Vancomycin Dosing Nomogram

CrCl (mL/min) / Weight (kg)		Cr Cl in mL/min							
		30	40	50	60	70	80	90	≥100
weight in kg	30	500mg q24h	500mg q24h	500mg q12h	500mg q12h	500mg q12h	500mg q8/12h	500mg q8/12h	500mg q8h
	35	500mg q24h	500mg q24h	500mg q12h	500mg q12h	500mg q12h	500mg q8/12h	500mg q8/12h	500mg q8h
	40	500mg q24h	500mg q24h	500mg q12h	500mg q12h	500mg q12h	500mg q8/12h	500mg q8/12h	500mg q8h
	45	750mg q24h	750mg q24h	750mg q12h	750mg q12h	750mg q12h	750mg q8/12h	750mg q8/12h	750mg q8h
	50	750mg q24h	750mg q24h	750mg q12h	750mg q12h	750mg q12h	750mg q8/12h	750mg q8/12h	750mg q8h
	55	1g q24h	1g q24h	1g q12h	1g q12h	1g q12h	750mg q8/12h	750mg q8/12h	750mg q8h
	60	1g q24h	1g q24h	1g q12h	1g q12h	1g q12h	1g q8/12h	1g q8/12h	1g q8h
	65	1g q24h	1g q24h	1g q12h	1g q12h	1g q12h	1g q8/12h	1g q8/12h	1g q8h
	70	1g q24h	1g q24h	1g q12h	1g q12h	1g q12h	1g q8/12h	1g q8/12h	1g q8h
	75	1.25g q24h	1.25g q24h	1.25g q12h	1.25g q12h	1.25g q12h	1.25g q8/12h	1.25g q8/12h	1.25g q8h
	80	1.25g q24h	1.25g q24h	1.25g q12h	1.25g q12h	1.25g q12h	1.25g q8/12h	1.25g q8h	1.25g q8h
	85	1.25g q24h	1.25g q24h	1.25g q12h	1.25g q12h	1.25g q12h	1.25g q8/12h	1.25g q8h	1.25g q8h
	90	1.25g q24h	1.25g q24h	1.25g q12h	1.25g q12h	1.25g q12h	1.25g q8/12h	1.25g q8h	1.25g q8h
	95	1.5g q24h	1.5g q24h	1g q8h	1g q8h	1g q8h	1.5g q8h	1.5g q8h	1.5g q8h
	≥100	Contact Antimicrobial Stewardship Team			If Patient is obese: 30mg/kg/day in divided doses q8h				

Guidelines for Vancomycin Dosing and Determination of Trough Levels in Adult Patients

Refer to Vancomycin Dosing Nomogram OR calculate dose as described below:

I. How to calculate a vancomycin dose:

a) Obtain actual body weight (ABW)

NOTE: do not calculate dose based on lean body weight; if morbidly obese use ABW for initial loading dose and monitor trough or consult ID.

b) Loading Dose (LD): For **more** severe infections (i.e., Meningitis, endocarditis, pneumonia, etc.) consider a loading dose of 25-30 mg/kg ABW

LD = 25-30 mg/kg (Use ACTUAL body weight)

c) Maintenance dose (MD): Calculate each maintenance dose:

MD = 15 mg/kg (Use ACTUAL body weight)

d.) Special Populations:
Morbid obesity (≥ 130% of IBW) use 30 mg/kg/day divided Q8H as obese patients often require more frequent dosing intervals (i.e., Q8H)[1,2,3] Obese patients rarely need doses in excess of 3.5 gm per day. Suggest starting at 1 to 1.25 gm Q8H and adjust upward if necessary.

Round calculated dose: doses should be rounded to the nearest 250 mg increment (i.e., 500 mg, 750 mg, 1000 mg, 1250 mg, 1500 mg, etc.)

II. Estimate patient's creatinine clearance (CrCl)

Use the Cockcroft-Gault equation. (See Pharmacokinetic Section for equation)

III. Select dosing interval based on CrCl

Estimated CrCl (mL/min)	Dosing interval to consider
≥100	Q8H
80-99	Q8H or Q12H
50-79	Q12H
25-49	Q18H or Q24H
<25 mL/min	Q36H or Q48H
Hemodialysis (check pre-dialysis level)	Give an initial loading dose of 15-20 mg/kg Re-dose patient with 15 mg/kg when serum level ≤ 20 mcg/mL
Peritoneal dialysis (IV administration)	

If the estimated renal function (CrCl) is near the border of two dosing intervals, it may be reasonable to begin with the more aggressive interval; the dose can then be modified if necessary according to serum levels.

ABW= Actual body weight; CrCl= Creatinine clearance; H= hour(s); IBW= ideal body weight; ID= infectious diseases; LD= loading dose; MD= maintenance dose; Q= every

References:

1. Bauer LA, Black DJ, Lill JS. Vancomycin dosing in morbidly obese patients. *Eur J Clin Pharmacol*. 1998 Oct;54(8):621-5.
2. Vance-Bryan K, Guay DR, Gilliland SS, et al. Effect of obesity on vancomycin pharmacokinetic parameters as determined by using a Bayesian forecasting technique. *Antimicrob Agents Chemother*. 1993 Mar;37(3):436-40.
3. Blouin RA, Bauer LA, Miller DD, et al. Vancomycin pharmacokinetics in normal and morbidly obese subjects. *Antimicrob Agents Chemother*. 1982 Apr;21(4):575-80.

Guidelines for Vancomycin Dosing and Determination of Trough Levels in Adult Patients

IV. Vancomycin Levels

Vancomycin levels are **NOT** needed in patients with stable renal function who are on standard doses of vancomycin **AND** are on therapy for less than 5 days. Vancomycin peak levels are rarely, if ever, indicated.

NOTE: Vancomycin demonstrates concentration-independent killing; therefore, peak concentrations are **NOT** useful or correlated to clinical outcomes.

Measure Trough Concentrations Only if:

- Patient is receiving vancomycin therapy > 5 days
- Patient has unstable renal function
- Patient is on an unusual/aggressive dosing regimen
- Patient is morbidly obese (> 130% of IBW)
- Patient has severe or life threatening infection and is receiving concomitant nephrotoxic drugs (i.e., cyclosporine, amphotericin B, aminoglycosides)

V. Implications for NURSING

Vancomycin needs to accumulate (steady state concentration) in order to obtain an accurate concentration. **Please DO NOT order a plasma level unless 3 doses have been administered on a given schedule** (i.e., order trough prior to the 4th dose) **Exception:** Dosing interval of 24 hours or longer

Trough level should be drawn within 30 minutes of the next dose

- Check what time the previous vancomycin dose (prior to the trough) was administered
- Calculate how many hours are between the dose and level
- Interpret the level in the context of recent vancomycin doses

Example: If the patient is on 1gm Q12H and received a dose at 11pm, then a level taken at 6am is 7 hours post-dose and is **NOT** a trough level.

- Be careful **NOT** to adjust **OR** hold vancomycin doses based on incorrectly drawn levels
- Do **NOT** hold the next dose while waiting for trough results (sub-therapeutic levels <15mcg/mL are not effective and can lead to resistant pathogens)

H= hour(s); IBW= Ideal body weight; Q= every

VI. Target Trough Vancomycin Level

Type of Infection	Target Trough Vancomycin Level
MRSA pneumonia, CNS infection (meningitis), bacteremia, endocarditis, osteomyelitis	15-20 mcg/mL
Endovascular Infection	15-20 mcg/mL
Hemodialysis	Maintain 15-20 mcg/mL Check pre-dialysis level, re-dose when ≤ 20 mcg/mL Often recommend to load with 15 – 20 mg/kg and re-dose
Serious infection and renal dysfunction (CrCl < 25mL/min)	If ≥ 24H dosing check trough at 24 hours Maintain 15-20 mcg/mL

VII. Adjusting a vancomycin dose (Recommendations)

Trough is too low- change the interval, keep the dose

- If the level is < 5 mcg/mL, the dosing INTERVAL should be shortened

Example: Trough level after 5 days of treatment reported as 3 mcg/mL on a regimen of 1000 mg Q12H, the **interval** should be **shortened** to 1000 mg Q8H

Trough is too high- decrease the dose, keep the interval

- If the trough level is >25 mcg/mL, the DOSE should be decreased 50%

Example: Trough level after 5 days of treatment is reported as 29 mcg/mL on a regimen of 1000 mg Q12H; the **dose** should be **decreased** to 500 mg Q12H

VIII. Monitoring (Inpatient)

- Baseline weight, BUN, serum creatinine, WBC, temperature, cultures, and sensitivities should be taken every other day in stable patients
- Daily urinary IN's and OUT's, CBC, and temperature should be monitored; should be performed in patients admitted to the ICU

BUN= Blood urea nitrogen; CBC= Complete Blood Count; CNS= Central nervous system; CrCl= Creatinine clearance; H= hour(s); ICU= Intensive Care Unit; MRSA= Methicillin-resistant Staphylococcus aureus; Q= every; WBC= White blood cells