

**RECOMMENDATIONS FOR DOSE ADJUSTMENT IN PATIENTS WITH RENAL DYSFUNCTION (last updated 7/30/08)**

	Maximum Adult Daily Dose	GENERAL COMMENTS / MIC CONSIDERATIONS	Usual Adult Dose <sup>1</sup> (CrCL > 50 ml/min)	CrCL 30 to 50 ml/min	CrCL 10 to 30 ml/min	CrCL < 10 ml/min	HEMODIALYSIS <sup>2</sup>	PERITONEAL DIALYSIS	CONTINUOUS RENAL REPLACEMENT THERAPY (CRRT)
<b>PENICILLINS</b>									
Amoxicillin (PO)	3 g		250 to 500 mg q8h	250 to 500 mg q8h	250 to 500 mg q12h	250 to 500 mg q24h	500 mg q24h	500 mg q12h	500 mg q12h
Amoxicillin/clavulanate (PO) (Augmentin)	1.75 g (amoxicillin)		875 mg q12h	875 mg q12h	500 mg q12h	500 mg q24h	500 mg q24h	250 mg q12h	500 mg q12h
Ampicillin/sulbactam (IV) (Unasyn)	12 g (ampicillin)		1.5 to 3 g q6h	1.5 to 3 g q6h	1.5 to 3g q12h	1.5 to 3 g q24h	3 g q24h	ND	1.5 - 3 g IV q8-12h
Ampicillin (IV)	12 g		1 to 2 g q4-6h	1 to 2 g q6-8h	1 to 2 g q8-12h	1 to 2 g q12h	1 to 2 g q12h	500 mg to 1 g q12h	1 to 2 g q8-12h
Oxacillin (IV) <sup>3</sup>	12 g	Monitor LFTs, WBC	2 g q4-6h				2 g q4-6h		
Penicillin G (IV)	30 M Units		2 to 4 M Units q4h	2 M Units q4h		1 M Units q4h	1 M Units q4h	1 M Units q4h	1 to 2 M Units q4h
Piperacillin/tazobactam (IV) (Zosyn)	27 g (piperacillin)	Initial dose adjustment when CrCL<40 ml/min; next adjustment when CrCL<20 ml/min; Consider extended infusion administration when MIC 16-32 mg/L	4.5 g q6h	4.5 g q8h	4.5 g q12h	4.5 g q12h	4.5 g q12h	4.5 g q12h	4.5 g q8h
<b>CEPHALOSPORINS</b>									
Cefazolin (IV)	8 g		1 g q8h	1 g q8h	1 g q12h	1 g q24h	1 g q24h	500 mg q12h	1 to 2 g q12h
Cephalexin (PO)	4 g	Dose 500 mg q12h for UTIs	500 mg q6h	500 mg q6h	500 mg q8-12h	500 mg q12-24h	500 mg q24h	500 mg q12-24h	ND
Cefadroxil (PO)	2 g		1 g q12h	1 g q24h	500 mg q24h	500 mg q24h	1 g 3x/week after HD	500 mg q24h	ND
Cefoxitin (IV)	12 g		2 g q6h	1 to 2 g q8-12h	1 to 2 g q12-24h	1 to 2 g q24-48h	1 g q24-48h	1 g q24h	1 g q8-12h
Cefuroxime (IV)	6 g		750 mg q8h	750 mg q8h	750 mg q12h	750 mg q24h	750 mg q24h	750 mg q12h	750 mg q12h
Cefuroxime (PO)	1 g		250 to 500 mg q12h				250 to 500 mg q24h	250 to 500 mg q24h	250 to 500 mg q12h
Ceftriaxone (IV) <sup>3</sup>	4 g	Dose 2 g q12h for meningitis	1 g q24h				1 g q24h		
Cefotaxime (IV)	12 g	Dose 1 g q8h for pneumonia Dose 2 g q4h for meningitis	1 to 2 g q8h 2 g q4h	1 to 2 g q8h	1 to 2 g q12h	1 to 2 g q24h	1 to 2 g q24h 2 g q12-24h	1 to 2 g q24h 2 g q12-24h	1 to 2 g q12h 2 g q8h
Cefpodoxime (PO)	800 mg		200 mg q12h	200 mg q12h		200 mg q24h	200 mg 3x/week after HD	200 mg q24h	ND
Ceftazidime (IV)	6 g	Dose 2 g q8h for meningitis	1 to 2 g q8h	1 to 2 g q12h	1 to 2 g q24h	1 to 2 g q48h	1 to 2 g 3x/week after HD	500 mg q24h	1 to 2 g q8h
Cefepime (IV)	6 g	Use this dose empirically and when known MIC ≤ 4 mg/L Dose 2 g q8h for febrile neutropenia, meningitis, and when known MIC 8-16 mg/L	1 to 2 g q12h	1 to 2 g q24h	1 g q24h	500 mg q24h	500 mg q24h	1 to 2 g q48h	1 to 2 g q12h
<b>MONOBACTAM</b>									
Aztreonam (IV)	8 g	Dose 2 g q8h for febrile neutropenia and meningitis	1 to 2 g q8h	1 to 2 g q8h	1 to 2 g q12h	1 to 2 g q24h	1 to 2g q24h	1 to 2 g q24h	1 to 2 g q12h
<b>CARBAPENEMS</b>									
Imipenem (IV)	4 g	Monitor renal function (Scr); Use when known MIC ≤ 2 mg/L	500 mg q6h	500 mg q8h	500 mg q12h	250 mg q12h	500 mg q12h	250 mg q12h	500 mg q8h
Meropenem (IV)	6 g	Monitor renal function (Scr); Use this dose empirically and when known MIC ≤ 2 mg/L Monitor renal function (Scr); Dose 2 g q8h for meningitis and when known MIC 4 mg/L Consider extended infusion administration when MIC 8-16 mg/L	500 mg q6h	500 mg q8h	500 mg q12h	500 mg q24h	500 mg q24h	500 mg q24h	500 mg q6-8h
<b>QUINOLONES</b>									
Levofloxacin (PO/IV)	750 mg	Monitor mental status changes; Mg <sup>2+</sup> , Ca <sup>2+</sup> , Al <sup>3+</sup> containing antacids, iron, zinc, and sucralate ↓ PO quinolone absorption >90% (separate administration times by ≥ 2 hrs)	250 mg q24h 500 mg q24h 750 mg q24h	250 mg q24h 250 mg q24h 750 mg q48h		250 mg q48h 250 mg q48h 500 mg q48h	250 mg q48h 250 mg q48h 500 mg q48h	250 mg q48h 250 mg q48h 500 mg q48h	250 mg q24h 250 mg q24h 500 mg q24h
<b>MACROLIDES</b>									
Azithromycin (IV)	500 mg		500 mg q24h			500 mg q24h			
Clarithromycin (PO)	1 g		500 mg q12h	500 mg q12h		500 mg q24h		500 mg q24h	
<b>ANTIFUNGALS</b>									
Amphotericin B (IV)	1.5 mg/kg	Monitor Scr, K <sup>+</sup> , Mg <sup>2+</sup> , PO <sub>4</sub> ; Administer in D <sub>2</sub> W over 4 to 6 hrs	0.5 to 1 mg/kg q24h		0.5 to 1 mg/kg q24h			0.5 to 1 mg/kg q24h	
Caespofungin (IV) <sup>3</sup>	70 mg	Decrease daily dose to 35 mg q24h in moderate liver disease	70 mg x 1, then 50 mg q24h			70 mg x 1, then 50 mg q24h			
Lipid amphotericin B (IV) (Abelcet)	5 mg/kg	Monitor Scr, K <sup>+</sup> , Mg <sup>2+</sup> , PO <sub>4</sub> ; Administer in D <sub>2</sub> W over 2 hrs	5 mg/kg q24h		5 mg/kg q24h			5 mg/kg q24h	
Fluconazole (PO/IV)	1.6 g	Monitor LFTs; consider PO therapy (>90% bioavailability); higher daily dosing (at least 400 mg) recommended in systemic infections	200 mg q24h	200 mg q24h	100 mg q24h		100 mg q24h	100 mg q24h	200 mg q24h
	1.6 g	Monitor LFTs; consider PO therapy (>90% bioavailability); higher daily dosing (at least 400 mg) recommended in systemic infections	400 to 800 mg q24h (for systemic fungal infections)	400 to 800 mg q24h	200 to 400 mg q24h		200 to 400 mg q24h	200 to 400 mg q24h	400 to 800 mg q24h
Flucytosine (PO)	150 mg/kg	Monitor Scr, CBC	12.5 to 25 mg/kg q8h		12.5 to 25 mg/kg q12-24h	12.5 to 25 mg/kg q24h-48h	12.5 to 25 mg/kg q24h-48h	500 mg to 1 g q24h	12.5 to 25 mg/kg q12-24h
Voriconazole (IV) <sup>3</sup>	12 mg/kg	IV; caution CrCL <50 ml/min (cyclosporin may accumulate) PO dose: <40kg 200 or 300 mg q12h <40kg 100 or 150 mg q12h Child-Pugh Class A or B: Reduce maintenance dosage by 50%	6 mg/kg q12h x 2, then 4 mg/kg q12h			6 mg/kg q12h x 2, then 4 mg/kg q12h			
<b>ANTIVIRALS</b>									
Acyclovir (IV)	30 mg/kg	Monitor Scr, WBC, mental status changes. Dose based on ideal or adjusted body weight.	5 to 10 mg/kg q8h	5 to 10 mg/kg q12h	5 to 10 mg/kg q24h	2.5 to 5 mg/kg q24h	2.5 to 5 mg/kg q24h	2.5 to 5 mg/kg q24h	5 to 10 mg/kg q24h
Famciclovir (IV)	1.5 g		500 mg q8-12h	500 mg q12-24h	500 mg q24h	250 mg q24h	250 mg 3x/week after HD	ND	ND
Valacyclovir (PO)	3 g	Monitor Scr, CBC, mental status changes	1 g q8-12h	1 g q12h	1 g q24h	500 mg q24h	1 g 3x/week after HD	500 mg q48h	500 mg q24h
Ganciclovir (PO)	3 g	Due to decreased oral bioavailability, use only as alternative to PO valganciclovir in patients with severe renal disease	1 g q8h	1 g q24h or use valganciclovir	500 mg q24h or use valganciclovir	500 mg 3x/week	500 mg 3x/week after HD	500 mg 3x/week	1 g q24h
Ganciclovir (IV)	10 mg/kg	Monitor Scr, WBC	5 mg/kg q12h (pdpuppo)	2.5 mg/kg q24h	1.25 mg/kg q24h	1.25 mg/kg 3x/week	1.25 mg/kg 3x/week after HD	1.25 mg/kg 3x/week	2.5 mg/kg q24h
Valganciclovir (PO)	1.8 g	Monitor Scr, WBC; Use IV or PO ganciclovir for patients with CrCL <10 ml/min and/or receiving dialysis	5 mg/kg q24h (maintenance)	2.5 mg/kg q24h	0.625 mg/kg q24h	0.625 mg/kg 3x/week	0.625 mg/kg 3x/week after HD	0.625 mg/kg 3x/week	1.25 mg/kg 3x/week
			900 mg q12h (pdpuppo)	450 mg q12h (pdpuppo)	450 mg q24h (CrCL 25-39)	450 mg q24h (CrCL 40-69)	450 mg q48h (CrCL 25-39)		
<b>ANTITUBERCULOSIS</b>									
Etambutol (PO)	2.5 g	Monitor uric acid, LFTs; vision test	15 to 25 mg/kg q24h		15 to 25 mg/kg q24-36h	15 to 25 mg/kg q48h	15 to 25 mg/kg q48h	15 to 25 mg/kg q48h	15 to 25 mg/kg q24-36h
Isoniazid (PO) <sup>1</sup>	300 mg	Monitor LFTs	5 mg/kg q24h				5 mg/kg q24h		
Pyrazinamide (PO)	2 g	Monitor LFTs	15 to 30 mg/kg q24h		12 to 20mg/kg q24h			15 to 30 mg/kg q24h	
Rifampin (IV, PO) <sup>1</sup>	600 mg	Monitor LFTs; significant drug interaction potential	600 mg q24h				600 mg q24h		
<b>MISCELLANEOUS</b>									
Clindamycin (IV) <sup>3</sup>	4.8 g		600 to 900 mg q8h				600 to 900 mg q8h		
Daptomycin (IV)	12 mg/kg	Monitor baseline and weekly CPK levels	6 to 8 mg/kg q24h	6 to 8 mg/kg q24h		6 to 8 mg/kg q48h	6 to 8 mg/kg q48h	6 to 8 mg/kg q48h	6 to 8 mg/kg q24h
Doxycycline (IV, PO)	300 mg		100 mg q12h				100 mg q12h		
Linezolid (IV, PO)	1.2 g	Monitor CBC; consider PO therapy (~100% bioavailability)	600 mg q12h				600 mg q12h		
Metronidazole (IV, PO) <sup>3</sup>	4 g	Monitor mental status changes	500 mg q8-12h		500 mg q8-12h		500 mg q12h		500 mg q8-12h
Polymyxin B (IV)	3 mg/kg	Reduce dose when CrCL< 80 ml/min; 1 mg = 10,000 units; Dilute each 50 mg in at least 300 mL D5W; monitor Scr, electrolytes, neurotoxicity	2.5 - 3 mg/kg q24h (can divide dose q12h)	2.5 to 3 mg/kg load x 1, then 1 to 1.5 mg/kg q24h	2.5 to 3 mg/kg load x 1, then 1 to 1.5 mg/kg q2-3 days			2.5 to 3 mg/kg load x 1, then 1 mg/kg q3-5 days	
Quinuoristin/dalfopristin (IV) <sup>3</sup>	22.5 mg/kg	Monitor LFTs, arthralgias/myalgias	7.5 mg/kg q8h			7.5 mg/kg q8h		7.5 mg/kg q8h	
Tigecycline (IV) <sup>3</sup>	100 mg	Severe (Child-Pugh Class C) hepatic impairment: 100 mg x1, then 50 mg q12h	100 mg x 1, then 50 mg q12h				100 mg x 1, then 50 mg q12h		
Trimethoprim/sulfia (IV, PO)	20 mg/kg (TMP)	Monitor Scr, WBC, platelet count	2.5 to 5 mg/kg q8-12h (TMP)	2.5 to 5 mg/kg q6-12h	2.5 to 5 mg/kg q12-24h	2.5 to 5 mg/kg q24h		2.5 to 5 mg/kg q24h	

<sup>1</sup> The dosing recommendations presented here are for ~70 kg adults with moderate to severe infections based on published literature and clinical experience. These recommendations should only be used as guidelines and dosing based on pharmacokinetic and clinical evaluation is suggested where possible. <sup>2</sup> For antimicrobials dosed every 24 hours in patients on hemodialysis, doses should be administered after dialysis on dialysis days. Alternatively, all doses may be administered once daily in the evening to ensure administration after dialysis on dialysis days. <sup>3</sup> Dosing adjustment may be necessary in patients with severe liver dysfunction. <sup>4</sup> For patients receiving continuous veno-venous haemofiltration (CVVH) or continuous veno-venous haemodiafiltration (CVVHDF) at ≥ 1L/h; ND = no data available