
<b>Drug Class</b>	Antihyperlipidemic—HMG-CoA Reductase Inhibitor (statin)
<b>Indication</b>	Treatment of high cholesterol
<b>Hint</b>	-statin ending for HMG-CoA Reductase Inhibitors

.....

<b>Generic Name</b>	<b>Naproxen</b>
<b>Brand Name</b>	Naprosyn <sup>®</sup> , EC-Naprosyn <sup>®</sup> , Aleve <sup>®</sup>
<b>Drug Class</b>	Nonsteroidal anti-inflammatory drug (NSAID)
<b>Indication</b>	Treatment of mild to moderate pain, including pain from arthritis and other inflammatory conditions

**TAMSULOSIN HYDROCHLORIDE**

.....

**DIVALPROEX SODIUM**

.....

**DONEPEZIL HYDROCHLORIDE**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Tamsulosin Hydrochloride</b>
<b>Brand Name</b>	Flomax®
<b>Drug Class</b>	Alpha blocker for Benign Prostatic Hyperplasia (BPH) treatment
<b>Indication</b>	Treatment of enlarged prostate

.....

<b>Generic Name</b>	<b>Divalproex Sodium</b>
<b>Brand Name</b>	Depakote®, Depakote ER®, Depakote Sprinkles®
<b>Drug Class</b>	Antiepileptic
<b>Indication</b>	Treatment of seizures, bipolar disorders, and migraine prophylaxis

.....

<b>Generic Name</b>	<b>Donepezil Hydrochloride</b>
<b>Brand Name</b>	Aricept®
<b>Drug Class</b>	Antipsychotic
<b>Indication</b>	Treatment of Alzheimer's dementia

**IBUPROFEN**

.....

**PREGABALIN**

.....

**LAMOTRIGINE**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Ibuprofen</b>
<b>Brand Name</b>	Advil <sup>®</sup> , Motrin <sup>®</sup>
<b>Drug Class</b>	Nonsteroidal anti-inflammatory drug (NSAID)
<b>Indication</b>	Treatment of mild pain and inflammatory conditions

.....

<b>Generic Name</b>	<b>Pregabalin</b>
<b>Brand Name</b>	Lyrica <sup>®</sup>
<b>Drug Class</b>	Anticonvulsant
<b>Indication</b>	Used as an adjunct in treatment of epilepsy and seizures; can also be used for neuropathic pain and fibromyalgia
<b>Controlled Substance</b>	C-V

.....

<b>Generic Name</b>	<b>Lamotrigine</b>
<b>Brand Name</b>	Lamictal <sup>®</sup>
<b>Drug Class</b>	Antiepileptic-anticonvulsant
<b>Indication</b>	Used as an adjunct in treatment of epilepsy and seizures

**ALENDRONATE SODIUM**

.....

**ISOSORBIDE MONONITRATE**

.....

**SPIRONOLACTONE**



## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Alendronate Sodium</b>
<b>Brand Name</b>	Fosamax®
<b>Drug Class</b>	Osteoporosis Agent—bisphosphonate
<b>Indication</b>	Treatment of osteoporosis
<b>Hint</b>	-dronate ending for bisphosphonates for osteoporosis

.....

<b>Generic Name</b>	<b>Isosorbide Mononitrate</b>
<b>Brand Name</b>	Imdur®
<b>Drug Class</b>	Antianginal Agent
<b>Indication</b>	Treatment and prophylaxis of angina

.....

<b>Generic Name</b>	<b>Spirolactone</b>
<b>Brand Name</b>	Aldactone®
<b>Drug Class</b>	Diuretic—potassium sparing
<b>Indication</b>	Treatment of edema and hypertension
<b>Special Considerations</b>	Should be avoided in patients on an ACE inhibitor

**LOSARTAN POTASSIUM**

.....

**GLIPIZIDE**

.....

**RISPERIDONE**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Losartan potassium</b>
<b>Brand Name</b>	Cozaar®
<b>Drug Class</b>	Antihypertensive—Angiotensin II receptor blocker (ARB)
<b>Indication</b>	Treatment of hypertension
<b>Hint</b>	-sartan ending for all ARBs

.....

<b>Generic Name</b>	<b>Glipizide</b>
<b>Brand Name</b>	Glucotrol®
<b>Drug Class</b>	Antidiabetic—Oral Hypoglycemic Agent
<b>Indication</b>	Used as an adjunct in treatment of type II diabetes

.....

<b>Generic Name</b>	<b>Risperidone</b>
<b>Brand Name</b>	Risperdal®
<b>Drug Class</b>	Antipsychotic—atypical
<b>Indication</b>	Treatment of schizophrenia; can also be used for bipolar treatment and irritability associated with autism

**CARISOPRODOL**

.....

**ROPINIROLE HYDROCHLORIDE**

.....

**DIAZEPAM**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Carisoprodol</b>
<b>Brand Name</b>	Soma®
<b>Drug Class</b>	Muscle Relaxant
<b>Indication</b>	Relief of musculoskeletal conditions
<b>Controlled Substance</b>	C-IV

.....

<b>Generic Name</b>	<b>Ropinirole Hydrochloride</b>
<b>Brand Name</b>	Requip®, Requip XL®
<b>Drug Class</b>	Antiparkinson Agent
<b>Indication</b>	Treatment of signs and symptoms of Parkinson's disease as well as restless leg syndrome (RLS)

.....

<b>Generic Name</b>	<b>Diazepam</b>
<b>Brand Name</b>	Valium®
<b>Drug Class</b>	Antianxiety—Benzodiazepine
<b>Indication</b>	Management of anxiety disorders
<b>Controlled Substance</b>	C-IV
<b>Hint</b>	Many benzodiazepine generic names end in <i>-am</i>

**ALLOPURINOL**

.....

**MIRTAZAPINE**

.....

**OXYBUTYNIN CHLORIDE**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Allopurinol</b>
<b>Brand Name</b>	Zyloprim®
<b>Drug Class</b>	Agent for gout
<b>Indication</b>	Treatment of gout or kidney stones

.....

<b>Generic Name</b>	<b>Mirtazapine</b>
<b>Brand Name</b>	Remeron®
<b>Drug Class</b>	Antidepressant—tetracyclic
<b>Indication</b>	Treatment of depression

.....

<b>Generic Name</b>	<b>Oxybutynin Chloride</b>
<b>Brand Name</b>	Ditropan®, Ditropan XL®, Urotrol®
<b>Drug Class</b>	Urinary Antispasmodic
<b>Indication</b>	Treatment of overactive bladder and bladder instability

**PIOGLITAZONE HYDROCHLORIDE**

.....

**MEMANTINE HYDROCHLORIDE**

.....

**METOCLOPRAMIDE HYDROCHLORIDE**



## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Pioglitazone Hydrochloride</b>
<b>Brand Name</b>	Actos®
<b>Drug Class</b>	Antidiabetic—Oral Hypoglycemic Agent
<b>Indication</b>	Used as an adjunct in treatment of type II diabetes

.....

<b>Generic Name</b>	<b>Memantine Hydrochloride</b>
<b>Brand Name</b>	Namenda®
<b>Drug Class</b>	Agent for Alzheimer's Dementia
<b>Indication</b>	Treatment for Alzheimer's dementia

.....

<b>Generic Name</b>	<b>Metoclopramide Hydrochloride</b>
<b>Brand Name</b>	Reglan®
<b>Drug Class</b>	Antiemetic
<b>Indication</b>	Prevention of nausea and vomiting

**BACLOFEN**

.....

**FOLIC ACID**

.....

**AMOXICILLIN TRIHYDRATE**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Baclofen</b>
<b>Brand Name</b>	Lioresal®
<b>Drug Class</b>	Muscle Relaxant
<b>Indication</b>	Used to control muscle spasms, especially those associated with multiple sclerosis

.....

<b>Generic Name</b>	<b>Folic Acid</b>
<b>Brand Name</b>	Folate®
<b>Drug Class</b>	Vitamin
<b>Indication</b>	Treatment of anemia or folic acid deficiency

.....

<b>Generic Name</b>	<b>Amoxicillin Trihydrate</b>
<b>Brand Name</b>	Amoxil®, Trimox®
<b>Drug Class</b>	Antibiotic—Penicillin
<b>Indication</b>	Treatment of bacterial infections of the ear, nose, throat, skin, and respiratory tract, and for the treatment of gonorrhea
<b>Hint</b>	- <i>cillin</i> ending for penicillins

**AMPHETAMINE AND DEXTROAMPHETAMINE SALTS**

.....

**BUSPIRONE HYDROCHLORIDE**

.....

**GLYBURIDE**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Amphetamine and Dextroamphetamine Salts</b>
<b>Brand Name</b>	Adderall®
<b>Drug Class</b>	CNS Stimulant
<b>Indication</b>	Treatment of attention deficit disorder with hyperactivity (ADHD) and narcolepsy
<b>Controlled Substance</b>	C-II

.....

<b>Generic Name</b>	<b>Buspirone Hydrochloride</b>
<b>Brand Name</b>	Buspar®
<b>Drug Class</b>	Antianxiety Agent
<b>Indication</b>	Treatment of anxiety

.....

<b>Generic Name</b>	<b>Glyburide</b>
<b>Brand Name</b>	Diabeta®, Micronase®
<b>Drug Class</b>	Antidiabetic—Oral Hypoglycemic
<b>Indication</b>	Used as an adjunct in the treatment of type II diabetes

**PROMETHAZINE HCl**

.....

**LEVETIRACETAM**

.....

**SULFAMETHOXAZOLE WITH TRIMETHOPRIM**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Promethazine HCl</b>
<b>Brand Name</b>	Phenergan®
<b>Drug Class</b>	Antihistamine
<b>Indication</b>	Treatment of seasonal allergies, nausea and vomiting, and preoperative sedation

.....

<b>Generic Name</b>	<b>Levetiracetam</b>
<b>Brand Name</b>	Keppra®
<b>Drug Class</b>	Antiepileptic, Anticonvulsant
<b>Indication</b>	Used as an adjunct in the treatment of partial seizures

.....

<b>Generic Name</b>	<b>Sulfamethoxazole with Trimethoprim</b>
<b>Brand Name</b>	Bactrim®, Septra®, SMZ-TMP DS®
<b>Drug Class</b>	Antibacterial—sulfonamide
<b>Indication</b>	Used for the treatment of urinary tract infections and other bacterial infections
<b>Hint</b>	<i>Sulfa-</i> beginning for all sulfa antibacterials

**PANTOPRAZOLE SODIUM**

.....

**DIGOXIN**

.....

**LIDOCAINE**



## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Pantoprazole Sodium</b>
<b>Brand Name</b>	Protonix®
<b>Drug Class</b>	Antiulcer Agent—Proton Pump Inhibitor (PPI)
<b>Indication</b>	Treatment of Gastroesophageal Reflux Disease (GERD), ulcers, and other hypersecretory conditions
<b>Hint</b>	-prazole ending for Proton Pump Inhibitors

.....

<b>Generic Name</b>	<b>Digoxin</b>
<b>Brand Name</b>	Digitex®, Lanoxin®, Lanoxicaps®
<b>Drug Class</b>	Cardiac Glycoside (Inotropic Agent)
<b>Indication</b>	Used for treatment of heart failure, atrial fibrillation and flutter, and tachycardia

.....

<b>Generic Name</b>	<b>Lidocaine</b>
<b>Brand Name</b>	Lidoderm®
<b>Drug Class</b>	Topical Analgesic (transdermal)
<b>Indication</b>	Relief of pain associated with neuralgia

**TOLTERODINE TARTRATE**

.....

**TRIAMTERENE WITH HYDROCHLOROTHIAZIDE**

.....

**PAROXETINE HYDROCHLORIDE**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Tolterodine Tartrate</b>
<b>Brand Name</b>	Detrol <sup>®</sup> , Detrol LA <sup>®</sup>
<b>Drug Class</b>	Urinary Antispasmodic
<b>Indication</b>	Treatment of overactive bladder and urinary urgency and urge incontinence

.....

<b>Generic Name</b>	<b>Triamterene with Hydrochlorothiazide</b>
<b>Brand Name</b>	Diazide <sup>®</sup> (capsules), Maxzide <sup>®</sup> (tablets)
<b>Drug Class</b>	Diuretic: Combination—potassium sparing and thiazide
<b>Indication</b>	Treatment of edema and hypertension

.....

<b>Generic Name</b>	<b>Paroxetine Hydrochloride</b>
<b>Brand Name</b>	Paxil <sup>®</sup> , Paxil CR <sup>®</sup> , Pexeva <sup>®</sup>
<b>Drug Class</b>	Antidepressant
<b>Indication</b>	Treatment of depression, can also be used for obsessive compulsive disorder, panic disorder, and social anxiety disorder

**HYDROXYZINE HYDROCHLORIDE**

.....

**DICYCLOMINE HYDROCHLORIDE**

.....

**GLIMEPIRIDE**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Hydroxyzine Hydrochloride</b>
<b>Brand Name</b>	Atarax®
<b>Drug Class</b>	Antihistamine
<b>Indication</b>	Treatment of pruritus and other allergic conditions; can also be used to treat anxiety through sedating effects

.....

<b>Generic Name</b>	<b>Dicyclomine Hydrochloride</b>
<b>Brand Name</b>	Bentyl®
<b>Drug Class</b>	GI Antispasmodic
<b>Indication</b>	Treatment of irritable bowel syndrome

.....

<b>Generic Name</b>	<b>Glimepiride</b>
<b>Brand Name</b>	Amaryl®
<b>Drug Class</b>	Antidiabetic—oral hypoglycemic
<b>Indication</b>	Used as an adjunct in the treatment of type II diabetes

**CELECOXIB**

.....

**INSULIN ASPART (rDNA ORIGIN)**

.....

**ESTROGENS (CONJUGATED)**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Celecoxib</b>
<b>Brand Name</b>	Celebrex®
<b>Drug Class</b>	Nonsteroidal Anti-Inflammatory Drug (NSAID)—COX-2 inhibitor
<b>Indication</b>	Treatment of symptoms of osteoarthritis, rheumatoid arthritis, and other inflammatory conditions

.....

<b>Generic Name</b>	<b>Insulin Aspart (rDNA origin)</b>
<b>Brand Name</b>	Novolog®
<b>Drug Class</b>	Antidiabetic
<b>Indication</b>	Treatment of insulin-dependent (type I) diabetes or type II diabetes not properly controlled, may be used in conjunction with long-acting insulin

.....

<b>Generic Name</b>	<b>Estrogens (Conjugated)</b>
<b>Brand Name</b>	Premarin®, Cenestin®, Enjuvia®
<b>Drug Class</b>	Estrogen Hormone
<b>Indication</b>	Treatment of symptoms of menopause, female hypogonadism, and prostate cancer

**HYDROXYZINE PAMOATE**

.....

**TIZANIDINE HYDROCHLORIDE**

.....

**METHYLPHENIDATE HYDROCHLORIDE**



## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Hydroxyzine Pamoate</b>
<b>Brand Name</b>	Vistaril®
<b>Drug Class</b>	Antihistamine
<b>Indication</b>	Treatment of anxiety, chronic urticaria, and atopic dermatitis; also used as a sedative

.....

<b>Generic Name</b>	<b>Tizanidine Hydrochloride</b>
<b>Brand Name</b>	Zanaflex®
<b>Drug Class</b>	Muscle Relaxant
<b>Indication</b>	Management of muscle spasticity

.....

<b>Generic Name</b>	<b>Methylphenidate Hydrochloride</b>
<b>Brand Name</b>	Ritalin®, Metadate ER®, Concerta®
<b>Drug Class</b>	CNS Stimulant
<b>Indication</b>	Treatment of ADHD and narcolepsy
<b>Controlled Substance</b>	C-II

**CIPROFLOXACIN HYDROCHLORIDE**

.....

**LANSOPRAZOLE**

.....

**EZETIMIBE**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Ciprofloxacin Hydrochloride</b>
<b>Brand Name</b>	Cipro <sup>®</sup> , Cipro XR <sup>®</sup>
<b>Drug Class</b>	Antibiotic—fluoroquinolone
<b>Indication</b>	Treatment of bacterial infections such as those that cause UTI, infectious diarrhea, and gonorrhea
<b>Hint</b>	-floxacin ending for fluoroquinolones

.....

<b>Generic Name</b>	<b>Lansoprazole</b>
<b>Brand Name</b>	Prevacid <sup>®</sup>
<b>Drug Class</b>	Antiulcer Agent—Proton Pump Inhibitor (PPI)
<b>Indication</b>	Treatment of Gastroesophageal Reflux Disease (GERD), ulcers, and other hypersecretory conditions
<b>Hint</b>	-prazole ending for Proton Pump Inhibitors

.....

<b>Generic Name</b>	<b>Ezetimibe</b>
<b>Brand Name</b>	Zetia <sup>®</sup>
<b>Drug Class</b>	Antihyperlipidemic
<b>Indication</b>	Treatment of high cholesterol

**PROPRANOLOL HYDROCHLORIDE**

.....

**BUDESONIDE AND FORMOTEROL FUMARATE  
DIHYDRATE**

.....

**FENTANYL**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Propranolol Hydrochloride</b>
<b>Brand Name</b>	Inderal <sup>®</sup> , Inderal LA <sup>®</sup> , InnoPran XL <sup>®</sup>
<b>Drug Class</b>	Antihypertensive—beta blocker
<b>Indication</b>	Treatment of hypertension (high blood pressure)
<b>Hint</b>	- <i>lol</i> ending for beta blockers

.....

<b>Generic Name</b>	<b>Budesonide and Formoterol Fumarate Dihydrate</b>
<b>Brand Name</b>	Symbicort <sup>®</sup>
<b>Drug Class</b>	Antiasthmatic (inhalation)
<b>Indication</b>	Treatment of asthma and COPD

.....

<b>Generic Name</b>	<b>Fentanyl</b>
<b>Brand Name</b>	Duragesic <sup>®</sup>
<b>Drug Class</b>	Opioid Analgesic (transdermal)
<b>Indication</b>	Management of chronic pain
<b>Controlled Substance</b>	C-II

**NYSTATIN**

.....

**DOXYCYCLINE HYCLATE**

.....

**INSULIN LISPRO**

**PHARMACOLOGY—TOP 200 DRUGS**

<b>Generic Name</b>	<b>Nystatin</b>
<b>Brand Name</b>	Nystop® (powder), Mycostatin® (cream, suspension)
<b>Drug Class</b>	Antifungal
<b>Indication</b>	Treatment of fungal infections including oral candidiasis (thrush)

.....

<b>Generic Name</b>	<b>Doxycycline Hyclate</b>
<b>Brand Name</b>	Vibramycin®
<b>Drug Class</b>	Antibiotic—tetracycline
<b>Indication</b>	Treatment of bacterial infections, including syphilis, gonorrhea, acne, and prophylaxis of malaria
<b>Hint</b>	-cycline ending for tetracyclines

.....

<b>Generic Name</b>	<b>Insulin Lispro</b>
<b>Brand Name</b>	Humalog®
<b>Drug Class</b>	Antidiabetic
<b>Indication</b>	Treatment of insulin-dependent (type I) diabetes or type II diabetes not properly controlled

**CARBIDOPA WITH LEVODOPA**

.....

**VALSARTAN**

.....

**FAMOTIDINE**



**PHARMACOLOGY—TOP 200 DRUGS**

<b>Generic Name</b>	<b>Carbidopa with Levodopa</b>
<b>Brand Name</b>	Sinemet®
<b>Drug Class</b>	Antiparkinson Agent
<b>Indication</b>	Treatment of symptoms of Parkinson’s disease

.....

<b>Generic Name</b>	<b>Valsartan</b>
<b>Brand Name</b>	Diovan®
<b>Drug Class</b>	Antihypertensive—Angiotensin II receptor blocker (ARB)
<b>Indication</b>	Treatment of hypertension
<b>Hint</b>	-sartan generic ending for ARBs

.....

<b>Generic Name</b>	<b>Famotidine</b>
<b>Brand Name</b>	Pepcid®
<b>Drug Class</b>	Antiulcer agent—H <sub>2</sub> receptor blocker
<b>Indication</b>	Treatment of Gastroesophageal Reflux Disease (GERD) and ulcers
<b>Hint</b>	-tidine generic ending for H <sub>2</sub> receptor blockers

**SITAGLIPTIN PHOSPHATE**

.....

**ESZOPICLONE**

.....

**TEMAZEPAM**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Sitagliptin Phosphate</b>
<b>Brand Name</b>	Januvia®
<b>Drug Class</b>	Antidiabetic
<b>Indication</b>	Treatment of type 2 diabetes

.....

<b>Generic Name</b>	<b>Eszopiclone</b>
<b>Brand Name</b>	Lunesta®
<b>Drug Class</b>	Sedative
<b>Indication</b>	Treatment of insomnia
<b>Controlled Substance</b>	C-IV

.....

<b>Generic Name</b>	<b>Temazepam</b>
<b>Brand Name</b>	Restoril®
<b>Drug Class</b>	Sedative
<b>Indication</b>	Treatment of insomnia
<b>Controlled Substance</b>	C-IV

**VERAPAMIL HYDROCHLORIDE**

.....

**CHLORPHENIRAMINE WITH HYDROCODONE**

.....

**ENALAPRIL MALEATE**

**PHARMACOLOGY—TOP 200 DRUGS**

<b>Generic Name</b>	<b>Verapamil Hydrochloride</b>
<b>Brand Name</b>	Calan <sup>®</sup> , Isoptin <sup>®</sup> , Verelen <sup>®</sup>
<b>Drug Class</b>	Antihypertensive—calcium channel blocker
<b>Indication</b>	Treatment of hypertension and angina

.....

<b>Generic Name</b>	<b>Chlorpheniramine with Hydrocodone</b>
<b>Brand Name</b>	Tussionex <sup>®</sup>
<b>Drug Class</b>	Antitussive
<b>Indication</b>	Treatment of cough
<b>Controlled Substance</b>	C-III

.....

<b>Generic Name</b>	<b>Enalapril Maleate</b>
<b>Brand Name</b>	Vasotec <sup>®</sup>
<b>Drug Class</b>	Antihypertensive—ACE inhibitor
<b>Indication</b>	Treatment of high blood pressure
<b>Hint</b>	ACE inhibitor generic names end in <i>-pril</i>

**SOLIFENACIN SUCCINATE**

.....

**ESTRADIOL**

.....

**PRAMIPEXOLE DIHYDROCHLORIDE**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Solifenacin Succinate</b>
<b>Brand Name</b>	Vesicare®
<b>Drug Class</b>	Urinary Antispasmodic
<b>Indication</b>	Treatment of overactive bladder and urinary incontinence

.....

<b>Generic Name</b>	<b>Estradiol</b>
<b>Brand Name</b>	Vivelle-Dot®
<b>Drug Class</b>	Hormone Replacement (topical)
<b>Indication</b>	Treatment of symptoms associated with menopause or estrogen replacement due to ovarian failure

.....

<b>Generic Name</b>	<b>Pramipexole Dihydrochloride</b>
<b>Brand Name</b>	Mirapex®
<b>Drug Class</b>	Antiparkinson Agent
<b>Indication</b>	Treatment of symptoms of Parkinson's disease

**CARBAMAZEPINE**

.....

**PHENYTOIN SODIUM (EXTENDED)**

.....

**LEVALBUTEROL HYDROCHLORIDE**



## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Carbamazepine</b>
<b>Brand Name</b>	Tegretol <sup>®</sup> , Carbatrol <sup>®</sup> , Epitol <sup>®</sup> , Equetro <sup>®</sup> , Tegretol XR <sup>®</sup>
<b>Drug Class</b>	Anticonvulsant
<b>Indication</b>	Treatment of seizures and nerve pain, may also be used for treatment of bipolar disorder

.....

<b>Generic Name</b>	<b>Phenytoin Sodium (Extended)</b>
<b>Brand Name</b>	Dilantin <sup>®</sup> , Phenytek <sup>®</sup>
<b>Drug Class</b>	Antiepileptic—Anticonvulsant
<b>Indication</b>	Control of seizures

.....

<b>Generic Name</b>	<b>Levalbuterol Hydrochloride</b>
<b>Brand Name</b>	Xopenex <sup>®</sup>
<b>Drug Class</b>	Brochodialator—Antiasthmatic
<b>Indication</b>	Treatment of asthma and COPD

**CEPHALEXIN MONOHYDRATE**

.....

**DESVENLAFAXINE**

.....

**MOMETASONE FUROATE MONOHYDRATE**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Cephalexin Monohydrate</b>
<b>Brand Name</b>	Keflex®
<b>Drug Class</b>	Antibiotic—cephalosporin
<b>Indication</b>	Treatment of bacterial infections, such as those that cause otitis media, strep throat, UTIs, and skin infections

.....

<b>Generic Name</b>	<b>Desvenlafaxine</b>
<b>Brand Name</b>	Pristiq®
<b>Drug Class</b>	Antidepressant—serotonin and norepinephrine reuptake inhibitor (SNRI)
<b>Indication</b>	Treatment of depression

.....

<b>Generic Name</b>	<b>Mometasone Furoate Monohydrate</b>
<b>Brand Name</b>	Nasonex®
<b>Drug Class</b>	Antiallergy agent (nasal spray)—steroid
<b>Indication</b>	Treatment and prophylaxis of nasal allergy symptoms

**ZIPRASIDONE HYDROCHLORIDE**

.....

**NIACIN (EXTENDED RELEASE)**

.....

**FLUCONAZOLE**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Ziprasidone Hydrochloride</b>
<b>Brand Name</b>	Geodon®
<b>Drug Class</b>	Antipsychotic
<b>Indication</b>	Treatment of schizophrenia

.....

<b>Generic Name</b>	<b>Niacin (Extended Release)</b>
<b>Brand Name</b>	Niacin®, Niacin SR®, Niacor®, Niaspan ER®, Slo-Niacin®
<b>Drug Class</b>	Antihyperlipidemic
<b>Indication</b>	Treatment of high cholesterol, may also be used to treat coronary artery disease (atherosclerosis)

.....

<b>Generic Name</b>	<b>Fluconazole</b>
<b>Brand Name</b>	Diflucan®
<b>Drug Class</b>	Antifungal
<b>Indication</b>	Treatment of vaginal candidiasis and other fungal infections

**GEMFIBROZIL**

.....

**LITHIUM CARBONATE**

.....

**TRIAMCINOLONE ACETONIDE**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Gemfibrozil</b>
<b>Brand Name</b>	Lopid®
<b>Drug Class</b>	Antihyperlipidemic
<b>Indication</b>	Treatment of high cholesterol

.....

<b>Generic Name</b>	<b>Lithium Carbonate</b>
<b>Brand Name</b>	Eskalith®, Lithobid®, Lithonate®
<b>Drug Class</b>	Antipsychotic
<b>Indication</b>	Treatment of bipolar disorder

.....

<b>Generic Name</b>	<b>Triamcinolone Acetonide</b>
<b>Brand Name</b>	Kenalog®, Cinolar®, Trianex®, Triderm®
<b>Drug Class</b>	Corticosteroid (topical)
<b>Indication</b>	Relief of inflammatory and pruritic symptoms

**DOXAZOSIN MESYLATE**

.....

**FLUTICASONE PROPIONATE**

.....

**OLMESARTAN MEDOXOMIL**



## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Doxazosin Mesylate</b>
<b>Brand Name</b>	Cardura <sup>®</sup> , Cardura XL <sup>®</sup>
<b>Drug Class</b>	Antihypertensive/Prostate—anti-inflammatory
<b>Indication</b>	Treatment of high blood pressure and benign prostatic hyperplasia (BPH)

.....

<b>Generic Name</b>	<b>Fluticasone Propionate</b>
<b>Brand Name</b>	Flovent <sup>®</sup> , Flovent Diskus <sup>®</sup> , Flovent HFA <sup>®</sup>
<b>Drug Class</b>	Antiasthmatic—steroid
<b>Indication</b>	Treatment for the prevention of asthma attacks

.....

<b>Generic Name</b>	<b>Olmesartan Medoxomil</b>
<b>Brand Name</b>	Benicar <sup>®</sup>
<b>Drug Class</b>	Antihypertensive—Angiotensin II receptor blocker (ARB)
<b>Indication</b>	Treatment of hypertension
<b>Hint</b>	-sartan generic ending for ARBs

**BUTALBITAL, ACETAMINOPHEN, AND CAFFEINE**

.....

**AMOXICILLIN WITH CLAVULANATE POTASSIUM**

.....

**ACETAMINOPHEN WITH CODEINE PHOSPHATE**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Butalbital, Acetaminophen, and Caffeine</b>
<b>Brand Name</b>	Fioricet®
<b>Drug Class</b>	Analgesic
<b>Indication</b>	Treatment of headache

.....

<b>Generic Name</b>	<b>Amoxicillin with Clavulanate Potassium</b>
<b>Brand Name</b>	Augmentin®, Augmentin ES-600®, Augmentin XR®
<b>Drug Class</b>	Antibiotic—penicillin
<b>Indication</b>	Treatment of bacterial infections, including sinusitis and otitis media

.....

<b>Generic Name</b>	<b>Acetaminophen with Codeine Phosphate</b>
<b>Brand Name</b>	Tylenol with codeine®
<b>Drug Class</b>	Opioid Analgesic
<b>Indication</b>	Treatment of mild to moderate pain
<b>Controlled Substance</b>	C-III

**INSULIN DETEMIR**

.....

**VALSARTAN WITH HYDROCHLOROTHIAZIDE**

.....

**OXCARBAZEPINE**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Insulin Detemir</b>
<b>Brand Name</b>	Levemir®
<b>Drug Class</b>	Antidiabetic
<b>Indication</b>	Treatment of insulin-dependent (type I) diabetes or type II diabetes not properly controlled

.....

<b>Generic Name</b>	<b>Valsartan with Hydrochlorothiazide</b>
<b>Brand Name</b>	Diovan-HCT®
<b>Drug Class</b>	Antihypertensive (combination ARB and diuretic)
<b>Indication</b>	Treatment of hypertension

.....

<b>Generic Name</b>	<b>Oxcarbazepine</b>
<b>Brand Name</b>	Trileptal®
<b>Drug Class</b>	Antiepileptic—Anticonvulsant
<b>Indication</b>	Treatment of seizures

**ONDANSETRON HYDROCHLORIDE**

.....

**EZETIMIBE WITH SIMVASTATIN**

.....

**LOSARTAN POTASSIUM WITH  
HYDROCHLOROTHIAZIDE**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Ondansetron Hydrochloride</b>
<b>Brand Name</b>	Zofran <sup>®</sup> , Zofran ODT <sup>®</sup>
<b>Drug Class</b>	Antiemetic
<b>Indication</b>	Prevention of nausea and vomiting usually caused by cancer treatment

.....

<b>Generic Name</b>	<b>Ezetimibe with Simvastatin</b>
<b>Brand Name</b>	Vytorin <sup>®</sup>
<b>Drug Class</b>	Antihyperlipidemic
<b>Indication</b>	Treatment of high cholesterol

.....

<b>Generic Name</b>	<b>Losartan Potassium with Hydrochlorothiazide</b>
<b>Brand Name</b>	Hyzaar <sup>®</sup>
<b>Drug Class</b>	Antihypertensive (combination ARB and diuretic)
<b>Indication</b>	Treatment of hypertension

**RAMIPRIL**

.....

**DARIFENACIN HYDROBROMIDE**

.....

**BENAZEPRIL HYDROCHLORIDE**



## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Ramipril</b>
<b>Brand Name</b>	Altace®
<b>Drug Class</b>	Antihypertensive—ACE inhibitor
<b>Indication</b>	Treatment of high blood pressure
<b>Hint</b>	ACE inhibitor generic names end in <i>-pril</i>

.....

<b>Generic Name</b>	<b>Darifenacin Hydrobromide</b>
<b>Brand Name</b>	Enablex®
<b>Drug Class</b>	Urinary antispasmodic
<b>Indication</b>	Treatment of overactive bladder and urinary urgency and incontinence

.....

<b>Generic Name</b>	<b>Benazepril Hydrochloride</b>
<b>Brand Name</b>	Lotensin®
<b>Drug Class</b>	Antihypertensive—ACE inhibitor
<b>Indication</b>	Treatment of high blood pressure
<b>Hint</b>	ACE inhibitor generic names end in <i>-pril</i>

**SUMATRIPTAN SUCCINATE**

.....

**METHADONE HYDROCHLORIDE**

.....

**METAXALONE**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Sumatriptan Succinate</b>
<b>Brand Name</b>	Imitrex®
<b>Drug Class</b>	Antimigraneous Agent
<b>Indication</b>	Treatment of migraine headaches

.....

<b>Generic Name</b>	<b>Methadone Hydrochloride</b>
<b>Brand Name</b>	Dolophine®
<b>Drug Class</b>	Opioid Analgesic
<b>Indication</b>	Used for relief of severe pain, and for the detoxification or temporary maintenance of narcotic addiction
<b>Controlled Substance</b>	C-II

.....

<b>Generic Name</b>	<b>Metaxalone</b>
<b>Brand Name</b>	Skelaxin®
<b>Drug Class</b>	Muscle Relaxant
<b>Indication</b>	Treatment of painful musculoskeletal conditions

**BENZONATATE**

.....

**BUMETANIDE**

.....

**DICLOFENAC SODIUM**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Benzonatate</b>
<b>Brand Name</b>	Tessalon Perles®
<b>Drug Class</b>	Antitussive
<b>Indication</b>	Relief of cough

.....

<b>Generic Name</b>	<b>Bumetanide</b>
<b>Brand Name</b>	Bumex®
<b>Drug Class</b>	Diuretic—Loop
<b>Indication</b>	Treatment of edema and hypertension

.....

<b>Generic Name</b>	<b>Diclofenac Sodium</b>
<b>Brand Name</b>	Voltaren®, Voltaren-XR®
<b>Drug Class</b>	Nonsteroidal anti-inflammatory drug (NSAID)—oral
<b>Indication</b>	Treatment of symptoms of osteoarthritis and rheumatoid arthritis

**METHOTREXATE SODIUM**

.....

**OLANZAPINE**

.....

**NITROFURANTOIN**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Methotrexate Sodium</b>
<b>Brand Name</b>	Rheumatrex <sup>®</sup> , Trexall <sup>®</sup>
<b>Drug Class</b>	Antimetabolite
<b>Indication</b>	Treatment of specific types of cancer, management of severe rheumatoid arthritis and psoriasis

.....

<b>Generic Name</b>	<b>Olanzapine</b>
<b>Brand Name</b>	Zyprexa <sup>®</sup>
<b>Drug Class</b>	Antipsychotic—atypical
<b>Indication</b>	Treatment of schizophrenia and bipolar disorder

.....

<b>Generic Name</b>	<b>Nitrofurantoin</b>
<b>Brand Name</b>	Macrobid <sup>®</sup> , Macrochantin <sup>®</sup>
<b>Drug Class</b>	Antibacterial
<b>Indication</b>	Treatment of urinary tract infections (UTIs)

**BENZTROPINE MESYLATE**

.....

**DIPYRIDAMOLE AND ASPIRIN**

.....

**AMLODIPINE BESYLATE WITH BENAZEPRIL  
HYDROCHLORIDE**



## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Benzotropine Mesylate</b>
<b>Brand Name</b>	Cogentin®
<b>Drug Class</b>	Antiparkinson Agent
<b>Indication</b>	Treatment of the symptoms of Parkinson's disease

.....

<b>Generic Name</b>	<b>Dipyridamole and Aspirin</b>
<b>Brand Name</b>	Aggrenox®
<b>Drug Class</b>	Antiplatelet Agent
<b>Indication</b>	Reduce the risk of stroke and blood clots

.....

<b>Generic Name</b>	<b>Amlodipine Besylate with Benazepril Hydrochloride</b>
<b>Brand Name</b>	Lotrel®
<b>Drug Class</b>	Antihypertensive (combination calcium channel blocker and ACE inhibitor)
<b>Indication</b>	Treatment of hypertension

**NIFEDIPINE**

.....

**OMEGA-3-ACID ETHYL ESTERS**

.....

**METHOCARBAMOL**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Nifedipine</b>
<b>Brand Name</b>	Procardia <sup>®</sup> , Nifedical XL <sup>®</sup>
<b>Drug Class</b>	Antihypertensive—calcium channel blocker
<b>Indication</b>	Treatment of hypertension and angina

.....

<b>Generic Name</b>	<b>Omega-3-Acid Ethyl Esters</b>
<b>Brand Name</b>	Lovaza <sup>®</sup>
<b>Drug Class</b>	Antihyperlipidemic
<b>Indication</b>	Treatment of high cholesterol

.....

<b>Generic Name</b>	<b>Methocarbamol</b>
<b>Brand Name</b>	Robaxin <sup>®</sup>
<b>Drug Class</b>	Muscle Relaxant
<b>Indication</b>	Relief of painful musculoskeletal conditions

**ACYCLOVIR**

.....

**FINASTERIDE**

.....

**SUCRALFATE**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Acyclovir</b>
<b>Brand Name</b>	Zovirax®
<b>Drug Class</b>	Antiviral
<b>Indication</b>	Treatment of genital herpes, herpes zoster (shingles), and other viral infections

.....

<b>Generic Name</b>	<b>Finasteride</b>
<b>Brand Name</b>	Proscar®, Propecia®
<b>Drug Class</b>	Prostate—Anti-Inflammatory
<b>Indication</b>	Treatment of benign prostatic hyperplasia (BPH)

.....

<b>Generic Name</b>	<b>Sucralfate</b>
<b>Brand Name</b>	Carafate®
<b>Drug Class</b>	Antiulcer
<b>Indication</b>	Treatment of Gastroesophageal Reflux Disease (GERD), and prevention and treatment of ulcers

**MUPIROCIN**

.....

**DICLOFENAC SODIUM**

.....

**OLOPATADINE HYDROCHLORIDE**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Mupirocin</b>
<b>Brand Name</b>	Bactroban®
<b>Drug Class</b>	Antibacterial (topical)
<b>Indication</b>	Treatment of impetigo, MRSA, and other bacterial skin infections

.....

<b>Generic Name</b>	<b>Diclofenac Sodium</b>
<b>Brand Name</b>	Voltaren Gel®, Pennsaid®, Solaraze®
<b>Drug Class</b>	Nonsteroidal Anti-Inflammatory Drug (NSAID)—topical
<b>Indication</b>	Treatment of symptoms of osteoarthritis

.....

<b>Generic Name</b>	<b>Olopatadine Hydrochloride</b>
<b>Brand Name</b>	Patanol®, Pataday®
<b>Drug Class</b>	Antiallergy (ophthalmic)
<b>Indication</b>	Treatment of allergic conjunctivitis

**HYDROXYCHLOROQUINE SULFATE**

.....

**PROCHLORPERAZINE**

.....

**THYROID, DESSICATED**



## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Hydroxychloroquine Sulfate</b>
<b>Brand Name</b>	Plaquenil®
<b>Drug Class</b>	Antimalarial
<b>Indication</b>	Treatment of malaria, also used for SLE (systemic lupus erythematosus) and rheumatoid arthritis (RA)

.....

<b>Generic Name</b>	<b>Prochlorperazine</b>
<b>Brand Name</b>	Compazine®
<b>Drug Class</b>	Antipsychotic—typical
<b>Indication</b>	Treatment of schizophrenia; can also be used to control severe nausea, vomiting, and excessive anxiety

.....

<b>Generic Name</b>	<b>Thyroid, desiccated</b>
<b>Brand Name</b>	Armour® Thyroid
<b>Drug Class</b>	Thyroid hormone
<b>Indication</b>	Treatment of hypothyroidism

**NEBIVOLOL HYDROCHLORIDE**

.....

**RALOXIFENE HYDROCHLORIDE**

.....

**VALACYCLOVIR HYDROCHLORIDE**

**PHARMACOLOGY—TOP 200 DRUGS**

<b>Generic Name</b>	<b>Nebivolol Hydrochloride</b>
<b>Brand Name</b>	Bystolic®
<b>Drug Class</b>	Antihypertensive—beta blocker
<b>Indication</b>	Treatment of hypertension (high blood pressure)
<b>Hint</b>	-lol generic ending for beta blockers

.....

<b>Generic Name</b>	<b>Raloxifene Hydrochloride</b>
<b>Brand Name</b>	Evista®
<b>Drug Class</b>	Osteoporosis Agent
<b>Indication</b>	Treatment of osteoporosis in postmenopausal women

.....

<b>Generic Name</b>	<b>Valacyclovir Hydrochloride</b>
<b>Brand Name</b>	Valtrex®
<b>Drug Class</b>	Antiviral
<b>Indication</b>	Treatment of genital herpes, herpes zoster (shingles), and cold sores (herpes labialis)

**AMIODARONE**

.....

**DIPHENOXYLATE HYDROCHLORIDE WITH ATROPINE  
SULFATE**

.....

**NORTRIPTYLINE HYDROCHLORIDE**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Amiodarone</b>
<b>Brand Name</b>	Cordarone <sup>®</sup> , Pacerone <sup>®</sup>
<b>Drug Class</b>	Antiarrhythmic
<b>Indication</b>	Treatment of ventricular fibrillation and tachycardia

.....

<b>Generic Name</b>	<b>Diphenoxylate Hydrochloride with Atropine Sulfate</b>
<b>Brand Name</b>	Lomotil <sup>®</sup>
<b>Drug Class</b>	Antidiarrheal
<b>Indication</b>	Treatment of diarrhea
<b>Controlled Substance</b>	C-V

.....

<b>Generic Name</b>	<b>Nortriptyline Hydrochloride</b>
<b>Brand Name</b>	Pamelor <sup>®</sup>
<b>Drug Class</b>	Antidepressant—tricyclic
<b>Indication</b>	Treatment of depression

**TERAZOSIN HYDROCHLORIDE**

.....

**QUINAPRIL HYDROCHLORIDE**

.....

**CLINDAMYCIN HYDROCHLORIDE**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Terazosin Hydrochloride</b>
<b>Brand Name</b>	Hytrin®
<b>Drug Class</b>	Antihypertensive/Prostate—Anti-inflammatory (alpha-adrenergic blocker)
<b>Indication</b>	Treatment of high blood pressure and benign prostatic hyperplasia (BPH)

.....

<b>Generic Name</b>	<b>Quinapril Hydrochloride</b>
<b>Brand Name</b>	Accupril®
<b>Drug Class</b>	Antihypertensive—ACE inhibitor
<b>Indication</b>	Treatment of high blood pressure
<b>Hint</b>	ACE inhibitor generic names end in <i>-pril</i>

.....

<b>Generic Name</b>	<b>Clindamycin Hydrochloride</b>
<b>Brand Name</b>	Cleocin®
<b>Drug Class</b>	Antibiotic
<b>Indication</b>	Treatment of serious respiratory tract infections and other serious bacterial infections; reserved for penicillin-allergic patients

**METHYLPREDNISOLONE**

.....

**LEVOFLOXACIN**

.....

**THEOPHYLLINE ANHYDROUS**



## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Methylprednisolone</b>
<b>Brand Name</b>	Medrol <sup>®</sup> , Medrol Dosepak <sup>®</sup>
<b>Drug Class</b>	Anti-inflammatory (corticosteroid)
<b>Indication</b>	Treatment of inflammatory conditions

.....

<b>Generic Name</b>	<b>Levofloxacin</b>
<b>Brand Name</b>	Levaquin <sup>®</sup>
<b>Drug Class</b>	Antibiotic—fluoroquinolone
<b>Indication</b>	Treatment of bacterial infections, such as those that cause community-acquired pneumonia, acute sinusitis, UTIs, among others
<b>Hint</b>	-floxacin ending for fluoroquinolones

.....

<b>Generic Name</b>	<b>Theophylline Anhydrous</b>
<b>Brand Name</b>	Theo-Dur <sup>®</sup> , Theo-24 <sup>®</sup> , Elixophyllin <sup>®</sup>
<b>Drug Class</b>	Bronchodilator
<b>Indication</b>	Treatment of the symptoms of asthma and chronic bronchitis

**GUANFACINE HYDROCHLORIDE**

.....

**DOXEPIN HYDROCHLORIDE**

.....

**PHENTERMINE HYDROCHLORIDE**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Guanfacine Hydrochloride</b>
<b>Brand Name</b>	Intuniv <sup>®</sup> , Tenex <sup>®</sup>
<b>Drug Class</b>	Antihypertensive/ADHD Treatment
<b>Indication</b>	Treatment of hypertension and ADHD in children over 6 years old

.....

<b>Generic Name</b>	<b>Doxepin Hydrochloride</b>
<b>Brand Name</b>	Sinequan <sup>®</sup>
<b>Drug Class</b>	Antidepressant—tricyclic
<b>Indication</b>	Treatment of depression

.....

<b>Generic Name</b>	<b>Phentermine Hydrochloride</b>
<b>Brand Name</b>	Adipex-P <sup>®</sup> , Ionamin <sup>®</sup>
<b>Drug Class</b>	Weight Management
<b>Indication</b>	Used for weight reduction
<b>Controlled Substance</b>	C-III

**VARENICLINE TARTRATE**

.....

**AZELASTINE HYDROCHLORIDE**

.....

**ZONISAMIDE**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Varenicline Tartrate</b>
<b>Brand Name</b>	Chantix®
<b>Drug Class</b>	Smoking Cessation Agent
<b>Indication</b>	To aid in the cessation of smoking

.....

<b>Generic Name</b>	<b>Azelastine Hydrochloride</b>
<b>Brand Name</b>	Astelin®
<b>Drug Class</b>	Antiallergy Agent—antihistamine (nasal spray)
<b>Indication</b>	Treatment of seasonal rhinitis and allergy symptoms

.....

<b>Generic Name</b>	<b>Zonisamide</b>
<b>Brand Name</b>	Zonegran®
<b>Drug Class</b>	Anticonvulsant
<b>Indication</b>	Used as an adjunct in the treatment of seizures

**METOLAZONE**

.....

**TRAVOPROST**

.....

**TELMISARTAN**

## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Metolazone</b>
<b>Brand Name</b>	Zaroxolyn®
<b>Drug Class</b>	Diuretic
<b>Indication</b>	Treatment of edema and hypertension

.....

<b>Generic Name</b>	<b>Travoprost</b>
<b>Brand Name</b>	Travatan®, Travatan Z®
<b>Drug Class</b>	Glaucoma Agent
<b>Indication</b>	Reduction of intraocular pressure in glaucoma

.....

<b>Generic Name</b>	<b>Telmisartan</b>
<b>Brand Name</b>	Micardis®
<b>Drug Class</b>	Antihypertensive—angiotensin II receptor blocker (ARB)
<b>Indication</b>	Treatment of hypertension
<b>Hint</b>	-sartan generic ending for ARBs

**TRAMADOL HYDROCHLORIDE WITH  
ACETAMINOPHEN**

.....

**CLOTRIMAZOLE WITH BETAMETHASONE  
DIPROPIONATE**

.....



## PHARMACOLOGY—TOP 200 DRUGS

<b>Generic Name</b>	<b>Tramadol Hydrochloride with Acetaminophen</b>
<b>Brand Name</b>	Ultracet®
<b>Drug Class</b>	Analgesic—combination product
<b>Indication</b>	Management of acute pain

.....

<b>Generic Name</b>	<b>Clotrimazole with Betamethasone Dipropionate</b>
<b>Brand Name</b>	Lotrisone®
<b>Drug Class</b>	Antifungal (topical combination product)
<b>Indication</b>	tinea pedis (athlete's foot), tinea cruris (jock itch), and tinea corporis (ringworm)

.....

**THIRD PARTY**

.....

**HEALTH MAINTENANCE ORGANIZATION (HMO)**

.....

**PREFERRED PROVIDER ORGANIZATION (PPO)**

Another name for an insurance provider.

.....

A type of insurance plan that requires the designation of a primary care physician (PCP). Patients must first get referral from their PCP for any type of specialty services.

.....

A type of insurance plan that does not require the designation of a primary care physician (PCP), but has a network of preferred providers to select from when services are needed.

**PREMIUM**

.....

**DEDUCTIBLE**

.....

**CO-PAYMENT**

## PHARMACY BILLING AND REIMBURSEMENT

The cost of the insurance coverage paid for by the member.

.....

The amount that must be paid each year out of pocket before benefits will kick in.

.....

The fee a patient pays at the time of service.

**COINSURANCE**

.....

**OUT OF POCKET EXPENSES**

.....

**SUBSCRIBER**

## PHARMACY BILLING AND REIMBURSEMENT

A fee a patient pays for services rendered based on a percentage of the cost.

Example: If the plan pays 80% and the patient pays 20% of the cost of the services, and the prescription costs \$100, then the patient's responsibility will be \$20, and the insurance will pay \$80.

.....

The total amount a patient will pay from their own money. This amount is generally regulated by the insurance company and set at a certain limit.

.....

Another name for the member, or person who pays for the insurance, under his or her healthcare plan.

**DEPENDENT**

.....

**PERSON CODE**

.....

**MEDICARE**



## PHARMACY BILLING AND REIMBURSEMENT

A person on a member's plan who is also covered by the insurance policy—an example could be a spouse or child.

.....

The code given to distinguish which person the service is being provided for.

Example: Member person code = 00

Spouse person code = 01

First child = 02, second = 03

.....

Government insurance provided to patients who are 65 or older, or younger patients with certain disabilities.

**MEDICARE PART A**

.....

**MEDICARE PART B**

.....

**DURABLE MEDICAL EQUIPMENT (DME)**

## PHARMACY BILLING AND REIMBURSEMENT

Portion of Medicare that provides coverage for inpatient hospital stays, nursing facilities, home healthcare services, and hospice care.

.....

Portion of Medicare that provides coverage for durable medical equipment (DME), outpatient services from hospitals, and physician services.

.....

Any medical equipment used to aid patients in achieving a better lifestyle.

Examples:

- cane
- walker
- wheelchair
- hospital bed
- insulin supplies
- nebulizer

**MEDICARE PART C**

.....

**MEDICARE PART D**

.....

**MEDICAID**

## PHARMACY BILLING AND REIMBURSEMENT

Portion of Medicare that is also known as the Medicare Advantage Plan; patients can receive benefits through a separate provider, but must be enrolled in Medicare Parts A and B to be eligible.

.....

Portion of Medicare that is the voluntary prescription drug coverage; patients must enroll during an eligibility period.

.....

Government-funded program run individually by each state for the low-income population.

**TRICARE**

.....

**CHAMPVA**

.....

**WORKERS' COMPENSATION**

## PHARMACY BILLING AND REIMBURSEMENT

Government health benefits program for military personnel and retirees; also includes dependents of active-duty service members.

.....

Health benefits program that helps pay medical expenses for the families of veterans who have been disabled because of injuries related to military experience.

.....

Medical coverage for an employee who is injured on the job; patient will pay no portion of prescription drug costs.

**COORDINATION OF BENEFITS**

.....

**FORMULARY**

.....

**PHARMACY BENEFIT MANAGER (PBM)**



## PHARMACY BILLING AND REIMBURSEMENT

When a patient has multiple insurance providers, one provider must be selected as the primary insurance and billed first. If there are unpaid claims that remain, the second insurance company can be billed, but only if there are charges remaining. This prevents duplication of reimbursement and payment.

.....

A list of drugs approved by the insurance company to be covered under an individual's plan.

A formulary is also a list medications approved by the P&T committee for administration to patients in a hospital or long-term care facility.

.....

A third-party administrator of prescription drug programs who processes and pays for all drug claims and manages the formulary for each plan.

**PRIOR AUTHORIZATION**

.....

**REFILL TOO SOON**

.....

**PLAN LIMITATIONS EXCEEDED**

## PHARMACY BILLING AND REIMBURSEMENT

Special approval needed before an insurance company will cover a specific medication for a patient, generally an expensive brand name drug that is not present on the formulary.

.....

An attempt by a member to get a prescription refilled before the insurance company permits a scheduled fill.

.....

An attempt by a member to fill a prescription for too large a quantity—for example, attempting to obtain a 90-day supply of a medication when only a 30-day supply is covered.

**DRUG UTILIZATION REVIEW**

.....

**ADJUDICATION**

.....

**BILLER IDENTIFICATION NUMBER (BIN)**

## PHARMACY BILLING AND REIMBURSEMENT

An evaluation required by OBRA to determine whether a medication is safe for the patient based on selected criteria and cost-effective measures.

.....

Determining whether or not a drug will be covered under the insurance plan; once a prescription has been entered, it will undergo adjudication by the insurance company to determine coverage.

.....

A unique 6-digit number identifying each third party to determine where the electronic claim should be sent.

**PHARMACY AND THERAPEUTICS COMMITTEE  
(P & T COMMITTEE)**

.....

**PERIODIC AUTOMATIC REPLENISHMENT (PAR LEVEL)**

.....

**ROTATE STOCK**

## PHARMACY INVENTORY MANAGEMENT

Committee comprised of nurses, physicians, pharmacists, and sometimes technicians within a hospital that meets on a regular basis to review issues related to medications, including:

- hospital formulary
  - reviewing, maintaining, and updating when necessary
- medication use evaluations (MUEs)
- discussing and investigating medication errors

.....

The amount of stock that should be on the shelves to meet demands; when inventory falls below par levels, stock should be reordered to replenish inventory.

.....

When new inventory arrives and is being placed onto the shelf for storage, it should be placed in order of shortest expiration date so as to use the products that expire first before those that expire last.

**PARTIAL FILL**

.....

**JUST-IN-TIME PURCHASING**

.....

**WHOLESALE PURCHASING**



## PHARMACY INVENTORY MANAGEMENT

If a pharmacy does not have a sufficient supply of a medication to fill an entire order for a patient, a partial fill may be given:

- usually a three- to five-day supply (enough to last the patient until the pharmacy receives stock from the wholesaler)

.....

Purchasing of inventory in quantities that just meet the demands until the next time ordering is completed.

- reduces amount of inventory
- can only be used if the pharmacy can predict the needs of patients, and if supplies are readily available
  - current drug shortages make just-in-time purchasing difficult

.....

Purchasing from one wholesaler as a single source of multiple manufacturers of drugs and other medical products.

- quick turnaround time for drugs when available
  - when drugs aren't available, known as **back orders**

**CONTROLLED SUBSTANCE ORDERING SYSTEM  
(CSOS)**

.....

**REVERSE DISTRIBUTION**

.....

**STORAGE REQUIREMENTS**

## PHARMACY INVENTORY MANAGEMENT

DEA electronic version of form 222 for ordering of controlled substances.

- pharmacies do not have to complete corresponding 222 paperwork for ordering

.....

Process of sending back medications when expired, damaged, or destroyed for credit from manufacturers.

.....

<b>Unit</b>	<b>Temperature °F</b>	<b>Temperature °C</b>
Freezer	-13°F to 14°F	-25°C to -10°C
Refrigerator	36°F to 46°F	2°C to 8°C
Room Temperature	59°F to 86°F	15°C to 30°C
Warmer	86°F to 104°F	30°C to 40°C

**COMPUTER PHYSICIAN ORDER ENTRY (CPOE)**

.....

**ELECTRONIC MEDICATION ADMINISTRATION  
RECORD (EMAR)**

.....

**E-PRESCRIBING**

## PHARMACY INVENTORY MANAGEMENT

The electronic entry of instructions from practitioners in a hospital for patient orders.

- can include orders for lab tests, pharmacy, physical therapy, and other hospital units
- gives other caregivers immediate access to patient orders and records
- helps improve workflow and compliance with documentation of patient issues

.....

Electronic documentation of administration of medications rather than a nurse or caregiver documenting on a paper chart; the patient's chart is electronic, and the system is paperless.

- helps minimize medication errors by eliminating handwriting illegibility
- helps minimize dosing problems and patient errors by utilizing bar-coding technology

.....

Direct transmission of prescriptions from physicians to the pharmacy; helps minimize errors due to illegibility in handwriting, and helps reduce the potential for forged prescriptions from drug-seeking patients.

**PURE FOOD AND DRUG ACT OF 1906**

.....

**FOOD, DRUG, AND COSMETIC ACT OF 1938 (FDCA)**

.....

**ADULTERATED PRODUCT**

## PHARMACY LAW AND REGULATIONS

### **Pure Food and Drug Act of 1906**

<b>Purpose</b>	<ul style="list-style-type: none"><li>• Prohibit interstate transportation of misbranded and adulterated food and drugs</li></ul>
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.....

### **Food, Drug, and Cosmetic Act of 1938 (FDCA)**

<b>Purpose</b>	<ul style="list-style-type: none"><li>• Defined adulteration and misbranding</li><li>• Created the FDA</li><li>• Required manufacturers to submit new drug application (NDA) to FDA</li></ul>
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.....

A product that may be contaminated, packaged under unsanitary conditions, prepared in containers that are composed of unsafe substances, have unsafe additives, or differ in strength, quality, or purity from what the drug is claiming to be.

**MISBRANDED PRODUCT**

.....

**NEW DRUG APPLICATION (NDA)**

.....

**DURHAM-HUMPHREY AMENDMENT OF 1951**



## PHARMACY LAW AND REGULATIONS

A product that has been labeled incorrectly, or whose label may include false or misleading statements about the ingredients of the drug.

.....

Documentation required by the FDA to be filed with each new drug prior to marketing.

.....

Amendment to the FDCA

<b>Durham-Humphrey Amendment of 1951</b>	
<b>Purpose</b>	<ul style="list-style-type: none"><li>• Distinguished between prescription and OTC medications<ul style="list-style-type: none"><li>• Required prescription drugs to bear the legend: "Caution: Federal Law Prohibits Dispensing Without a Prescription."</li></ul></li><li>• Allowed verbal prescriptions to be given over the phone</li><li>• Allowed refills to be called in</li></ul>

**LEGEND DRUGS**

.....

**OTC DRUGS (OVER THE COUNTER)**

.....

**KEFAUVER-HARRIS AMENDMENT OF 1962**

## PHARMACY LAW AND REGULATIONS

Drugs that require a prescription in order to be dispensed.

.....

Drugs that are available for purchase without a prescription.

.....

<b>Kefauver-Harris Amendment of 1962</b>	
<b>Purpose</b>	<ul style="list-style-type: none"><li>• Requires all medications to be safe and effective<ul style="list-style-type: none"><li>• Passed in response to the thalidomide birth defects</li></ul></li><li>• Requires drug manufacturers to file investigational new drug application (INDA)</li></ul>

**THALIDOMIDE**

.....

**INVESTIGATIONAL NEW DRUG APPLICATION (INDA)**

.....

**POISON PREVENTION PACKAGING ACT OF 1970**

## PHARMACY LAW AND REGULATIONS

Drug given to pregnant mothers for morning sickness in the late 1950s and early 1960s.

- Babies were born with severe birth defects, and the Kefauver-Harris Amendment of 1962 was passed in response to this tragedy.

.....

Documentation required by the FDA to be completed before drugs are tested in clinical trials on humans.

.....

<b>Poison Prevention Packaging Act of 1970</b>	
<b>Purpose</b>	<ul style="list-style-type: none"><li>• Prevent accidental childhood poisonings from both prescription and OTC drugs</li></ul>

**CHILD-RESISTANT CONTAINER**

.....

**EXCEPTIONS FOR CHILD-RESISTANT CONTAINERS**

.....

**OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970**

## PHARMACY LAW AND REGULATIONS

A container that cannot be opened by 80% of children under age 5 but can be opened by 90% of adults.

.....

According to the Poison Prevention Packaging Act, there are exceptions that do not require child-resistant containers.

Exceptions:

- if a patient requests a non-childproof resistant container (and signs a waiver)
- drugs dispensed to institutionalized patients or those ordered as such by a prescriber

Examples of common medication exceptions:

- sublingual nitroglycerin
  - oral contraceptives
  - inhalation aerosols
- .....

<b>Occupational Safety and Health Act of 1970</b>	
<b>Purpose</b>	<ul style="list-style-type: none"><li>• To ensure a safe workplace for employees</li><li>• Affects pharmacy employees by ensuring compliance for protection from air contamination, needle sticks, and hazardous chemical exposure</li></ul>

**MATERIAL SAFETY DATA SHEETS (MSDS)**

.....

**EYEWASH**

.....

**SPILL KIT**



## PHARMACY LAW AND REGULATIONS

Provided to the pharmacy about each chemical; contains important information on the hazards of particular substances, including flammability and reactivity of chemicals. Also includes information on how to store chemicals and what to do in the event of a spill or accidental ingestion.

.....

Used for flushing contaminants from the eye after exposure to a hazardous chemical.

.....

Provides protection in the event of a spill, in such cases as chemotherapy (cytotoxic drugs), certain antibiotics, and some radiopharmaceuticals.

**COMPREHENSIVE DRUG ABUSE PREVENTION AND  
CONTROL ACT OF 1970 (CSA)**

.....

**CONTROLLED SUBSTANCE**

.....

**DEA NUMBER**

## PHARMACY LAW AND REGULATIONS

<b>Comprehensive Drug Abuse Prevention and Control Act of 1970 (CSA)</b>	
<b>Purpose</b>	<ul style="list-style-type: none"><li>• To combat drug abuse and regulate prescription drug use of narcotics and controlled substances</li></ul>

.....

Drugs that have a high risk for physical and psychological dependence and abuse, placed into one of five schedules based on potential for abuse.

.....

Issued to practitioners authorized to prescribe controlled substances.

<b>Step</b>	<b>Verifying a DEA number is valid</b>
1.	The first letter should be A, B, F, or M
2.	The second letter should be the same as the first letter of the prescriber's last name
3.	Add the first, third, and fifth numbers
4.	Add the second, fourth, and sixth numbers
5.	Multiply the answer from step 4 by 2
6.	Add the amount from step 5 to the amount from step 3
7.	The last number in this answer should be the same as the last digit of the DEA number

Example:

Dr. James Hensley

DEA number: AH2496570

Is the DEA number valid?

Step 1: Is the first letter A, B, F, or M? YES

Step 2: Is the second letter the same as the prescriber's last name? YES

Step 3:  $2 + 9 + 5 = 16$

Step 4:  $4 + 6 + 7 = 17$

Step 5:  $17 \times 2 = 34$

Step 6:  $34 + 16 = 50$

Step 7: Is the last number the same as the last digit in the DEA number?

YES—the number is VALID.

**SCHEDULE I NARCOTICS**

.....

**SCHEDULE II NARCOTICS**

.....

**SCHEDULE III NARCOTICS**

## PHARMACY LAW AND REGULATIONS

<b>Controlled Level</b>	<b>Schedule I (C-I)</b>
<b>Abuse potential</b>	Has no accepted medical use in the United States (for research purposes only)
<b>Examples</b>	<ul style="list-style-type: none"> <li>• crack cocaine</li> <li>• ecstasy</li> <li>• heroin</li> <li>• LSD</li> <li>• marijuana</li> </ul>

.....

<b>Controlled Level</b>	<b>Schedule II (C-II)</b>
<b>Abuse potential</b>	Has high potential for abuse
<b>Examples</b>	<ul style="list-style-type: none"> <li>• Adderall® (amphetamine with dextroamphetamine salts)</li> <li>• Demerol® (meperidine)</li> <li>• Dilaudid® (hydromorphone)</li> <li>• Oxycontin® (oxycodone)</li> <li>• Percocet® (oxycodone with acetaminophen)</li> <li>• Ritalin® (methylphenidate)</li> </ul>
<b>Restrictions</b>	No refills Cannot be phoned in except for emergencies

.....

<b>Controlled Level</b>	<b>Schedule III (C-III)</b>
<b>Abuse potential</b>	Less potential for abuse than C-II
<b>Examples</b>	<ul style="list-style-type: none"> <li>• Tylenol 3 (acetaminophen with codeine phosphate)</li> <li>• anabolic steroids</li> </ul>
<b>Restrictions</b>	Can only be refilled a maximum of 5 times within 6 months

**SCHEDULE IV NARCOTICS**

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**SCHEDULE V NARCOTICS**

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**DEA FORM 222**

## PHARMACY LAW AND REGULATIONS

<b>Controlled Level</b>	<b>Schedule IV (C-IV)</b>
<b>Abuse potential</b>	Less abuse potential than C-II and C-III
<b>Examples</b>	<ul style="list-style-type: none"><li>• benzodiazepines (Xanax<sup>®</sup>, Valium<sup>®</sup>, Ativan<sup>®</sup>)</li><li>• Ambien<sup>®</sup> (zolpidem)</li><li>• Lunesta<sup>®</sup> (eszopiclone)</li><li>• Soma<sup>®</sup> (carisoprodol)</li></ul>
<b>Restrictions</b>	Refill restrictions same as C-III (can only be refilled a maximum of 5 times within 6 months)

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<b>Controlled Level</b>	<b>Schedule V (C-V)</b>
<b>Abuse potential</b>	Lowest possible abuse potential
<b>Examples</b>	<ul style="list-style-type: none"><li>• Lomotil<sup>®</sup> (diphenoxylate with atropine)</li><li>• Lyrica (pregabalin)</li><li>• Cough syrups with codeine</li></ul>
<b>Restrictions</b>	Some states allow dispensing without a prescription (must be 18 and sign a log)

.....

DEA form used for ordering C-II medications—must be completed by a pharmacist only.

**DEA FORM 224**

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**DEA FORM 106**

.....

**DEA FORM 41**



## PHARMACY LAW AND REGULATIONS

Pharmacies must submit this form to register with the DEA prior to dispensing controlled substances.

.....

Form completed by a pharmacy in the event of a theft of a controlled substance. The pharmacy must notify the nearest DEA office and complete the form.

.....

Form must be submitted for destruction of controlled substances in the event of damaged or outdated medications.

**DEA FORM REVIEW TABLE**

.....

**CONTROLLED SUBSTANCES INVENTORY**

.....

**DRUG ENFORCEMENT ADMINISTRATION (DEA)**

## PHARMACY LAW AND REGULATIONS

<b>DEA Form</b>	<b>Purpose</b>
222	Ordering and returning C-II's
224	Registering with the DEA
106	Theft of controlled substance
41	Destruction of outdated or damaged controlled substances

.....

Inventory must be taken every two years (exact count on C-II's and estimated on C-III-V), and records kept for minimum of 2 years.

.....

Agency created under the CSA to enforce all controlled substance laws of the United States.

**DRUG LISTING ACT OF 1972**

.....

**NATIONAL DRUG CODE (NDC)**

.....

**ORPHAN DRUG ACT OF 1983**

## PHARMACY LAW AND REGULATIONS

<b>Drug Listing Act of 1972</b>	
<b>Purpose</b>	<ul style="list-style-type: none"><li>• FDA assigned each drug a specific number to identify it: the National Drug Code (NDC) number</li></ul>

.....

Number assigned to each drug by the FDA:

- first five numbers = drug manufacturer
- second four numbers = drug product
- third set of two numbers = package size

.....

<b>Orphan Drug Act of 1983</b>	
<b>Purpose</b>	<ul style="list-style-type: none"><li>• Provide tax incentives and expedited review and approval to manufacturers producing drugs for serious or life-threatening diseases affecting less than 200,000 patients (<b>orphan drugs</b>)</li></ul>

**ORPHAN DRUG**

.....

**DRUG PRICE COMPETITION AND PATENT TERM RESTORATION ACT OF 1984**

.....

**BRAND NAME**

## PHARMACY LAW AND REGULATIONS

A drug that is used to treat a disease that affects less than 200,000 patients.

.....

<b>Drug Price Competition and Patent Term Restoration Act of 1984</b>	
<b>Purpose</b>	<ul style="list-style-type: none"><li>• To encourage creation of generic drugs by streamlining the approval process for generic drugs</li><li>• To encourage creation of new brand name drugs by extending patent licenses</li></ul>

.....

Proprietary name given by a drug manufacturer and protected by a patent.

**ABBREVIATED NEW DRUG APPLICATION (ANDA)**

.....

**GENERIC DRUG**

.....

**CHEMICAL NAME**



## PHARMACY LAW AND REGULATIONS

Documentation required by the FDA for generic drug makers; requires generic drugs to demonstrate bioequivalence to the brand name product, but does not require the same testing and clinical trials.

.....

Comparable to the brand name product in strength, dosage form, and route of administration; must also demonstrate similar effectiveness and efficacy, but is not protected by a patent.

.....

A scientific name based on the structure of the chemical compound.

**PRESCRIPTION DRUG MARKETING ACT OF 1987**

.....

**ANABOLIC STEROID CONTROL ACT OF 1990**

.....

**ANABOLIC STEROID**

<b>Prescription Drug Marketing Act of 1987</b>	
<b>Purpose</b>	<ul style="list-style-type: none"><li>• Prohibits the reimportation of a drug into the United States by means other than by the manufacturer</li><li>• Prohibits the sale of drug samples and the distribution of samples to anyone other than those who are licensed to prescribe them</li></ul>

.....

<b>Anabolic Steroid Control Act of 1990</b>	
<b>Purpose</b>	<ul style="list-style-type: none"><li>• Designated anabolic steroids as a C-III substance due to misuse by athletes</li></ul>

.....

Synthetic testosterone abused by athletes and regulated under the Anabolic Steroid Control Act; classified as a schedule III narcotic.

**OMNIBUS BUDGET RECONCILIATION ACT OF 1990  
(OBRA-90)**

.....

**COUNSELING**

.....

**DIETARY SUPPLEMENT HEALTH AND EDUCATION  
ACT OF 1994 (DSHEA)**

<b>Omnibus Budget Reconciliation Act of 1990 (OBRA-90)</b>	
<b>Purpose</b>	<ul style="list-style-type: none"><li>• Any participant in a Medicaid reimbursement program must undergo drug utilization review (DUR) by the pharmacist.</li><li>• Every patient must receive an offer to be counseled by the pharmacist.<ul style="list-style-type: none"><li>• Failure to do so can result in loss of Medicaid reimbursement.</li></ul></li></ul>

.....

Done by the pharmacist to communicate with a patient any questions regarding medication or warnings and precautions that should be addressed.

- **A technician must never counsel patients, but can ask whether a patient has any questions for the pharmacist.**

.....

<b>Dietary Supplement Health and Education Act of 1994 (DSHEA)</b>	
<b>Purpose</b>	<ul style="list-style-type: none"><li>• Manufacturers of supplements are permitted to make claims not approved by the FDA, but they must still comply with purity and safety standards to protect patients and prevent adulteration.</li></ul>

**HEALTH INSURANCE PORTABILITY AND ACCOUNT-  
ABILITY ACT OF 1996 (HIPAA)**

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**MEDICARE PRESCRIPTION DRUG, IMPROVEMENT,  
MODERNIZATION ACT OF 2003 (MMA)**

.....

**FDA MODERNIZATION ACT OF 2004**

## PHARMACY LAW AND REGULATIONS

### **Health Insurance Portability and Accountability Act of 1996 (HIPAA)**

<b>Purpose</b>	<ul style="list-style-type: none"><li>• Protect patient confidentiality of medical records, including prescription history</li></ul>
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### **Medicare Prescription Drug, Improvement, Modernization Act of 2003 (MMA)**

<b>Purpose</b>	<ul style="list-style-type: none"><li>• Also known as Medicare Part D, provides prescription drug coverage to patients eligible for Medicare</li></ul>
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.....

### **FDA Modernization Act of 2004**

<b>Purpose</b>	<ul style="list-style-type: none"><li>• Change label on prescription drugs from "Caution: Federal Law Prohibits Dispensing Without a Prescription" to "Rx Only"</li></ul>
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**COMBAT METHAMPHETAMINE EPIDEMIC ACT  
OF 2005**

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**AFFORDABLE CARE ACT OF 2010 (ACA)**

.....

**FOOD AND DRUG ADMINISTRATION (FDA)**



<b>Combat Methamphetamine Epidemic Act of 2005</b>	
<b>Purpose</b>	<ul style="list-style-type: none"><li>• Monitor usage of products that can be used to produce methamphetamine:<ul style="list-style-type: none"><li>• pseudoephedrine, ephedrine, and phenylpropanolamine</li></ul></li><li>• 3.6 g per day product limit, and patients must show valid ID to obtain</li><li>• Medications stored behind the counter</li></ul>

.....

<b>Affordable Care Act of 2010 (ACA)</b>	
<b>Purpose</b>	<ul style="list-style-type: none"><li>• To increase access to healthcare for uninsured Americans</li><li>• Universal healthcare coverage to be in effect by 2014 for all citizens of the United States</li></ul>

.....

Under the U.S. Department of Health and Human Services; responsible for:

- new drug review and approval
- generic drug approval
- issuing drug recalls if needed
- OTC drug reviews

**NATIONAL ASSOCIATION OF BOARDS OF  
PHARMACY (NABP)**

.....

**CENTERS FOR MEDICARE AND MEDICAID  
SERVICES (CMS)**

.....

**STATE BOARDS OF PHARMACY (BOP)**

## PHARMACY LAW AND REGULATIONS

Represents all 50 state boards of pharmacy; has no regulatory authority.

.....

Oversees all Medicare and Medicaid services; establishes conditions for a facility to be reimbursed for any services provided.

.....

Oversees the practice of pharmacy in each state; defines all roles and duties of pharmacists and pharmacy technicians; can discipline when necessary.

**LICENSURE**

.....

**REGISTRATION**

.....

**CERTIFICATION**

## PHARMACY LAW AND REGULATIONS

Permission by the state board for an individual to practice in a given occupation; individual must demonstrate a minimum competency in order to practice.

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Enrolling on a list created by the state board of pharmacy.

.....

A voluntary process in which an organization recognizes that an individual has met specific standards required for certification. **The Pharmacy Technician Certification Board (PTCB) certifies technicians, and this is required for practice in some states.**

**UNITED STATES PHARMACOPEIA (USP)**

.....

**USP CHAPTER <797>**

.....

**USP CHAPTER <795>**

## PHARMACY LAW AND REGULATIONS

Sets official standards for all prescription and OTC drugs manufactured and sold in the United States; sets standards based on quality, purity, strength, and consistency of product.

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Chapter of USP dedicated to sterile compounding and requirements to help eliminate contamination of compounded sterile products (CSPs).

.....

Chapter of USP dedicated to nonsterile compounding.

**DRUG RECALL**

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**CLASS I RECALL**

.....

**CLASS II RECALL**



## PHARMACY LAW AND REGULATIONS

May be issued by the FDA to withdraw a drug from the market or issued voluntarily by the manufacturer in the case of contamination or other liability concerns.

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Probability exists that use of the product or drug will lead to serious adverse health events or death.

- Example: label mix-up of a lifesaving drug

.....

Probability exists that use of this product or drug may cause adverse health events that will be reversible or temporary.

- Example: a drug labeled with an understrength that is not a lifesaving drug

**CLASS III RECALL**

.....

**LOT NUMBER**

.....

**THE JOINT COMMISSION (TJC)**

## PHARMACY LAW AND REGULATIONS

Probability exists that the use of this product will most likely NOT cause an adverse health event

- Example: container defect, off taste or smell

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Number assigned by a manufacturer based on the batch when it was produced; allows tracking of a product so that it can be located in the event of a recall

.....

Formerly known as the Joint Commission on Accreditation of Healthcare Organizations (JCAHO); accredits hospitals and evaluates facilities based on patient care standards and patient safety

**MEDWATCH**

.....

**POLICIES AND PROCEDURES MANUAL**

.....

**GLOVE FINGERTIP SAMPLING**

## PHARMACY QUALITY ASSURANCE

Voluntary program run by the FDA that allows any healthcare professional or patient to report a serious adverse event associated with the use of a specific drug.

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A manual with written instructions for the pharmacy staff (both technicians and pharmacists) on all operations within the pharmacy.

- must be updated regularly
- must be written in accordance with hospital, state, and federal policies
- Any revisions and/or changes to policies must be approved by the appropriate committee (usually P and T committee).

.....

Used as a quality assurance tool for sterile compounding procedures.

- detects the presence of microorganisms on the fingertips of gloves if a sterile compounding technician is using poor aseptic technique practices
- An agar plate is used to detect the pathogens.
- should be completed on personnel prior to compounding CSPs and annually thereafter as a part of competency training

**NONSTERILE COMPOUNDING**

.....

**STERILE COMPOUNDING**

.....

**COMPOUNDED STERILE PREPARATION (CSP)**

## STERILE AND NONSTERILE COMPOUNDING

Compounding includes altering a drug to a form that is not commercially available based on instructions from a licensed prescriber. It can include: changing the dosage form or delivery system (e.g., crushing tablets and mixing to form a liquid), altering the strength of a drug (e.g., if a pediatric formulation is not available), combining two or more active ingredients, or preparing a drug from bulk products.

Compounding nonsterile products does not have to be done under sterile conditions, and the compound will be administered in a method that is not parenteral. The most commonly produced nonsterile compounds are suspensions, solutions, ointments and creams, suppositories, and tablets or capsules.

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Sterile compounding requires sterile conditions, meaning freedom from any bacteria or microorganisms. This process is reserved for parenteral products, or those injected, but can also be used for compounding medications being instilled into the eye and inhaled into the lungs.

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Also known as compounded sterile product, any drug that is compounded under sterile conditions.

**ASEPTIC TECHNIQUE**

.....

**GARBING PROCESS**

.....

**PERSONAL PROTECTIVE EQUIPMENT (PPE)**



## STERILE AND NONSTERILE COMPOUNDING

The process used to prepare CSPs; this technique is vital to avoid microbial contamination of the medication being compounded.

.....

Process must be followed strictly to prevent contamination; when finished, remove items in reverse order.

Garbing order (assume scrubs are already worn):

1. shoe covers
2. hair cover
3. face mask (beard cover if necessary)
4. wash hands aseptically
5. disposable gown
6. eye shield (if necessary)
7. sterile gloves

.....

Essential for infection control and to protect the technician from blood-borne pathogens as well as exposure to hazardous chemicals.

Includes:

- gloves to protect the hands
- masks and a respirator to protect the respiratory tract as well as the nose and mouth
- goggles to protect the eyes in the event of any splashing
- face shields

**ISOPROPYL ALCOHOL 70% (IPA)**

.....

**BEYOND USE DATING**

.....

**pH**

## STERILE AND NONSTERILE COMPOUNDING

Used for disinfecting and cleaning several areas:

- work surfaces of compounding area
- tops of vials prior to needle puncture
- gloved hands when necessary

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The date after which a product must not be dispensed or used (expiration date); this is determined by the pharmacist based on when the product is prepared and its storage conditions.

.....

A measure of how acidic or basic a solution is; closer to 1 is more acidic, and closer to 14 is more basic. **Blood pH is 7.4, so IV solutions should try to stay close to that value or at least neutral (pH = 7).**

**TONICITY**

.....

**HYPERTONIC SOLUTION**

.....

**HYPOTONIC SOLUTION**

## STERILE AND NONSTERILE COMPOUNDING

How the cells in our body respond to surrounding fluid; three classifications—hypertonic, hypotonic, and isotonic.

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A solution that has **more** particles than the surrounding cells, which causes water to be drawn out of cells, and the cells to shrivel.

.....

A solution that has **fewer** particles than the surrounding cells, which causes water to be drawn into the cells, and the cells to swell and sometimes burst.

**ISOTONIC**

.....

**COMPATIBILITY**

.....

**PHYSICAL INCOMPATIBILITIES**

## STERILE AND NONSTERILE COMPOUNDING

A solution that has **the same amount** of particles as the surrounding cells, so no water will move in or out, and the cell will stay the same size.

.....

The ability to combine two or more products without creating a change in the physical, chemical, or therapeutic effectiveness of the drug.

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When two or more drugs that are not compatible are combined, a physical change occurs that can be detected, including cloudiness, temperature, or a color change.

**CHEMICAL INCOMPATIBILITIES**

.....

**THERAPEUTIC INCOMPATIBILITIES**

.....

**RISK LEVELS**



## STERILE AND NONSTERILE COMPOUNDING

When two or more drugs are combined and are not compatible, a chemical change occurs that may alter the pH of a solution or cause the decomposition of a component.

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When two or more drugs are combined that are not compatible, it causes a change in the effectiveness of one or more of the drugs when administered.

.....

Four contamination risk levels defined by the USP Chapter <797> include:

- low-risk CSPs
- medium-risk CSPs
- high-risk CSPs
- immediate-use CSPs

Assigned according to the probability of contaminating a CSP.

**LOW-RISK CSPs**

.....

**MEDIUM-RISK CSPs**

.....

**HIGH-RISK CSPs**

## STERILE AND NONSTERILE COMPOUNDING

Involves the mixing of no more than three sterile products within an ISO class 5 workbench.

- Example: single transfer of a dosage from a vial into an IV bag

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Involves more complex sterile compounding procedures than low risk, such as mixing more than three sterile products or administering to multiple patients.

- Example: preparation of total parenteral nutrition (TPN)

.....

Involves mixing more than three products and/or one of the products is not sterile or is being compounded in an environment less than ISO class 5; these products must be sterilized before being injected into the patient.

- Example: using a nonsterile ingredient in preparing a medication for a patient

**IMMEDIATE USE CSP**

.....

**ANTEROOM**

.....

**CLEAN ROOM**

## STERILE AND NONSTERILE COMPOUNDING

Intended to be used only for emergency situations or when a patient requires the immediate use of a CSP; must be administered within one hour of preparation.

Example: emergency medications for cardiopulmonary resuscitation

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Area where pharmacy personnel prepare for sterile compounding, including:

- garbing
- hand washing
- gathering supplies

.....

Place where hoods are housed to be used during sterile compounding; personnel should not enter unless properly garbed.

**INTERNATIONAL ORGANIZATION FOR  
STANDARDIZATION (ISO)**

.....

**HIGH-EFFICIENCY PARTICULATE AIRFLOW FILTER  
(HEPA)**

.....

**HORIZONTAL LAMINAR AIRFLOW WORKBENCH  
(LAFW)**

## STERILE AND NONSTERILE COMPOUNDING

System for describing the maximum number of particles in the air allowed in a room where sterile products are compounded.

ISO Class	Maximum Particle Count (in particles of 0.5 microns and larger per m <sup>3</sup> of air)
4	352
5	3,520 (minimum for compounding area of sterile products)
6	35,200
7	352,000 (minimum for clean rooms)
8	3,520,000 (minimum for anterooms)
9	35,200,000

.....

Used to minimize airborne contamination by filtering 99.97% of particles sized 0.3 microns and greater.

.....

A hood used to prepare CSPs that are not hazardous.

- Air is pulled into the hood through a prefilter and then filtered through the HEPA filter before blowing horizontally across the work surface toward the worker.
- Technicians must work 6 inches inside the hood to avoid mixing the unfiltered air of the clean room with the HEPA filtered air of the LAFW.

**CLEANING THE HORIZONTAL LAW**

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**VERTICAL LAMINAR AIRFLOW WORKBENCH**

.....

**SYRINGE**



## STERILE AND NONSTERILE COMPOUNDING

Must be cleaned at the beginning of each shift, before every batch compounding session, and if there are any major spills or cleanup of contaminated products.

Cleaning should be first done with sterile water to remove any residue, and then disinfected with 70% IPA.

- Start with the hood's hang bars and hooks.
  - Next, clean the ceiling using overlapping motions starting from the back and moving toward the front.
  - Next, clean the back of the hood starting from the top and moving back and forth to the bottom.
  - Next, clean each side using down and up movements starting from the back of the hood to the exterior portion.
  - Finally, clean the work surface starting from the back and using overlapping movements to clean until the front is reached.
  - Be careful to not spray disinfectant on the surfaces, but rather on the cloth used to do the cleaning—this will protect the HEPA filter from absorption of chemicals.
- .....

A hood used to prepare CSPs that are hazardous (e.g., chemotherapy).

- Air flows down through the HEPA filter and is forced upward and vented outside.
  - Technicians should wear eye protection and use double gloves for these preparations.
- .....

Used in the preparation of a CSP to withdraw or inject solutions.

Parts of a syringe:

- barrel—covered with calibration marks to measure fluid volume
- plunger—fits inside barrel; is moved in and out to adjust fluid volume
- tip—where the needle attaches; can be Luer-lock or slip-tip
  - Luer-lock: a secure connection with the needle and the syringe
  - slip-tip: the needle slides onto the syringe—not as secure
- Flat knob—end of the plunger, which is pulled to increase volume in the barrel

Special Precautions: The syringe can only be handled on the barrel or the flat knob; all other surfaces, if touched, can subject the medication to contamination.

**NEEDLE**

.....

**NEEDLE GAUGE**

.....

**SHARPS CONTAINER**

## STERILE AND NONSTERILE COMPOUNDING

Used to puncture containers of medication and to withdraw or inject fluid.

Parts of a needle:

- hub—end point that will attach to the syringe
  - shaft—length of the needle
  - bevel—slanted opening of the needle
  - lumen—hollow portion of the needle where fluid moves
- .....

The size of a needle is determined by its gauge.

- The higher the gauge, the smaller the opening or diameter (lumen) of the needle.
  - The lower the gauge, the larger the opening or diameter of the needle.
  - Ranges in size from 16-gauge to 25-gauge:
    - Example: A 16-gauge needle makes a larger hole than a 25-gauge needle.
- .....

A red container used to safely dispose of all items considered dangerous and sharp, such as: needles, syringes, and broken glass.

**VIAL**

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**AMPULE**

.....

**FILTER NEEDLE**

## STERILE AND NONSTERILE COMPOUNDING

A container that is sealed containing medication either in liquid or powder form.

- can be made from plastic or glass
  - has a hard plastic cap that is removed by the technician prior to puncture
  - can be either single-dose (preservative-free and can only be used one time) or multiple-dose (contains preservatives and is stable for up to 28 days from initial use)
- .....

A sealed container made from glass that has an elongated neck.

- must be broken prior to use
- Contains no preservatives—single use only

Opening an ampule:

- Make sure the medication is at the body (gently tap the head if necessary).
  - Swab 70% IPA around the neck.
  - Snap the neck away from you using gentle but firm pressure.
- .....

A needle used to withdraw fluid from an ampule; has a built-in filter to remove any glass particles that may have fallen into the medication.

**LARGE VOLUME PARENTERAL**

.....

**SMALL VOLUME PARENTERAL**

.....

**IV SOLUTIONS**

## STERILE AND NONSTERILE COMPOUNDING

An IV infusion of greater than 250 mL (most commonly given as 500 mL or 1000 mL).

- used for electrolyte replacement and hydration
- given as a continuous infusion or IV drip

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A CSP given usually as an IVPB over a short period of time.

- less than 250 mL (usually 150, 100, 50, or 25 mL)
- examples: antibiotics, antifungals, antiviral medications

.....

<b>Common IV Base Solutions</b>	<b>Also Known As</b>
0.9% Sodium Chloride (NaCl)	Normal Saline (NS)
0.45% Sodium Chloride (NaCl)	0.45% Normal Saline (1/2 NS)
Lactated Ringer's	LR
Dextrose 5% in Water	D <sub>5</sub> W
Dextrose 10% in Water	D <sub>10</sub> W
Sterile Water for Injection	SWFI
5% Dextrose in 0.9% Sodium Chloride	D <sub>5</sub> NS
5% Dextrose in 0.45% Sodium Chloride	D <sub>5</sub> 1/2NS

**DILUENT**

.....

**CORING**

.....

**TOTAL PARENTERAL NUTRITION (TPN)**



## STERILE AND NONSTERILE COMPOUNDING

A liquid used to reconstitute a powder medication before it is injected into a patient or another IV solution.

Common diluents:

- sterile water
- normal saline

.....

The accidental introduction of small pieces of rubber from the top of a vial into the solution of medication; if this occurs, must discard vial.

.....

An IV solution that provides nutrients for patients who are unable to eat or cannot get the nutrition they need through eating orally.

Composed of:

- sterile water (hydration)
- dextrose (sugar and carbs)
- amino acids (protein building blocks)
- lipids (fatty acids)
- electrolytes and other additives (vitamins and minerals)
- medications that a patient may need

**COMPOUNDING LOG**

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**CLASS III PRESCRIPTION BALANCE**

.....

**PHARMACEUTICAL WEIGHTS**

## STERILE AND NONSTERILE COMPOUNDING

Used to record all entries of each compounded prescription so a reference can be available and easily accessible.

Lists the following information:

- date of compound
- Rx number
- names of specific ingredients used, along with:
  - expiration date
  - lot number
  - manufacturer
  - NDC number
- amount weighed or measured
- name of compound
- procedures detailing how compound was prepared
- name of preparer and pharmacist checking

.....

A two-pan balance that has a capacity of 15 to 120 grams.

- can be used to weigh small amounts in the range of +/- 5 mg
- used with pharmaceutical weights
- Weighing paper is placed on pans to prohibit contact of medication with the balance.
- Weighing boat can be used to weigh a larger quantity of a chemical.

.....

Weights used for calibration of class III prescription balance and for weighing ingredients.

- must be handled with forceps to avoid the transfer of any oils or dirt from the hands

**DIGITAL BALANCE**

.....

**GRADUATED CYLINDER**

.....

**BEAKER**

## STERILE AND NONSTERILE COMPOUNDING

Uses one pan and a digital or analytical readout for weighing ingredients.

- easier to use than a class III balance and more accurate

.....

A glass or plastic tool used for measuring liquid volumes.

- range in size from 5 mL to more than 1,000 mL
- For highest degree of accuracy, always choose the smallest size that can measure the volume desired (e.g., choose a 100 mL cylinder to measure 95 mL—don't choose a 250 mL cylinder).

.....

Can also be used to measure larger volumes of liquid, but less accurate than a graduated cylinder.

**MENISCUS**

.....

**MORTAR AND PESTLE**

.....

**OINTMENT SLAB**

## STERILE AND NONSTERILE COMPOUNDING

Curve at the upper surface of a liquid caused by surface tension.

- The liquid at the **bottom** of the meniscus should be measured at eye level.

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Used in nonsterile compounding to grind substances.

Mortar—bowl-shaped item

Pestle—used for crushing or grinding substances

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A flat surface used for mixing compounds such as creams, ointments, pastes, or gels.

- Usually made from ground glass, so it is nonabsorbent.

**GEOMETRIC DILUTION**

.....

**TRITURATION**

.....

**LEVIGATION**



## STERILE AND NONSTERILE COMPOUNDING

A method that ensures equal distribution of ingredients:

- First, mix the ingredient in the smallest amount with an equal amount of the next ingredient in quantity.
- Mix these thoroughly, then add another amount equal to that which is now in the mortar and mix again.
- Continue this process, increasing in quantity until all ingredients are mixed evenly.

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Grinding tablets or other substances into a fine powder.

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A levigating agent is added to a triturated powder slowly to make a paste.

Examples of levigating agents:

- mineral oil
- castor oil
- vegetable oil
- glycerin

**SPATULATION**

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**PUNCH METHOD**

.....

**CAPSULE SIZES**

## STERILE AND NONSTERILE COMPOUNDING

Combining substances using a spatula.

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A method for hand-filling capsules.

- The powder to be filled is placed on a surface, and the capsule is punched into the powder repeatedly until full.
- .....

Sizes range from 5 (smallest) to 000 (largest).













