

PHA 5127 – Fall 2003
Case Study # 6

1. A 55kg, 60-year-old male is hospitalized for a ruptured duodenal diverticulum that was surgically repaired. Before the surgery the patient is put on a short-term infusion (0.5h) of aminoglycosides.
 - The desired steady-state peak (one hour after the end of the infusion) and trough values (at the end of the dosing interval) are: $C_{max} = 6\text{mg/L}$, $C_{min} = 1\text{mg/L}$
 - Population estimates for CL (=2.4L/h) and Vd (=0.25L/kg).
 - During the first infusion blood samples are taken 1 and 3 hours after the stop of the infusion to verify that the proper dosing regimen was selected. Plasma concentrations were 4.8mg/L and 2.8mg/L one and three hours after stop of the infusion, respectively
 - assume 1-compartment body model
 - A.** Calculate CL, Vd and k_e considering the population pharmacokinetic estimates.
 - B.** Calculate a dosing regimen that would achieve the desired steady-state peak ($C_{max}=6\text{mg/L}$) and trough ($C_{min}=1\text{mg/mL}$) one hour after the end of the infusion and at the end of the dosing interval, respectively.
 - C.** Calculate the 'actual' k_e based on the two blood levels. Is it the same as the population estimate? What should you do?
 - D.** Calculate the new clearance for the patient.
 - E.** Calculate the new dosing interval.
 - F.** Calculate the recommended dose for the 'actual' k_e .
 - G.** Calculate the trough level at steady-state.

2. R.B. is a 30-year-old, 70 kg female with a serum creatinine of 0.9 mg/dL. An initial gentamicin dose of 100mg was infused i.v. over 30 min. Calculate the plasma concentration of gentamicin one hour and 7 hours after the infusion was started. ($V_d=0.25\text{L/kg}$, $CL=CL_{Cr}$)