Answers to Practice Problem Set #5

1. Cephalexin (comon trade name: Keflex) is an antibiotic. The usual pediatric dosage regimen for strep pharyngitis (strep throat) is 25-50mg/kg/day in 2 divided doses. You receive a prescription to fill a 10-day supply of this medication for a 32-pound child with strep throat. The product is available as an oral suspension, 250mg/5ml. Please write the instructions that you will place on the prescription label. (Use a complete sentence, please).

instructions: **Take one teaspoonful twice daily for 10 days.**

(25-50mg/kg/day)(14.5kg)(1day/2doses)(5ml/250mg)(1tsp/5ml) = 0.73–1.45 tsp
Note that there is no need to go outside the dosing range when you have a perfectly acceptable dose within the recommended dosing range.

2. You are asked to recommend an initial dose of lisinopril, an angiotensin-converting enzyme inhibitor used for blood pressure control that also can slow the progression of renal (kidney) disease. The patient is a 45 year-old, 165-pound, 5'3" female with a serum creatinine of 2.4 mg/dl. Facts and Comparisons gives you the following information:

Lisinopril dosage in renal impairment

CrCl (ml/min)	initial dose (mg/day)
>30	10mg
≥10, ≤30	5mg
<10	2.5mg

Please calculate this patient's creatinine clearance and recommend a starting dose.

24 ml/min **IBW = (3)(2.3) + 45 = 52 kg**

5 mg as a starting dose

$$\frac{(140 - 45)(52\ kg)}{(2.4)(85)} = 24\ ml/min$$

3. A patient has received 3 days of penicillin G 1,000,000units IV q6h. The physician wants to switch the patient to an oral product that is reasonably close in dose to what the patient was receiving intravenously, and have the patient finish a full 10 days of therapy with the penicillin. The oral form of penicillin most commonly given is penicillin V, which comes as 250mg and 500mg tablets. You know that 250mg = 400,000units. Please give the strength, directions, and number of tablets of the product you will dispense.

penicillin V **500** mg, # **28** tablets **10 days penicillin – 3 days completed = 7 days remaining**

directions: Take **1** tablet(s) 4 times a day until all tablets are gone.

(1,000,000 units/dose)(250mg/400,000 units) = 625mg/dose

Here you can go in several directions. You can round down and have the patient take 500mg po QID, which would be easiest. You can round up and have the patient take three 250mg tablets QID – less optimal since the patient has to swallow 12 tablets daily. The least optimal method from the patient's point of view is to give the exact calculated dose: two-and-a-half 250mg tablets/dose. It's a pain for a patient to break a tablet in half. I chose the method that gives the patient the least amount of hassle.

4. You receive a supply of this year's "flu" vaccine. The package notes that the product should be stored between 2° and 8° C. Your refrigerator thermometer measures temperature in °F. Please calculate the temperature range in °F within which you will need to maintain your refrigerator in order to properly store this vaccine.

range: 36° - 46°F $\frac{2.8}{5} \times 9) + 32 = 35.6$ to 46.4

5. A patient has been taking 20mEq of potassium chloride daily in the form of K-Dur, which is affectionately referred to by many pharmacists as a "horse tablet". The patient has been experiencing difficulty in swallowing the tablet, so the physician wants you to dispense a liquid form of potassium. You have a potassium chloride 20% solution on your shelf. How many teaspoonfuls of this liquid will the patient need to take daily in order to equal her K-Dur dose? Round to the nearest half-teaspoonful.
(MW: K 39, Cl 35.5)

1.5 teaspoonful(s)

(20 mEq/dose)(74.5 mg/mEq)(100ml/20,000mg) = 7.45 ml/dose

6. A common formula for determining a "loading dose" of a medication is:

$$\frac{\text{(desired serum conc) (volume of distribution)}}{\text{bioavailability}} = \text{loading dose}$$

Digoxin is a medication for which a loading dose is often given. Assuming that the therapeutic serum concentration range is 0.8-1.6 ng/ml, and the volume of distribution is 6.7 L/kg, what oral loading dose (bioavailability = 0.85) would you recommend for a 145-pound patient? The oral dosing strengths available are 0.125mg and 0.25mg.

give **2 (or 3)** tablets of the **0.25** mg strength

Important note: 0.8 – 1.6 ng/ml = 0.8 – 1.6 µg/L

$$\frac{(0.8–1.6\mu g/L)(6.7L/kg)(145\ lb)(1kg/2.2\ lb)}{0.85} = 416\text{-}816\mu g = 0.42–0.82mg$$

0.5mg or 0.75mg are both doses within this range; give as few tablets as possible

7. Vancomycin is an antibiotic that, when given intravenously, is usually dosed at 15mg/kg. A physician has asked you to mix a dose for a 6'2" 185-pound male patient. You have a vial of vancomycin that, when reconstituted, produces a 250mg/ml solution. How much of this solution will you add to a 250ml bag of D5W in order to prepare an appropriate dose for this patient?

5.0 ml

(185 lb)(1kg/2.2 lb)(15mg/kg)(1 ml/250 mg) = 5.0 ml

if you used IBW: (82 kg)(15mg/kg)(1 ml/250 mg) = 4.93 ml ≈ 5.0 ml

8. The recommended maintenance infusion dose for aminophylline (a medication given to patients with breathing difficulties) for a non-smoking adult is 0.5mg/kg/hr. Your pharmacy carries theophylline 400mg in 500ml D5W for infusion. Aminophylline is 79% theophylline (the rest is the salt of the drug and not active). Please calculate the infusion rate for a 150-pound patient (assume patient is at IBW).

34 ml/hr

Important note: here you are using 2 different drugs and so you *must* differentiate between them in your calculation units. I will use the following shorthand for the different drugs in my equations:
A = aminophylline T = theophylline realize that 1 A contains 0.79 T

$$150\ lb \times \frac{1kg}{2.2\ lb} \times \frac{0.5mg\ A}{kg/hr} \times \frac{500ml}{400mg} \times \frac{0.79mg\ T}{1\ mg\ A} = 33.7\ ml/hr$$

9. By the time the patient in question 8 is ready to be discharged, the physician has lowered the rate of the theophylline infusion to 30ml/hr. Please calculate a comparable daily oral dose of theophylline using Theodur, a long-acting form of theophylline that is available at most pharmacies in 100mg, 200mg, and 300mg tablet strengths,

and that is usually given BID. Remember that you only want to dispense *one* strength of this tablet and that you want to avoid making patients cut tablets in half whenever possible

comparable daily dose: Theodur **300** mg po BID.

(30 ml/hr)(400 mg/500 ml)(24 hr/day)(1 day/2 doses) = 288 mg/dose

10. You receive the following prescription:

Keflex 500mg po QID x 5 days, then 250mg po QID. Please dispense 3 weeks' supply.

Keflex is available as 250mg and 500mg capsules.

You will dispense **104** capsules of the **250** mg strength.

(2 caps/dose)(4 doses/day)(5 days) = 40 caps

(1 cap/dose)(4 doses/day)(16 days) = 64 caps

total: 104 caps

Note that you *cannot* use the 500mg caps, because this would mean the patient would have to cut a capsule in half for each dose for the last 16 days. Capsules cannot be cut in half.