

Generic Name	CrCl	Dose	Interval	Comments
Piperacillin/Tazobactam <i>Zosyn</i> * ID	> 40 ml/min	4.5 gm	Q 6-8hrs	May increase bleeding time,
	20-40 ml/min	2.25 gm	Q 6hrs	especially in ESRD. May inacti-
	< 20 ml/min	2.25 gm	Q 8hrs	vate gentamicin or tobramycin
	Hemodialysis	2.25 gm	Q 12hrs	due to complexation
Procainamide IV <i>Maintenance</i>	> 80 ml/min	3.0-3.5 mg/min	cont. inf	LD : 15 mg/kg IV, over 30 min
	40-80 ml/min	2.5-3.0 mg/min		MAINT Target level = 4-8 mg/L
	25-40 ml/min	2.0-2.5 mg/min		
	< 25 ml/min	1.5-2.0 mg/min		
*If Level Therapeutic, IV to PO conversion=Total 24hr mg IV dose divided by 0.85=Total PO Dose (divided into 4-6 doses)				
Pyrazinamide	> 50 ml/min	15-30 mg/kg	Q 24hrs	Up to 2 gms/day
	< 50 ml/min	Avoid or reduce to 12 mg/kg	Q 24hrs	

Ranitidine PO <i>Zantac</i>	> 50 ml/min	150 mg	Q 12hrs	Dose after HD
	< 50 ml/min	150 mg	Q 24hrs	

Rifampin IV * or PO <i>Rifadin</i>	> 10 ml/min	600 mg	Q 24hrs	TB dosing only
	< 10 ml/min	300 mg	Q 24hrs	* IV Needs ID Approval

Synercid *ID <i>Dalfopristin/Quinupristin</i>	> 10 ml/min	7.5 mg/kg	Q 8-12hrs	Infuse over 60 minutes
	< 10 ml/min	7.5 mg/kg	Q 8-12hrs	Dose after HD

Trimethoprim/Sulfamethoxazole: IV or PO <i>Bactrim (PCP)</i>	> 30 ml/min	15-20mg/kg/day	Q 6-8hrs	Dose is in mg TMP/kg/day
	15-29 ml/min	15-20 mg/kg/day; then 7-10 mg/kg/day	Q 6-8hrsx2d Q 12hrs	For oral doses, round to the nearest 80 mg
	< 15 ml/min	7-10 mg/kg/day	Q 12hrs	
	Hemodialysis	10 mg/kg/day	Q HD	Dose after HD

Trimethoprim/Sulfamethoxazole: IV or PO (NON PCP) <i>Bactrim</i>	> 30 ml/min	8-12 mg/kg/day	Q 6-8hrs	Dose is in mg TMP/kg/day
	15-29 ml/min	8-12 mg/kg/day	Q 6-8hrsx2d	For PO Doses, round to the nearest 80mg
	< 15 ml/min	4-6 mg/kg/day	Q 12-24hrs	
	Hemodialysis	6 mg/kg	Q HD	Dose after HD

Valganciclovir PO <i>Valcyte</i> CMV Treatment: Induction Therapy <i>(14-21 days)</i>	> 60 ml/min	900 mg	BID	
	40-59 ml/min	450 mg	BID	
	25-39 ml/min	450 mg	QD	
	10-24 ml/min	450 mg	QOD	
	< 10 ml/min	consult pharmacy		

Valganciclovir PO <i>Valcyte</i> <i>CMV Treatment:</i> <i>Maintenance Therapy</i>	> 60 ml/min	900 mg	QD	
	40-59 ml/min	450 mg	QD	
	25-39 ml/min	450 mg	QOD	
	10-24 ml/min	450 mg	2x/week	
	< 10 ml/min	consult pharmacy		

Valganciclovir PO <i>Valcyte</i> CMV Prophylaxis: Induction Therapy	> 60 ml/min	900 mg	QD	Prophylaxis: maintenance
	40-59 ml/min	450 mg	QD	dose is 1/2 the prophylaxis
	25-39 ml/min	450 mg	QOD	induction dose
	10-24 ml/min	450 mg	2x/week	
	< 10 ml/min	consult pharmacy		

Vancomycin IV (40-59 kg) <i>Vancocin</i>	> 45 ml/min	750 mg	Q 12hrs	ID approval needed after 72hrs
	30-44 ml/min	500 mg	Q 24hrs	CrCl < 15ml/min or Dialysis Pts;
	15-29 ml/min	500 mg	Q 48hrs	500 mg x 1
	< 15 ml/min	Consult Pharmacy		repeat dose by level Infuse over at least 60 mins

Generic Name	CrCl	Dose	Interval	Comments
Vancomycin IV (60-79 kg) <i>Vancocin</i>	> 45 ml/min	1 gm	Q 12hrs	ID approval needed after 72hrs
	30-44 ml/min	1 gm	Q 24hrs	CrCl < 15 ml/min or Dialysis Pts;
	15-29 ml/min	1 gm	Q 48hrs	1000 mg x 1
	< 15 ml/min	Consult Pharmacy		repeat dose by level Infuse over at least 60 mins

Vancomycin IV (> 80 kg) <i>Vancocin</i>	> 45 ml/min	1 gm	Q 12hrs	ID approval needed after 72hrs
	30-44 ml/min	1 gm	Q 24hrs	CrCl , 15 ml/min or Dialysis Pts ;
	15-29 ml/min	1 gm	Q 48hrs	1000 mg x 1
	< 15 ml/min	Consult Pharmacy		repeat dose by level In Obese Pts use Dosing Wt Infuse over at least 60 mins

EXTENDED INTERVAL AMINOGLYCOSIDE DOSING GUIDELINES

- Eligible patients:** Those with:
- Adequate urine output (i.e.: > 0.5 ml/kg/hr or > 800 ml/24h) **and**
 - WBC count > 1000 cells/µL

Extended Interval Dosing of aminoglycosides is **NOT RECOMMENDED** due to lack of data or unpredictable kinetics in:

- Pregnant patients
- Patients with endocarditis, cystic fibrosis, severe burns, ascites
- Neutropenic patients (ANC < 1000)
- Patients with **CrCl < 20 mL/min**
- Patients who are dialysis dependent

Dosing	Interval:	based on CrCl
Initial dose = 5-6 mg/kg*†	> 60 ml/min	Q24h
	40-60	Q36h
	20-40	Q48h

- * Consider 7 mg/kg in known Pseudomonas infections
† Use actual body weight (ABW) for patients not > 25% over ideal body weight (IBW)
‡ Use dosing weight (DW) for patients > 25% over IBW

KEY

= Patients requiring adjusted maintenance doses (for renal & hepatic insufficiency) should receive an initial full dose followed by an adjusted dose

*** ID = Requires ID Approval. Page 39244, the ID Fellow on-call, for antibiotic approvals between 7 a.m. and 11 p.m. During the hours of 11 p.m. to 7 a.m., ID approval is deferred and the Pharmacy will dispense sufficient quantities of ID restricted medications to treat the patient until 7 a.m. It is the responsibility of the prescriber to obtain ID approval at 7 a.m. for continued therapy.**

- Select References:**
- Aronoff GR, Berns JS, Brier ME, Bennett WM et al. Drug Prescribing in Renal Failure. Dosing Guidelines for Adults. 4th Edition, American College of Physicians; 1999. Philadelphia PA
 - 2002 Physician's Desk Reference
 - Fine RF, Matzke ER. Drug Therapy Individualization for Patients with Renal Insufficiency. In Pharmacotherapy: A Pathophysiologic Approach. 5th Edition. New York. McGraw Hill; 2002: 939-952
 - St. Peter WL, Redic-Kill KA, Halstenson CE. Clinical Pharmacokinetics of Antibiotics in Patients with Impaired Renal Function. 1992 Clinical Pharmacokinetics. 22:169-210
 - Livorrese LL, Slavin D, Benz RL, et al. Use of Antibacterial Agents in Renal Failure. Inf Dis Clin NA. 2000:14

USEFUL FORMULAS

Ideal Body Weight (IBW)
 IBW - Male = 50 kg + (2.3 kg x each inch > 60 inches) = _____kg
 IBW - Female = 45 kg + (2.3 kg x each inch > 60 inches) = _____kg

Actual Body Weight (ABW) Use ABW unless patient is obese or 25% greater than over IBW

Dosing Weight (DW) Use DW in obese patients where ABW is 25% > IBW
 DW = IBW + (ABW - IBW) x 0.4 = _____kg

Creatinine Clearance
Est CrCl (male) = (140 - age) x IBW / 72 x SCr = _____ ml/min

Est CrCl (female) = [(140 - age) x IBW] x 0.85 / 72 x SCr = _____ ml/min

* To calculate estimated CrCl in patients > 65 yrs or weight < IBW or muscle atrophy **and** SrCr < 0.7 mg/dl, use 1.0 mg/dl value for SrCr to estimate CrCl

IV TO PO CONVERSION

Evaluation for conversion from parenteral to oral therapy should be an ongoing process

- Criteria for early conversion from IV to PO are:**
- Patient is tolerating an oral diet for ≥ 24 hours
 - Patient tolerating other oral medications for ≥ 24 hours
 - No evidence of hyperemesis, bowel obstruction or malabsorption
 - Clinically stable and improving as evidenced by:
 - Temperature <101 F for ≥ 24 hours
 - Hemodynamically stable, not on pressors

Parenteral and oral bioavailability are nearly equivalent and published outcomes are similar for the following medications:

Ciprofloxacin, Fluconazole, Levofloxacin, Linezolid, Metronidazole

Additional medications with high oral bioavailability include:
 Amoxicillin/clavulanic acid (Augmentin), Cephalixin, Clindamycin, Famotidine

IV TO PO CONVERSION / COST COMPARISON CHART

IV DRUG	PO EQUIVALENT	COST IV / PO
Ampicillin/sulbactam	Augmentin 500mg q8h	\$24.00-\$40.00 / \$6.30
1.5 - 3 gm Q6hrs	or 875mg q12h	
Cefazolin 1 gm q8h	Cephalexin 500mg q6h	\$7.25 / \$0.55
Ciprofloxacin 400mg q12h	Ciprofloxacin 500mg q12h	\$48.50 / \$0.78
Clindamycin 300-600 mg q8h	Clindamycin 300-450mg q6h	\$18.60-\$21.00 / \$3.50 - \$5.20
Famotidine 20mg q12h	Famotidine 20mg q12h	\$5.45 / \$0.16
Fluconazole 400 mg q24h	Fluconazole 400 mg q24h	\$131.78 / \$25.00
Levofloxacin 500 mg q24h	Levofloxacin 500 mg q24h	\$15.60 / \$7.25
Linezolid 600 mg q12h	Linezolid 600 mg q12h	\$133.25 / \$100.50
Metronidazole 500 mg q8h	Metronidazole 500mg q8h	\$3.80 / \$0.21

EXTDNED INTERVAL AMINOGLYCOSIDE SERUM DRUG LEVELS

- DO NOT ORDER** peak or random levels

- Trough level can be drawn immediately before the second dose

- Adjust dose and/or interval based on serum drug trough level

Gentamicin, Tobramycin:
 Trough level < 1 mcg/ml - continue present extended interval dosing
 Trough level > 1 mcg/ml - increase interval proportionally

- In general, aminoglycoside trough levels should be ordered in patients:
 - Receiving or expected to receive > 5 days therapy
 - With significant changes in renal function

Beth Israel Deaconess Medical Center

Department of Pharmacy

Renal Dosing Guidelines

2004

The BIDMC renal dosing guidelines provide general dosing and administration recommendations for common medications that require adjustment in patients with renal dysfunction or renal insufficiency.

Use of the guidelines is intended to improve the safety and efficacy of medication therapy in this patient population.

Recommendations provided here are derived from a review of evidence based literature, medication-specific pharmacokinetic parameters and manufacturers' guidelines. While the guidelines serve as a useful reference tool for the majority of patients, patient-specific conditions and clinical circumstances may require dose modification to meet individual patient care needs.