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# *Psychiatric Medication Administration Exam: Study Guide*

**Review the following information concerning medications typically administered in psychiatric settings.**

## Classifications of Medications

- **Anticonvulsants** – use of anticonvulsants to treat bipolar disorder
  - Carbamazepine (Tegretol®) – need to monitor serum levels when initiating therapy
  - Valproic acid (Depakene®) – black box warning concerning liver failure
  - Divalproex (Depakote®) – correct instructions for use of sprinkle capsules

- **Antidepressant, Selective Serotonin Reuptake Inhibitor (SSRI)**
  - Length of time for patient to experience effectiveness after beginning therapy
  - Sample medications:
    - Fluoxetine (Prozac®) – risk of suicidal ideation and agitation among adolescent and young adult patients.
    - Sertraline (Zoloft®)
    - Venlafaxine (Effexor®)

- **Antihistamine**
  - Diphenhydramine (Benadryl®)

- **Antimanic Agent**
  - Lithium – risk associated with dehydration; need to monitor serum lithium levels

- **Antipsychotics, Atypical** – advantage of atypical antipsychotics over typical antipsychotics
  - Sample medications
    - Aripiprazole (Abilify®) – intended effect of adding to treatment of schizophrenia
    - Clozapine (Clozaril®) – adverse effect of severe reduction in WBCs agranulocytosis); monitor WBC count
    - Olanzapine (Zyprexa®) – adverse effects that lead to noncompliance/nonadherence
    - Quetiapine (Seroquel®) – in addition to lithium to treat depressive episodes of bipolar disorder
    - Risperidone (Risperdal®) – black box warning concerning an increase in mortality with elderly persons who have dementia-related psychosis; adverse effects, including hyperglycemia

- **Antipsychotic, Typical**
  - Haloperidol (Haldol®) – adverse effect of neuroleptic malignant syndrome (NMS)



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- **Anti-Parkinson's Agents**
  - Benzotropine (Cogentin®) – purpose for administering with neuroleptic medications such as haloperidol

- **Benzodiazepines**
  - Symptoms of alcohol withdrawal and medication of choice to treat
  - Safety risks for elderly persons are taking benzodiazepines
  - Adverse effects, including monitoring after IM administration
  - Medical conditions which contraindicate benzodiazepines
  - Sample medications
    - Diazepam (Valium®)
    - Lorazepam (Ativan®)

- **Cholinesterase Inhibitors**
  - Rivastigmine (Exelon®)

- **Herbal Supplement**
  - St John's Wort – interactions with psychiatric medications

- **Narcotic, Opioid**
  - Symptoms of toxicity; Narcotic agonist (reversal agent)
  - Sample medication:
    - Oxycodone (Oxycontin®)

- **Reversal agent**
  - Naloxone (Narcan®)

- **Serotonin Modulator**
  - Trazodone (Desyrel®) – adverse effect during first few days of therapy

- **Stimulants**
  - Dextroamphetamine and amphetamine (Adderall®) – indications of effectiveness with a patient who has attention deficit hyperactivity.

**Medications to Treat Medical Conditions**

- Albuterol (Proventil®) – adverse effects
- Carvedilol (Coreg®) – therapeutic and adverse effects
- Insulin sliding scale – identify the correct dose on a sliding scale, given a blood glucose value; proper verification procedure for administering insulin.
- Potassium chloride solution – laboratory monitoring
- Ramipril (Altace®) – an ACE inhibitor. Monitor during the first 2 hours after administering the first dose.



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## Calculations

- Calculate mL doses of oral liquids and IM preparations needed to prepare ordered dose
- For example, calculate mL of lorazepam 2 mg/mL needed to prepare an ordered dose

    - Available concentration = $\frac{\text{Desired dose}}{x}$
    - $\frac{2\text{ mg}}{1\text{ mL}} = \frac{\text{Desired dose}}{x}$
    - Desired dose X 1 = 2x
    - $x = \frac{\text{Desired dose X 1}}{2}$
- Calculate number of tablets needed to prepare ordered dose
    - Never split or crush extended-release preparations

## Laboratory Values

- Liver function tests (LFTs)
- Peaks and troughs for serum levels of medications
- Serum electrolytes
- Serum levels of medications – nursing action when serum level exceeds therapeutic range
- White blood cell count (WBCs)

## Routes

- Oral
- IM injection – recommend site
- IV observations
    - Distinguish among infiltration, phlebitis, and infection.
    - Correct management of infiltration, phlebitis, infection
- Transdermal patch – application technique

## Age Groups

- Adolescent
- Young Adult

} Risk for suicidal ideation and agitation associated with specific medications

- Middle Aged – medication of benefit in addition to lithium for depressive episodes of bipolar disorder postmenopausal women
- Elderly – medications that contribute to risk for falling; contraindicated medications



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# Calculation Review

**Why are calculations included in our exams?**

Although most facilities have pharmacy calculate and deliver unit dose medications, and have IV pumps to calculate IV rates, the nurse remains responsible for the delivery of the correct dose of medications and IVs. Nurse Directors from our client facilities have indicated that they consider calculations to be a critical part of our evaluation process.

## Conversions

| | |
|---|---|
| Milligram to Gram | 1000 mg = 1 G |
| Microgram to milligram | 1000 mcg = 1 milligram |
| Pounds to kilogram | 2.2 pounds = 1 kg |
| Centimeter to inch | 2.54cm = 1 inch |
| Milliliter to Liter | 1000mL = 1L |
| mL (cc) to ounces | 30mL (cc) = 1 ounce |

## Medication Calculations

You have an order to administer phenytoin (Dilantin) oral suspension 100 mg TID per feeding tube

Dilantin oral suspension is supplied to you in a 5 mL bottle which contains 125 mg/mL. How many mL per dose will you administer?

You can use either method below (or an alternate method) to determine the answer

| **Method #1: Ratio Proportion** | **Method #2: Formula Method** |
|---|---|
| $\frac{125\text{ mg}}{1\text{ mL}} = \frac{100\text{ mg}}{\text{“x” mL}}$ <br> Cross-multiply and solve for “x”. <br> $\frac{125\text{ mg}}{1\text{ mL}} = \frac{100\text{ mg}}{\text{“x” mL}}$ <br> 125 “x” = 100 <br> “x” = 100/125; “x” = **0.8 mL** | $\frac{100\text{mg (dose desired)}}{125\text{ mg (dose on hand)}} \times 1\text{ mL} = \text{“x” mL}$ <br> Solve for “x”. <br> 100/125 = “x” <br> “x” = **0.8 mL** |

You will administer **0.8 mL**

Your 4 year old pediatric patient weight 40 pounds. She is febrile. You need to administer acetaminophen (Tylenol) 15mg/kg. How many mg will you administer?

First covert 40 pounds into kilograms.

| **Method #1: Ratio Proportion** | **Method #2: Formula Method** |
|---|---|
| $\frac{1\text{ kg}}{2.2\text{ pounds}} = \frac{x\text{ kg}}{40\text{ pounds}}$<br><br>Cross-multiply and solve for x.<br><br>$\frac{1\text{ kg}}{2.2\text{ pounds}} \times \frac{x\text{ kg}}{40\text{ pounds}}$<br><br>$2.2x = 40$<br><br>$x = 18.18\text{ kg}$ | $\frac{40\text{ pounds}}{2.2\text{ pounds}} \times \frac{1\text{ kg}}{} = x\text{ kg}$<br><br>$x = 18.18\text{ kg}$ |

Since you will administer 15mg of acetaminophen per 1 kg, you will multiply 15mg with the weight of 18.18 kg.

15mg x 18.18kg = 272.7.

**You will administer 272.7 mg.**

Need more practice? Check out practice calculations in the Critical Thinking: Nursing Calculations Part 2 course on www.RN.com.

# IV Rate Calculations

Each method below gives the same result. Use the one most familiar to you.

**Method #1**

Use drop factor constant

| Common Drop Factors | Drop Factor Constant |
|---|---|
| 60 gtt/mL – minidrip set | 1 |
| 10 gtt/mL – regular drip set | 6 |
| 15 gtt/mL – regular drip set | 4 |

IV drip rate in drops per minute = $\frac{\text{Volume to be infused (mL) over 1 hour}}{\text{Drop factor constant}}$

Example:

Rate is 100 mL/hr. You have a regular drip set – 10 gtt/mL. Drop factor constant is 6.
At how many drops per minute will you set the rate?

$\frac{\text{100 mL}}{\text{6 (drop factor constant)}}$ = 100/6 = **16.66 (round to 17) drops per minute**

**Method #2**

Determine the rate per hour
Multiply the rate per hour by the drip rate
Divide the total by 60 (minutes) – converts rate per hour to rate per minute.

Example:

Rate is 125 mL/hr
IV set delivers 15 drops per mL

$\frac{\text{125 mL/hr}}{\text{60 minutes}}$ x 15 drops/ mL = **31.25, rounded to 31 drops per minute**

**Sample Problems**

**Problem #1**

Your patient has an order for terbutaline (Brethine) 0.25 mg subcut. The pharmacy delivers a syringe with 1mg/mL. What is the correct volume to deliver to the patient? (See next page for answer.)

**Problem # 2**

You receive an order for 60 mg of meperidine (Demerol) IM for your post surgical patient. The injection syringe is pre-packaged with 75 mg/ mL. How much will you administer? (See next page for answer.)

**Problem #3**

Your patient has been receiving digoxin (Lanoxin)125 mcg Q AM. Today his doctor writes a new order:

Digoxin 0.25 mg PO Q AM start now

How many 125 mcg tablets will you administer? (See next page for answer.)

**Problem #4**

An IV is ordered to run at 60 mL/hr. The IV drip set delivers 15gtt/mL. How many drops per minute will you set the IV at? (See next page for answer.)

**Problem #5**

An IV is ordered to run at 175/hr. The IV drip set delivers 10 gtt/mL. How many drops per minute will you set the IV at? (See next page for answer.)

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**Answer to Problem #1**

| Method #1: Ratio Proportion | Method #2: Formula Method |
|---|---|
| $\frac{1\text{ mL}}{1\text{ mg}} = \frac{x\text{ mL}}{0.25\text{ mg}}$  <br>Cross-multiply and solve for x.<br>$\frac{1\text{ mL}}{1\text{ mg}} = \frac{x\text{ mL}}{0.25\text{ mg}}$<br>$0.25x = 1$<br>$x = 0.25\text{ mL}$ | $\frac{0.25\text{ mg}}{1\text{ mg}} \times 1\text{ mL} = x\text{ mL}$<br>$x = 0.25\text{ mL}$ |

**Answer to problem # 2**

| Method #1: Ratio Proportion | Method #2: Formula Method |
|---|---|
| $\frac{75\text{ mg}}{1\text{ mL}} = \frac{60\text{ mg}}{x\text{ mL}}$  <br>Cross-multiply and solve for x.<br>$\frac{75\text{ mg}}{1\text{ mL}} = \frac{60\text{ mg}}{x\text{ mL}}$<br>$75x = 60$<br>**$x = 0.8\text{ mL}$** | $\frac{60\text{mg}}{75\text{ mg}} \times 1\text{ mL} = x\text{ mL}$<br>Solve for x.<br>**$x = 0.8\text{ mL}$**<br>. |

**You will administer 0.8 mL.**

**Answer to Problem #3**

| Method #1: Ratio Proportion | Method #2: Formula Method |
|---|---|
| $\frac{0.125\ mcg}{1\ tablet} = \frac{0.25\ mcg}{x\ mL}$<br><br>Cross-multiply and solve for x.<br><br>$\frac{0.125\ mcg}{1\ tablet} = \frac{0.25\ mg}{x\ tablet}$<br><br>$0.125x = 0.25$<br><br>$x = .0.25/0.125$<br>**x = 2 tablets** | $\frac{0.25\ mg}{0.125\ mg} \times 1\ tablet = x\ tablet$<br><br>Solve for x.<br><br>$x = \frac{0.25}{0.125}$<br><br>**x= 2 tablets** |

**You will administer 2 tablets.**

**Answer to Problem #4**

| Method #1: Drop Factor Constant | Method #2: Calculation |
|---|---|
| $\frac{60\ mL/hr}{4\ (drop\ factor\ constant)} = x\ drops\ per\ minute$<br><br>Divide and solve for x<br><br>$60/4 = 15$<br><br>**x = 15 drops per minute** | $\frac{60\ (mL/hr) \times 15\ (drops/mL)}{60\ (minutes)} = x\ drops\ per\ minute$<br><br>Solve for x.<br><br>$\frac{60 \times 15}{60} = 15$<br><br>**x = 15 drops per minute** |

**You will set rate at 15 drops per minute**

| **Method #1: Drop Factor Constant** | **Method #2: Calculation** |
| --- | --- |
| $\frac{175 \text{ mL/hr}}{6 \text{ (drop factor constant)}} = x \text{ drops per minute}$<br><br>Divide and solve for x<br><br>175/6 = 29.16<br><br>**x = 29 drops per minute** | $\frac{175 \text{ (mL/hr) x 10 (drops/mL)}}{60 \text{ (minutes)}} = x \text{ drops per minute}$<br><br>Solve for x.<br><br>$\frac{175 \times 10}{60} = 29.16$<br><br>**x = 29 drops per minute** |

**You will set rate at 29 drops per minute**