1. Theophylline has a volume of distribution of 0.5 L/kg in children (weight 25 kg) and adults (weight 65 kg). The average total body clearance in children is 0.1 L/h/kg, that in adults is 0.04 L/h/kg.
   a. Calculate the average half-life of theophylline in children and adults.
   b. For a therapeutic range of 10-20 µg/ml, what dosing regimens are necessary for an immediate release theophylline product with complete bioavailability to stay within this range at all times (assume instantaneous bolus absorption).

2. How rapidly should the aminophylline loading dose be administered if it is given intravenously?

3. The hepatic clearance of a drug in a patient is reduced by 50% due to chronic viral hepatitis. How is the total body clearance of the drug affected? What should be the new dose of the drug in the patient? Assume that renal drug clearance ($fe = 0.4$) and plasma drug protein binding are not altered.

4. When should plasma samples for theophylline concentrations be obtained for a patient who is on an oral regimen with a constant dosing interval?