

Antimicrobial Renal Dosage Adjustment Guidelines for Adults

[milligrams/dosing interval in hours unless otherwise specified]

Doses are for 70 kg adults; smaller or larger patients, or those receiving certain modes of renal replacement therapy may require additional dosage adjustments

Antimicrobial doses in chart represent usual initial adult doses for moderate to severe infections due to susceptible organisms. Specific disease states or individual patients may warrant dosages that differ from the recommendations. Please contact the pharmacist serving your patient care area for patient-specific recommendations.

Drug & Administration Route	CREATININE CLEARANCE (mL/min)					
	> 80	50-80	30-50	10-30	< 10/ hemodialysis	CRRT ^a
PENICILLINS						
amoxicillin po	250-500mg/q8h or 875mg/q12h		250-500mg/q8-12h		250-500mg/q24h	
amoxicillin/ clavulanate po	500mg/q8h or 875 mg/q12h			250-500mg/q12h	250-500mg/q24h	
ampicillin ^{LD} iv	500-2000mg/q4-6h ¹		500-2000mg/q8h	500-2000mg/q12h	500-2000mg/q12-24h	1000-2000mg/q8h-q12h
ampicillin / sulbactam ^{LD} iv	1500-3000mg/q6h		1500-3000mg/q6-8h	1500-3000mg/q12h	1500-3000mg/q12-24h	1500-3000mg/q8h
dicloxacillin po	125-1000mg/q6h	No adjustment in renal dysfunction				
nafcillin iv	1000-2000mg/q4-6h	No adjustment in renal dysfunction				
oxacillin iv	1000-2000mg/q4-6h	No adjustment in renal dysfunction				
penicillin G iv	2-4 mU ² /q4-6h		2-3 mU/q4-6h		2 mU/q6h	2-4mU/q6h
piperacillin / tazobactam ^{LD} iv	3375mg/q8h ³ (4 hour infusion) See Order Instructions in Epic on use of prolonged infusion			< 20mLs/min 3375mg/q12h (4 hour infusion)		3375mg/q8h (4hr infusion) ^b
	3375mg/q6h (half hour infusion)		2250mg/q6h		2250mg/q8h	2250mg/q6h
ticarcillin / clavulanate ^{LD} iv	3100mg/q4-6h		2000mg/q4-6h	2000mg/q8h	2000mg/q12h	3100mg/q6h
MISCELLANEOUS ANTIMICROBIALS						
azithromycin po/iv	250-500mg/q24h	No adjustment in renal dysfunction				
aztreonam ^{RST LD} iv	1000-2000mg/q6-8h (use q6h in febrile neutropenia)		1000-2000mg/q8h	1000mg/q8h or 2000mg/q12h	500-1000mg/q12h	2000mg/q12h
ciprofloxacin po low dose (uncomplicated urinary tract infection) mid-dose (complicated UTI, intraabdominal infection, prostatitis, sinusitis)	250mg/q12h		250mg/q12h	250mg/q24h		
	500mg/q12h		500mg/q12h	500mg/q24h		

Drug & Administration Route	CREATININE CLEARANCE (mL/min)					
	> 80	50-80	30-50	10-30	< 10/ hemodialysis	CRRT ^a
ciprofloxacin po high dose (severe /nosocomial pneumonia, bone/joint infection, bacteremia)	750mg/q12h		500mg/q12h	750mg/q24h		
	iv					
low dose	200mg/q12h		200mg/q12h	200mg/q24h		200mg/q24h
mid-dose	400mg/q12h		400mg/q24h	200mg/q12h or 400mg/q24h		400mg/q24h
high dose	400mg/q8h		400mg/q12h	200mg/q12h or 400mg/q24h		400mg/q12h
clarithromycin po	250-500mg/q12h			125-250mg/q12 or 250-500mg/q24h		
clindamycin po	150-450mg/q6-8h	No adjustment in renal dysfunction				
iv	600-900mg/q8h					
colistimethate ^{RST, c} • If obese, use LBW • round dose to nearest 25mg • Dose shown as colistin base activity • Load with initial dose of 3mg/kg (max 200mg)	1.7mg/kg/q8h	2mg/kg/q12h	1.5mg/kg/q12h	2mg/kg/q24h	2.5mg/kg/q48h or 1.25mg/kg q24h	2mg/kg/q12h
dapsone po	100mg/q24h				50mg/q24h	
daptomycin ^{RST, 4} iv use AdjBW if obese	4, 6, 8 mg/kg/q24h			4, 6, 8 mg/kg/q48h		4, 6, 8 mg/kg/q48h
doxycycline / minocycline po/iv	100mg/q12h	No adjustment in renal dysfunction				
ertapenem ^{RST} im/iv	1000mg/q24h			500mg/q24h		
imipenem ^{RST} iv		To avoid toxicity, this medication requires careful dose adjustment based on nature of infection, body size, and renal function. Please seek guidance (clinical pharmacist, manufacturer's labeling) regarding dose when prescribing.				
linezolid ^{RST} po/iv	600mg/q12h	No adjustment in renal dysfunction				
meropenem ^{RST LD} iv	1000mg/q8h See Order Instructions in Epic on use of prolonged infusion		1000mg/q12h or	500mg/q12h	500mg/q24h	1000mg/q12h
meropenem meningitis iv	2000mg/q8h See Order Instructions in Epic on use of prolonged infusion		2000mg/q12h	1000mg/q12h	1000mg/q24h	1000mg/q12h

Drug & Administration Route	CREATININE CLEARANCE (mL/min)					
	> 80	50-80	30-50	10-30	< 10/ hemodialysis	CRRT ^a
metronidazole po	500mg/q6-12h				250-500mg/q8-12h	No adjustment necessary
iv	500mg/q6-q8h				500mg/q8-12h	No adjustment necessary
moxifloxacin po/iv	400mg/q24h	No adjustment in renal dysfunction				
nitrofurantoin (Macrochantin) po	50-100mg/q6h		Not effective			
pentamidine iv	3-4mg/kg/q24h			3-4mg/kg/q24-36h	3-4mg/kg/q48h	
quinupristin/dalfopristin ^{RST} iv	7.5mg/kg/q8-12h	No adjustment in renal dysfunction				
tigecycline ^{RST} iv	100mg x 1 then 50mg/ q12h	No adjustment in renal dysfunction				
TMP/SMX ⁵ po/iv						
Urinary tract	160mg (1 DS tablet)/q12h			160mg/q24h	160mg/q48h	
S. maltophilia or Nocardia spp.	10-15mg/kg/day divided q6-8h			7-12mg/kg/day divided q8-12h	5-7mg/kg/day divided q12-24h	8-12mg/kg/day, divided q6-8h
Pneumocystis jiroveci (carini) Pneumonia	15-20mg/kg/day divided q6h			12-15mg/kg/day divided q6-8h	7-10mg/kg/day divided q8-12h	15mg/kg/day, divided q6-8h
CA-MRSA	320mg (2 DS tablets)/q12h			160mg/q12h	160mg/q24h	
CEPHALOSPORINS						
cefazolin iv	1000-2000mg/q8h			1000-2000mg/q12h	1000mg/q24h Alt: 2000mg/2000mg/3000mg at end of each tiw ⁶ hemodialysis session	2000mg/q12h
cephalexin po	250-1000mg/q6h	250-500mg/q8h	250-500mg/q8-12h		250-500mg/q12-24h	
cefdinir po	300mg/q12h			300mg/q24h		
cefixime po	400mg once daily		300mg/24h		200mg/q24h	
cefotetan iv	1000-2000mg/q12h			1000-2000mg/q24h	1000-2000mg/q48h	
cefoxitin iv	1000-2000mg/q6h		1000-2000mg/q8h	1000-2000mg/q12h	1000-2000mg/q24h	
cefpodoxime po	100-400mg/q12h			100-400mg/q24h	100-400mg/tiw ⁶	

		CREATININE CLEARANCE (mL/min)					
Drug & Administration Route		> 80	50-80	30-50	10-30	< 10/ hemodialysis	CRRT ^a
ceftaroline ^{RST}	iv	600mg/q12h	600mg/q12h	400mg/q12h	15-30mLs/min: 300mg q12h	< 15mLs/min: 200mg q12h	
cefuroxime	po	250-500mg/q12h				250-500mg/q12-24h	
	LD iv	750-1500mg/q8h			750mg/q12h	750mg/q24h	
cefotaxime ^{LD}	iv	1000-2000mg/q6-8h	1000-2000mg/q8h	1000-2000mg/q8-12h	1000-2000mg/q12h	1000-2000mg/q24h	1000-2000mg/q12h
ceftazidime ^{RST LD}	iv	1000-2000mg/q8		1000-2000mg/q12h	1000-2000mg/q24h	500-1000mg/q24h	1000-2000mg/q12h
ceftriaxone	iv	1000-2000mg/q24h	No adjustment in renal dysfunction				
	meningitis	2000mg/q12h	No adjustment in renal dysfunction				
cefepime ^{LD}	iv	2000mg/q12h, alt 1000mg /q8h		1000mg/q12h or 2000mg/q24h	500-1000mg/q24h Alt: 2000mg tiw ⁶ after hemodialysis		2000mg/q12h ^d
	(meningitis or neutropenic fever)	> 60mls/min	2000mg/q8h	30-60mls/min: 2000mg/q12h	2000mg q24h	1000mg/q24h	2000mg/q12h
ANTIVIRALS							
abacavir	po	300mg/q12h or 600mg/q24h	No adjustment in renal dysfunction				
acyclovir ^{RST(IV)}							
treatment	po						
HSV		400mg TID		400mg TID	400mg BID	400mg daily	
VZV Shingles		800mg 5x daily ⁷		800mg 5x daily	800mg TID	800mg BID	
treatment	iv	Note: If obese, use lean body weight					
HSV		5 mg/kg q8h		5mg/kg/q12h	5mg/kg/q24h	2.5mg/kg/q24h	5mg/kg/q24h
HSV encephalitis, VZV		10mg/kg q8h		10mg/kg/q12h	10mg/kg/q24h	5mg/kg/q24h	7.5mg/kg/q24h
acyclovir prophylaxis	po						
Immunocompromised (HIV, solid organ transplant, chemotherapy)		400mg BID		400mg BID	400mg daily		
Stem Cell transplant		400mg TID		400mg BID	400mg daily		
VZV prophylaxis after SCT or bortezomib		800mg BID		800mg BID	800mg daily		

Drug & Administration Route	CREATININE CLEARANCE (mL/min)						
	> 80	50-80	30-50	10-30	< 10/ hemodialysis	CRRT ^a	
prophylaxis all indications	iv	100mg q12h			100mg q24h		100mg q12h
atazanavir po	400mg/q24h; 300mg/q24h with ritonavir		No adjustment in renal dysfunction				
darunavir/ritonavir po	600mg/q12h or 800mg/q24h		No adjustment in renal dysfunction				
efavirenz po	600mg/q24h		No adjustment in renal dysfunction				
emtricitabine po	200mg/q24h		200mg/q48h	200mg/q72h	200mg/q96h		
entecavir po Usual dose	0.5mg once daily		0.5mg/q48h	0.5mg/q72hrs	0.5mg/q7 days		
decompensated liver disease OR refractory-to- lamivudine	1mg once daily		1mg /q48h	1mg/q72hrs	1mg/q7 days		
etravirine po	200mg BID with food	No adjustment in renal dysfunction					
fosamprenavir po	PI-naïve:1400mg/ q12h or 1400mg/q24h w/ritonavir PI-experienced: 700mg/q12h w/ritonavir		No adjustment in renal dysfunction				
foscarnet	iv	60mg/kg/q8h or 90mg/kg/q12h (induction) 90-120mg/kg q24h (maintenance)		Adjustment required for CrCl ≤ 100 mL/min: To avoid toxicity, this medication requires careful dose adjustment based on nature of infection, body size, and renal function. Please seek guidance regarding dose adjustment (clinical pharmacist/ manufacturer's labeling)			
ganciclovir induction ^{LD}	iv	≥70mls/min	50-69mls/min	25-49mls/min	10-24mls/min	1.25mg/kg/tiw ⁶	2.5mg/kg/q12h
		5mg/kg/q12h for 2-3 weeks	2.5mg/kg/q12h	2.5mg/kg/q24h	1.25mg/kg/q24h		
maintenance		≥70mls/min	50-69mls/min	25-49mls/min	10-24mls/min	0.625 mg/kg/tiw ⁶	2.5mg/kg/q24h
		5mg/kg/q24h	2.5mg/kg/q24h	1.25mg/kg/q24h	0.625mg/kg/q24h		
lamivudine po	150mg/q12h or 300 mg/q24h		150mg/q24h		50-150mg/q24h		
lopinavir/ritonavir po	2 tablets/q12h or 4 tabs q24h		No adjustment in renal dysfunction				

Drug & Administration Route	CREATININE CLEARANCE (mL/min)					
	> 80	50-80	30-50	10-30	< 10/ hemodialysis	CRRT ^a
nevirapine ^b po	200mg/q12h or 400mg/q24h	No adjustment in renal dysfunction				
oseltamivir treatment po	> 60mls/min 75mg BID	30-60mLs/min 30mg/q12h	30mg/q24h	30mg after every HD	75mg/q24h ^e	
prevention	> 60mls/min 75mg/q24h	30-60mLs/min 30mg/q24h	30mg/q48h	30mg after alternate HD	75mg/q48h	
raltegravir	400mg BID	No adjustment in renal dysfunction				
saquinavir with ritonavir po	1000mg/q12h	No adjustment in renal dysfunction				
Tenofovir-df po	300 mg/q24h	Consider alternate drug in mild-moderate renal dysfunction		300mg/qweek		
Truvada (tenofovir/emtricitabine) po	1 tablet daily	1 tab q48h – with careful risk/benefit monitoring	Do not use Truvada. Use individual components or other agents			
tipranavir po with ritonavir	500mg/q12h	No adjustment in renal dysfunction				
valacyclovir po Genital herpes initial episode	1000 mg/q12h x 10days		1000 mg/q24h	500mg/q24h		
recurrent	1000 mg/q24h x 5 days, or 500mg/q12h x 3days (If HIV+ : 1000mg/q12h x 5-10 days)		1gm q48h x 3 doses or 500mg/q24h x 3 days (If HIV+ : 1000mg/q24h x 5-10 days)			
valacyclovir po suppressive	(if HIV+ , or > 10 recurrences /year: 500mg /q12h)		500mg/q48h (if HIV+ , or > 10 recurrences/year: 500mg /q24h)			
Varicella zoster	1000 mg/q8h		1000 mg/q12h	1000 mg/q24h	500mg/q24h	
valganciclovir po induction	≥60mls/min 900mg/q12h	40-59mls/min 450mg/q12h	25-39mls/min 450mg/q24h	10-24mls/min 450mg/q2 days	450mg after every other dialysis	
maintenance	≥60mls/min 900mg/q24h	40-59mls/min 450mg/q24h	25-39mls/min 450mg/q2 days	10-24mls/min 450mg/biw ¹²		
zidovudine (AZT) po	300mg/q12h			100mg/q8h or 200mg/q12h		

Drug & Administration Route	CREATININE CLEARANCE (mL/min)					CRRT ^a
	> 80	50-80	30-50	10-30	< 10/ hemodialysis	
ANTIMYCOBACTERIALS						
ethambutol po Use LBW if obese	15-25mg/kg/q24h (max dose/day = 2000mg)				15-25mg/kg tiw ⁶ (after dialysis)	
isoniazid po	300mg/q24h	No adjustment in renal dysfunction				
rifabutin po	300mg/q24h	No adjustment in renal dysfunction				
rifampin po/iv	600mg/q24h	No adjustment in renal dysfunction				
pyrazinamide po Use LBW if obese	25-35mg/kg/q24h (max dose/day = 3000mg)				25-35mg/kg tiw ⁶ (after dialysis)	
ANTIFUNGALS						
amphotericin B ⁹ iv	0.25-1.5mg/kg/q24h, no adjustment in renal dysfunction					
amphotericin B lipid complex ^{RST} iv	3 or 5mg/kg/q24h, no adjustment in renal dysfunction					
fluconazole ¹⁰ LD po/iv	100-400mg/q24h			100-200mg/q24h		400+ mg/q24h
flucytosine § po	25 mg/kg/q6h		25 mg/kg q8h	25mg/kg/q12h	25 mg/kg/q24h	
itraconazole § po	200mg/q8-24h	No adjustment in renal dysfunction				
micafungin ^{RST 11} iv	100mg/q24h	No adjustment in renal dysfunction				
voriconazole § ^{RST} po/iv Use LBW if obese			No adjustment in renal dysfunction			
(loading dose)	6mg/kg/q12h x 2 doses (round doses to nearest 50mg)					
(induction)	4mg/kg/q12h x 1 week (round doses to nearest 50mg)					
(maintenance)	200mg/q12h					

§ Serum concentrations may be useful in optimizing therapy; LD: Consider larger initial "loading" dose when renal function is poor. TMP-SMX = trimethoprim-sulfamethoxazole; RST= Restricted, requires CAUSE/ID approval, MRSA: Methicillin resistant Staphylococcus aureus, CA-MRSA: Community acquired methicillin resistant Staphylococcus aureus

¹ For endocarditis or meningitis, recommended dose is 2000mg IV q4h; ² mU = million units; ³ For Pseudomonas sp. prolonged infusion regimens are adequate. Prolonged infusion dosing also adequate for treating infections in cystic fibrosis patients; ⁴Use 8mg/kg/dose for bacteremia with vancomycin-resistant enterococci; ⁵Dosing based on trimethoprim component ⁶tiw = 3 times weekly; ⁷5x/d = 5 times a day; ⁸When initiating nevirapine, dose 200mg/q24h x first 2 weeks; ⁹May use up to 1.5 mg/kg for Aspergillus; ¹⁰Load of twice the maintenance dose can be given for most infections; ¹¹Use 100-150mg/q24h for invasive Aspergillosis ¹²biw = twice weekly

- CRRT= Continuous Renal Replacement Therapy, continuous veno-venous hemofiltration, etc. Trotman, et al. Clin Infect Dis;41:1159, Heintz, et al Pharmacotherapy;29:562
- Asin-Prieto, et al J Antimicrob Chemother 2014;69:180
- Garonzik, et al. Antimicrob Agents Chemother 2011;55:3284, Dalfino, et al. Clin Infect Dis 2012;54:1720
- Wilson, et al. Antimicrob Agents Chemother 2012;56:2178
- Eyler, et al Pharmacotherapy 2012;32:1062

Weight-based dosing:

LBW = Lean Body Weight in kilograms (kg)

LBW (male) = $50 + (2.3 \times \# \text{ inches over } 5' \text{ tall})$, LBW (female) = $45.5 + (2.3 \times \# \text{ inches over } 5' \text{ tall})$

TBW = Total Body Weight in kilograms (kg)

AdjBW = Adjusted Body Weight

AdjBW = $((\text{TBW} - \text{LBW}) \times 0.4) + \text{LBW}$

Creatinine Clearance Calculation - Adult Patients

CrCl (male) = $\frac{(140 - \text{age}) \times (\text{LBW or TBW}^*)}{\text{SCr} \times 72}$

* whichever is lower

CrCl (female) = (CrCl male) \times (0.85)

SCr = Serum creatinine concentration in mg/dL

Equation may overestimate renal function in patients with decreased muscle mass.