Answers to Practice Problem Set #4

1. Cefixime is an oral antibiotic often used for ear infections in children. The recommended dose is 8mg/kg/day given as a single daily dose. Cefixime is available as an oral suspension containing 100mg/5ml. What dose in ml would you recommend be given to a 19-pound child? (please round to the nearest 0.2ml)

__**3.4**__ml

8 mg/kg/day x 19 lb x 1 kg/ 2.2 lb x 5ml/100mg = 3.45ml

2. Ceftizoxime is a medication commonly prescribed for lower respiratory tract infections. A 160-pound, 68-year-old female patient with a serum creatinine of 1.2mg/dl was prescribed ceftizoxime 2gm IV q8h. Facts and Comparisons makes the following recommendations for patients with renal insufficiency:

CrCl	dose
50-79 ml/min	1/2 dose q8h
5-49	1/4-1/2 dose q12h
dialysis pts	1/4 dose q24-48hours

Please calculate this patient's creatinine clearance and recommend any needed dosing adjustments.

CrCl:___**51**__ml/minute

I recommend ceftizoxime __**1**__g IV q__**8**__h.

(140-68)(160 lb)(1kg/2.2 lb) = 51 ml/min $CrCl_{calc}$
(85) (1.2)

3. Nitroglycerin is a medication often given intravenously in the acute care setting to control angina (chest pain). The usual recommended starting dose is 5µg/min. A standard nitroglycerin drip contains 50mg nitroglycerin in 250ml of D5W. What infusion rate, in ml/hr, should the nurse program the pump to deliver the medication for a standard initial dose?

___**1.5**_ml/hr

5 mcg x 250ml x 60min x 1 mg = 1.5 ml/hr
min 50mg hr 1000mcg

4. A drug is said to reach "steady state" when 5 half-lives have elapsed. In the case of warfarin (a blood thinner), however, the steady state is dependent not upon the drug's half-life, but upon the half-life of the clotting factors it inhibits. The clotting factors inhibited by warfarin have the following half-lives:
Factor II - 50 hours
Factor VII - 6 hours
Factor IX - 24 hours
Factor X - 36 hours
Based on this information, how long will it take a patient to reach maximal anticoagulation?

__**10.4**__ days
"maximal" anticoagulation will be reached when all clotting factors are inhibited. This will take approximately 10 days, since 50hrs (the half-life of the clotting factor taking the longest time to reach steady state) x 5 = 250 hours, which is 10.4 days.

5. Clarithromycin (trade name: Biaxin) is a new antibiotic often given for sinusitis (sinus infection). A 3-year-old, 34-pound child has been prescribed a three-week course of therapy. Pediatric dosing recommendations are 7.5mg/kg po BID, with a maximum of 500mg/dose. The drug is available in a 125mg/5ml strength, 100ml and 200ml bottles, and a 250mg/5ml strength, 100ml bottle. When reconstituted, each bottle has a shelf life of 14 days. Please calculate how many milliliters the child should receive for each dose (round to the nearest 0.2ml), identify what strength and size of bottle you will dispense, and how many bottles you will dispense (assume that you will also dispense enough water to reconstitute more than one bottle at the appropriate time).

Directions: Give __**4.6**__ml twice daily for 3 weeks.

I will dispense _____ bottle(s) of the _____mg/5ml strength. Amount in

each bottle:_____ml when reconstituted.

34 lb x 1 kg x 7,5mg x 5ml = 4.6 ml/dose
2.2 lb kg 125mg

I will dispense 2 bottles of the 125mg/5ml strength, 100ml (when reconstituted). The first bottle I will dispense reconstituted, and it should last 10.5 days. The second bottle can be dispensed in one of two ways:
a. Can give the parent the unreconstituted bottle with a label, plus an extra bottle with the correct amount of water measured out, so that all that the parent has to do is to pour the water into the bottle with the powdered medication and shake well.
b. The parent can come by the pharmacy between days 7 and 10, at which time the pharmacy can reconstitute the second bottle for the parent.
Either way, the child should have just enough between the two bottles to last 21 days.

6. A physician has written the following order for a patient:
Insulin drip 3u/hr
The standard insulin drip that you mix in your pharmacy is 50 units of regular insulin in 250ml NS. The nurse would like you to calculate an infusion rate at which she should set the pump.

__**15**__ml/hr
3 units x 250ml = 15 ml/hr
hr 50units

7a. A 48-year-old, 5'9", 170-pound male patient with a serum creatinine of 1.1 has been prescribed vancomycin, an antibiotic. Population pharmacokinetic parameters state that the volume of distribution for vancomycin is 0.7 L/kg and that the clearance is (0.65)(CrCl).
half-life = (0.693)(V)
Cl
Please calculate this patient's expected vancomycin half-life.

ABW = (170 lb)(1kg/2.2 lb) = 77 kg

IBW = (9" x 2.3kg/") + 50kg ≈ 71 kg but ABW within 20% of IBW, so will use

CrCl = (140-48)(77 kg) = 89 ml/min
(1.1)(72)

half-life = (0.693)(0.7L/kg)(77 kg) = 645 min x 1hr = 10.75 hrs
(0.65)(89 ml/min)(1 L/1000ml) 60 min

8. For the patient in question 7, you have targeted a vancomycin trough (i.e. the lowest plasma concentration reached in the dosing interval) of 5-10 mg/L. Prior medical records from a hospital in Vancouver, B.C., indicate that this patient was previously treated there with vancomycin at the same dose and frequency that the doctor has prescribed here. This patient had a trough of 2.7 µMol/L. Please determine whether or not this trough will be within your desired range. (vancomycin MW: 3300)

__**8.9**__ mg/L

2.7 µMol x 3300 µg x 1 mg = 8.9 mg
L µMol 1000 µg L

8.9 mg/L is within my 5 - 10 mg/L target trough range

9. Prostaglandin E2 (dinoprostone) is a vaginal suppository which is supposed to be stored at -20°C. What temperature would this be in °F?

__**-4**__ °F **(-20°C)(9/5) + 32 = - 4° F**

10. The suppositories in question 9, which contain 20mg of prostaglandin E2, are mainly used to create a lower-strength vaginal gel used for cervical ripening of pregnant women who are at term or post-term. The one commercial product available contains 0.5mg of prostaglandin E2 in 2.5ml of methylcellulose gel. If you were asked to compound this product extemporaneously, how many suppositories would you triturate, how much methylcellulose would you use, and how many 3ml syringes could you fill? (each syringe will contain 2.5ml)

____**1**__ suppository(ies)

___**100**_ ml methylcellulose gel

___**40**__ total 3ml syringes of prostaglandin E2 0.5mg/2.5ml

$$\frac{\textbf{20mg PE2}}{\textbf{supp}} \times \frac{\textbf{1 syringe}}{\textbf{0.5mg PE2}} = \textbf{40 } \frac{\textbf{syringes}}{\textbf{supp}}$$

40 total 3ml syringes of prostaglandin E2 0.5mg/2.5ml (this is assuming that the amount of gel displacement by the suppository is negligible (which it is, since the total suppository mass in each syringe adds less than 1% to the total mass)