Case Studies #3

1. B.F. is a 5’ 4”, 72 kg, 30 year old female who suffered a severe burn that has since been infected by S. aureus. Her \( C_{\text{creat}} \) is measured at 0.6 mg/dL. Design a dosing regimen of half-hour i.v. infusions of gentamicin that will give her a true \( C_{\text{max}} \) of 7.5 µg/ml and a true trough concentration of 0.5 µg/ml.

2. B.F. is given the infusion you recommended at 8:00 am. At 9:00 am a plasma sample is taken and yields a \( C_{\text{p*max}} \) of 9.2 µg/ml. Another sample is taken one half hour before the next infusion to give a \( C_{\text{p*min}} \) of 2.4 µg/ml. Calculate the actual \( k_e \) and \( V_d \) for B.F. and recommend a dosing change to give a true \( C_{\text{max}} \) of 7.5 µg/ml. What is the new true \( C_{\text{min}} \) expected with this dosing change.

3. I.P. is admitted to the hospital after a major auto accident. At admission he weighed 71 kg, and is 5’9”. The day following surgery I.P. weighs 76 kg and is suffering from an infection. At 10:00 am he is given a half an hour infusion of 350 mg of amikacin.
   a. Predict his volume of distribution.
   b. What will his plasma concentration be at 3:00 pm if his creatinine clearance is 7.2 L/h or 120 ml/min?

4. G.W., a 30 year old, 50 kg man, is receiving 70 mg of tobramycin infused IV over a 30 minute period every 8 hours. His serum creatinine has increased from 1 mg/dl to 2 mg/dl over the past 24 hours. Because his renal function appears to be decreasing, three plasma samples were obtained to monitor serum gentamicin concentrations as follows: just before a dose, 1 hour after the end of the infusion, and at the end of the dosing interval (two troughs and one peak level. The serum gentamicin concentrations at theses times were 4 mg/L, 8 mg/L, and 5 mg/L. Calculate the volume of distribution, elimination rate constant and clearance of tobramycin for G.W.

5. H.K., 55 year old, 55 kg woman with a serum creatinine of 1.0 mg/dl, has been empirically started on 500 mg of vancomycin every 8 hours for treatment of a staphylococcal infection. What are the expected peak and trough vancomycin concentrations for H.K.