

Vancomycin Dosing Chart  
Marshall Pierce, PharmD.

**Initial Dosing**

1. Calculate the patient's lean body weight.  
Males (kg) = 50 kg + 2.3 (height in inches > 60 inches)  
Female (kg) = 45.5 kg + 2.3 (height in inches > 60 inches)
2. Calculate the patient body surface area<sub>meters squared</sub> =  
$$\text{Weight}_{\text{kg}}^{0.425} * ((\text{Height}_{\text{inches}} * 2.54)^{0.725}) * 0.007184$$
3. Calculate the patient's individualized creatinine clearance (ml/min).  
Males =  $\frac{(140 - \text{age}) * (\text{Lean body weight or actual weight which ever is less})}{\text{Scr mg/dl} * 72}$   
Females = 0.85 x above  
  
ml/min/1.73<sub>meters squared</sub> = above \* 1.73 / patients surface area
4. Use a loading dose of 20-25 mg/kg based on actual body weight for a peak of 20-30 mcg/ml.
5. Using the patient's actual body weight select a maintenance dose of 8, 9, 10, 11, 12, 13, 14 or 15 mg/kg, for a dose of 500-2000 mg per dose. Round the dose as necessary. Note: for every 1 mg/kg difference between the patient's actual dose and the chart dose the predicted level will be approximately 1 mcg/ml in error when aiming for a trough of 10 mcg/ml.
6. Using the chart for the selected mg/kg dose find the patient's creatinine clearance on the chart. Go down the column under the patient's creatinine clearance, changing the dosage interval, until you find a trough of approximately 10-15 mcg/ml for nondialysis patients and 15-20 mcg/ml for dialysis and pneumonia patients.
7. You now have the patient's dose (mg/kg) and dosage interval.
8. Record on the kinetic monitoring form the dosage in mg/kg you have selected, dose in mg and predicted trough.
9. Note, the vancomycin dosing program on the web site performs the same calculations and will give the results.

**Retrospective Dosing: Dosage Interval Adjustment Using Steady State Serum Levels**

1. Use the appropriate chart for the patient's mg/kg dose. Find the patient's current dosage interval row on the chart. Go across the row until you find the column with the closest trough to the patient's actual level.
2. Now go up or down this column and select the trough you desire. Look down the row to the left to determine the dosage interval. You now have the new dosage interval for the patient.

### How The Chart Works

1. The chart predicts steady state vancomycin levels using standard one compartment pharmacokinetic equations.

$$C_{\text{min steady state}} = \frac{\text{Dose}_{\text{mg/kg}} (1 - e^{-KT'}) e^{-K(\text{Tau} - T')}}{Vd_{0.65/\text{kg}} K T' (1 - e^{-K \text{Tau}})}$$

$$K = 0.00107 (\text{Clcr}_{\text{per } 1.73 \text{ meters squared}}) + 0.0052$$

$$Vd = 0.65 \text{ l/kg (actual body weight)}$$

2. As you move across a row to the right the creatinine clearance decreases along with the calculated K, which causes the predicted trough to increase.
3. As you move down a column, increasing the dosage interval, the predicted trough decreases.
4. Computer programs fit actual serum levels by altering the Vd and the K (or Cl) until the predicted levels converge on the actual measured levels within certain constraints. The Vd is mainly determined by the peak and K (or Cl) is determined mainly determined by the trough.

When only trough levels are available the Vd is held constant and the K (or Cl) is varied until the predicted trough level converges on the actual trough. This is what you are doing when moving across a dosage interval row until you get as close as possible to the actual level.

5. Pharmacokinetic simulations performed with volume of distributions ranging from 0.5-1 l/kg showed that prediction errors for troughs when assuming a set volume of distribution are not clinically meaningful.
  - Clearance and Vd were handled as independent parameters. Patients with the same creatinine clearance had the same clearance (l/hr) for the range of Vds.
  - K was calculated from the Vd and Cl for creatinine clearances from 0-150 ml/min. These values were then used to calculate the trough for the range of Vds using dosing intervals from 12-168 hours.
  - There was little change in predicted levels and they were not clinically meaningful.
  - It was also demonstrated that the prediction error, when adjusting the dose based on steady state levels using a set volume of distribution, was not clinically meaningful.
6. Note, the vancomycin dosing program on the web site performs the same calculations and will give the results.