2008 Calculations Quiz 4

1. You receive an order for dopamine 3.2 mg/ml in 50ml D10W. Dopamine is available in a stock solution of 200mg/5ml. How many milliliters of dopamine stock solution will you need to make this product? Assume that you will first measure the dopamine stock solution and then will add sufficient D10W to make a total of 50ml of fluid. Round your answer to the nearest tenth of a milliliter.

2. A 26-lb child is to receive morphine sulfate at a rate of 20 mcg/kg/hr. You place 4 mg of morphine sulfate in a syringe containing a total of 20 mL of fluid. At what flow rate (mL/hr) will the nurse need to set the pump? Round to the nearest 0.1 ml/hr.

3. You receive an order for paclitaxel 175 mg/m^2 for a 6'0", 160-lb patient. What would be a reasonable dose in milligrams (round to the nearest 5 mg) and how much of a 6 mg/ml stock solution will be needed for this dose? (Round stock solution volume to the nearest 0.2 ml)

4. You receive an order for propofol 5 mcg/kg/min. The patient weighs 150 pounds. You have a 50 ml syringe pump containing 500 mg of propofol. What will be the infusion rate in ml/hr? Please round to the nearest tenth of a milliliter.

5. A 24 lb child is to receive trimethoprim/sulfamethoxazole suspension for 10 days. The physician has asked you to dose the child. Dosing guidelines are 8 mg/kg/day of the trimethoprim component given in 2 divided doses (so 4 mg/kg/dose). The suspension contains 40mg trimethoprim and 200mg sulfamethoxazole in 5 ml. The mother will use a teaspoon to administer the medication. Calculate how many teaspoonfuls the child will need for each dose and how many milliliters of suspension the child will need for the full 10 days of therapy.

6. You receive an order for Zosyn® 3.375g IV q6h for a 71 year old, 158 lb, 5'9" male patient with a serum creatinine of 1.8 mg/dL. Using the dosing recommendations in Facts and Comparisons, determine the most appropriate dose for this patient. Your answer should include both the dose (e.g., 3.375 g) and dosing frequency (e.g., q6h).

7. You receive a prescription for prednisone "qs for 16 days" with a sig of "40mg days 1-4, 30mg days 5-8, 20mg days 9-12, and 10mg days 13-16." How many 10-mg tablets will you dispense?

8. A patient is using fluticasone proprionate one spray in each nostril daily. There are 6 mg of fluticasone in each bottle, with each actuation containing 50 mcg. How many days should one bottle last?

9. A 19-year old, 115-lb patient with cystic fibrosis is admitted with pneumonia caused by *Pseudomonas aeruginosa*. The physician would like to treat the infection with ceftazidime and tobramycin. You would like to try dosing the tobramycin using data from a recently-published study. You know that

$$C_0 = \text{dose}/ (V_1)(\text{wt})$$

Your desired concentration at time 0 is 30 mg/L. The paper showed an average volume of 0.263 L/kg in a group of children with cystic fibrosis receiving tobramycin. What daily dose of tobramycin should get this patient to the desired serum concentration? Round the dose to the nearest 10mg. (note: wt = actual body weight)

10. You are reading a recently-published study comparing a new medication regimen for diabetes to "usual care" (an older, well-established medication regimen). Out of 630 patients receiving the new regimen 19 developed a diabetes-related complication versus 31 of 622 patients receiving usual care.

A practical way of comparing treatments is calculating the number needed to treat (NNT), defined as the number of people needing treatment with a specific regimen in order to prevent one event (e.g., a disease-related complication). This calculation requires knowing the incidence of events in both the group of interest and the comparator group. Incidence is the number of people experiencing the event divided by all the people in that group.

Absolute risk reduction (ARR) is calculated by subtracting the incidence of an event in one group from the incidence in another group, and NNT = 1/ARR. When doing NNT calculations, you will always round your calculated number up to the next whole person (e.g., 18.75 people = 19 people) How many people receiving the new regimen would need to be treated in order to prevent one event, compared to usual care? (NNT = 50.8 = 51 people)

IBW equation
Men: 50kg + [(2.3)(#inches > 5ft)]
Women: 45kg + [(2.3)(#inches > 5ft)]

Cockroft-Gault equation

$$CrCl = \frac{(140 - age)\,(ABW)}{(\text{gender factor})(S_{cr})}$$

Salazar-Corcoran equations

Men: $\frac{[137 - age]\,[(0.285)(ABW) + (12.1)(ht^2)]}{(51)(S_{Cr})}$ Women: $\frac{[146\text{-}age]\,[(0.287)(ABW) + (9.74)(ht^2)]}{(60)(S_{Cr})}$

where:
- weight: ABW in kg
- height: meters
- 1.0 mg/dL is used for serum creatinine concentration if actual serum creatinine is below 1.0 mg/dL

Haycock-Schwartz BSA equation

$$BSA = (\text{ht in cm})^{0.3964}\,(\text{wt in kg})^{0.5378}\,(0.024265)$$