Northwestern Medicine Antimicrobial Renal Dosing Guidance

Northwestern Medicine Antimicrobial and Diagnostic Stewardship Program

**For acutely ill patients, consider usual dosing for the first 24h prior to adjusting for renal dysfunction. Use clinical judgement in addition to this general guidance.

Antimicrobials			
Acyclovir	Cefpodoxime	Daptomycin	Nirmatrelvir-ritonavir (Paxlovid)
Aminoglycosides	Ceftaroline	Ertapenem	Nitrofurantoin
Amoxicillin	Cephalexin	Ethambutol	Oseltamivir
Amoxicillin-clavulanate	Ceftazidime	Fluconazole	Penicillin G
Ampicillin	Ceftazidime-avibactam	Foscarnet	Piperacillin-tazobactam
Ampicillin-sulbactam	Ceftolozane-tazobactam	Ganciclovir	Polymyxin B
Aztreonam	Cefuroxime	Imipenem	TMP-SMX
Cefazolin	Cidofovir	Imipenem-relebactam	Valacyclovir
Cefepime	Ciprofloxacin	Levofloxacin	Valganciclovir
Cefiderocol	Colistin	Meropenem	Vancomycin
Cefoxitin	Dalbavancin	Meropenem-vaborbactam	

Footnotes and References

Dosing protocol links:

- Aminoglycoside Dosing Protocol (adjBW) ‡ : Gram negative infections, Endocarditis Synergy, Cystic Fibrosis, Surgical Prophylaxis
- CRRT Dose Adjustments
- Vancomycin Dosing Protocol
- Antimicrobial Dosing in Obesity. *Only for patients with obesity (BMI ≥30),* drugs to be adjusted are indicated with IBW or AdjBW
- Agents not adjusted for renal function
- ISPD Guideline for Peritonitis and ISPD Peritoneal Antimicrobial Dosing Tables 5 and 6 (Can refer to Delnor PD dosing recommendations)
- HIV Antiretroviral Renal Adjustments

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Acyclovir IV ‡ (AdjBW)	Standard dosing	10 mg/kg q8h	10 mg/kg q12h	10 mg/kg q24h	5mg/kg q24h	5 mg/kg q24h
	Less severe mucocutaneous	5 mg/kg q8h	5 mg/kg q12h	5 mg/kg q24h	2.5 mg/kg q24h	2.5 mg/kg q24h
Acyclovir PO ‡ (AdjBW) (preference for PO valacyclovir for all treatment)	HSV **treatment**	400 mg q8h (5x daily for immunocompromised)	400 mg q8h (5x daily for immunocompromised)	200 mg q8h (400 mg q8h for immunocompromised)	200 mg q12h	200 mg q12h
	VZV **treatment**	800 mg 5x daily	800 mg 5x daily	800 mg q8h	400 mg q12h	400 mg q12h
	Prophylaxis	400 mg q12h	400 mg q12h	400 mg q12h	200 mg q12h	200 mg q12h
Amoxicillin PO	Standard dosing	1000 mg q8h	1000 mg q8h	1000 mg q12h	500 mg q12h	500 mg q12h
	Cystitis	1000 mg q12h	1000 mg q12h	1000 mg q12h	500 mg q12h	500 mg q12h
Amoxicillin-clavulanate PO (doses based on amoxicillin component)	Standard dosing Immediate release tab: 875mg / 125mg	875 mg q12h	875 mg q12h	500 mg q12h (avoid 875 mg tabs)	500 mg q24h (avoid 875 mg tabs)	500 mg q12h (avoid 875 mg tabs)
	Pneumonia and URTI: XR Amox/clav 1000 mg/62.5 mg	2000 mg q12h	2000 mg q12h	500 mg q12h (avoid XR tabs)	500 mg q24h (avoid XR tabs)	500 mg q12h (avoid XR tabs)
Ampicillin IV	Standard dosing	2 g q6h	2 g q8h	2 g q12h	2 g q24h	2 g q24h *
	Endocarditis or meningitis	2 g q4h	2 g q6h	2 g q8h	2 g q12h	2 g q12h
Ampicillin-sulbactam IV	Standard dosing	3 g q6h	3 g q8h	3 g q12h	3 g q24h	3 g q24h *
	Carbapenem Resistant *Acinetobacter baumanii*	CrCl >40 mL/min: 9 g q8h infused over 4 hours	CrCl 31-40 mL/min: 9 g q12h infused over 4 hours	3 g q8h infused over 4 hours	3 g q12h infused over 4 hrs	3 g q12h * infused over 4 hours
Aztreonam IV	Standard dosing	2 g q8h	2 g q8h	2 g q12h	2 g q24h	2 g q24h *
Cefazolin IV	Standard dosing	2 g q8h	2 g q8h	2 g q 12h	2 g q 24h	1 g q24h or 2,2,3 g 3x weekly post-HD *
	Cystitis OR less severe infections in patients <70kg	1 g q8h	1 g q8h	1 g q12h	1 g q24h	1 g q24h or 2,2,3 g 3x weekly post-HD *
Cefepime IV	Severe dosing (e.g. neutropenic fever, CNS, sepsis, osteomyelitis)	2 g q8h	2 g q12h	2 g q24h	2 g LD, then 1 g q24h	1 g q24h or 2 g 3x weekly post-HD *
	Cystitis or less severe infections in patients <55kg or elderly (≥80 years)	1 g q8h	1 g q12h	1 g q24h	1 g q24h	1 g q24h or 2 g 3x weekly post-HD *
Cefiderocol IV **	Standard dosing	CrCl ≥120: 2 g q6h CrCl 51 to <120: 2 g q8h	1.5 g q8h	1 g q8h	750 mg q12h	750 mg q12h

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Cefoxitin IV	Standard dosing	2 g q6h	2 g q8h	2 g q12h	1 g q24h	1 g q24h *
Cefpodoxime PO (If non-cystitis and concomitant acid suppression, avoid cefpodoxime)	Standard dosing (and dosing for cystitis with concomitant acid suppression)	400 mg q12h	400 mg q12h	400 mg q24h	400 mg q24h	400 mg q24h *
	Cystitis (no acid suppression)	200 mg q12h	200 mg q12h	200 mg q24h	200 mg q24h	200 mg q24h *
Ceftazidime IV	Standard dosing	2 g q8h	2 g q12h	2 g q24h	1 g q24h	1 g q24h (inpatient) or 2,2,2 g 3x weekly post-HD *
Ceftaroline IV **	Severe infection, bacteremia, osteo	600 mg q8h	400 mg q8h	400 mg q12h	200 mg q8h	200 mg IV q8h
	Standard dosing	600 mg q12h	400 mg q12h	400 mg q12h	200 mg q12h	200 mg IV q12h
Ceftazidime-avibactam IV **	Standard dosing	2.5 g q8h	1.25 g q8h	0.94 g q12h	0.94 g q24h	0.94 g q24h *
Ceftolozane-tazobactam IV **	Standard dosing	3 g q8h	3 g q8h	1.5 g q8h	750 mg q8h	750 mg q8h
	Cystitis	1.5 g q8h	1.5 g q8h	750 mg q8h	750 mg q8h	750 mg q8h
Cefuroxime IV	Standard dosing	1.5 g IV q8h	1.5 g IV q8h	1.5 g IV q12h	1.5 g IV q24h	1.5 g IV q24h *
Cefuroxime PO	Standard dosing (if concomitant acid suppression, avoid cefuroxime)	1000 mg q12h	1000 mg q12h	500 mg PO q12 h	500 mg PO q24h	500 mg q24h *
Cephalexin PO	Standard dosing	1000 mg q8h	1000 mg q8h	1000 mg q12h	500 mg q12h	500 mg q24h *
	Severe infection	1000 mg 4x daily	1000 mg q8h	1000 mg q12h	500 mg q12h	500 mg q24h *
	For UTI/SSTI	1000 mg q8h	500 mg q8h	500 mg q12 h	250 mg q12h	250 mg q24h *
Ciprofloxacin IV	Severe Infection, *Pseudomonas,* and step-down therapy	400 mg q8h	400 mg q8h	400 mg q12h	400 mg q24h	400 mg q24h *
	Uncomplicated infections and cystitis	400 mg q12h	400 mg q12h	400 mg q12h	400 mg q24h	400 mg q24h *
Ciprofloxacin PO	Severe infection, *Pseudomonas,* and step-down therapy	750 mg q12h	750 mg q12h	750 mg q24h	500 mg q24h	500 mg q24h *
	Uncomplicated infections and cystitis	500 mg q12h	500 mg q12h	500 mg q24h	250 mg q24h	250 mg q24h *
Cidofovir IV † ** (IBW)	Alternative dosing regardless of renal function for adenovirus or BK virus: 1 mg/kg 3x weekly without probenecid	5 mg/kg once weekly with probenecid and hydration	CrCl <50: Risk vs. benefit, discuss with ID team, consider 3 mg/kg once weekly			

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Colistin IV **	For urinary source only, use polymyxin B IV for severe infections	CrCl ≥80 mL/min: 2.5 mg/kg q12h	CrCl 50-79 mL/min: 1.9 mg/kg q12h	CrCl 30-49 mL/min: 2.5 mg/kg q24h	CrCl 10-29 mL/min: 1.5 mg/kg q36h	1.5 mg/kg q48h *
Daptomycin IV † (AdjBW) (round to the nearest 250 mg, max dose of 1000 mg)	Severe *Staph* infections	8 mg/kg q24h	8 mg/kg q24h	8 mg/kg q48h	8 mg/kg q48h	8 mg/kg 3x weekly post-HD *
	Uncomplicated *Staph* infections	6 mg/kg q24h	6 mg/kg q24h	6 mg/kg q48h	6 mg/kg q48h	6 mg/kg 3x weekly post-HD *
	For VRE infections	10 mg/kg q24h	10 mg/kg q24h	10 mg/kg q48h	10 mg/kg q48h	10 mg/kg 3x weekly post-HD *
Dalbavancin IV **	Osteo, severe infection	1500 mg x1	1500 mg x1	1125 mg x1	1125 mg x1	1500 mg x1
	SSTI	1500 mg weekly x2	1500 mg weekly x2	1000 mg x1, then 750 mg one week later	1000 mg x1, then 750 mg one week later	1500 mg weekly x2
Ertapenem IV	Restricted to a single dose prior to discharge	1 g q24h	1 g q24h	500 mg q24h	500 mg q24h	500 mg q24h or 1,1,1 g 3x weekly post-HD *
Ethambutol PO † (IBW)	See specific TB or NTM guidelines (round to the nearest 100 or 400 mg tablet)	15 or 25 mg/kg q24h	15 or 25 mg/kg q24h	15 or 25 mg/kg 3x weekly	15 or 25 mg/kg 3x weekly	15 or 25 mg/kg 3x weekly post-HD *
Fluconazole IV/PO	Disseminated infections	LD 800 mg LD x1, then 400 mg q24h (up to 800 - 1200 mg q24h for CNS)	LD 800 mg x1, then 200 - 400 mg q24h	LD 800 mg x1, then 200 mg q24h (up to 400 mg q24h for CNS)	100 mg q24h	400 mg 3x weekly post-HD *
	Esophageal candidiasis	400 mg q24h	200 mg q24h	200 mg q24h	100 mg q24h	200 mg 3x weekly post-HD *
	Prophylaxis	200 mg q24h	100 mg q24h	100 mg q24h	100 mg q48h	100 mg 3x weekly post-HD *
Foscarnet IV † (AdjBW)	Refer to Clinical Pharmacology Foscarnet dosing					
Ganciclovir IV † (AdjBW)	Induction	CrCl >70: 5 mg/kg q12h	CrCl 50-69: LD 5 mg/kg, then 2.5 mg/kg q12h	CrCl 25-49: LD 5 mg/kg, then 2.5 mg/kg q24h	CrCl 10-24: LD 5 mg/kg, then 1.25 mg/kg q24h	LD 5mg/kg, then 1.25 mg/kg 3x weekly post-HD *
	Maintenance	CrCl >70: 5 mg/kg q24h	CrCl 50-69: 2.5 mg/kg q24h	CrCl 25-49: 1.25 mg/kg q24h	CrCl 10-24: 0.625 mg/kg q24h	0.625 mg/kg 3x weekly post-HD *
Imipenem-cilastatin IV	CNS or severe infection (Dose based on imipenem)	1 g q6h	500 mg q6h	250 mg q6h	Not recommended for CrCl <15 unless on HD	500 mg q12h
	Standard dosing and nocardia treatment (Dose based on imipenem)	500 mg q6h	500 mg q8h	500 mg q12h	Not recommended for CrCl <15 unless on HD	250 mg q12h
	Non-TB Mycobacterium (NTM) (Dose based on imipenem)	500 - 1000 mg q8-12h	500 - 1000 mg q8-12h	500 mg q12h	Not recommended for CrCl <15 unless on HD	250 mg q12h

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Imipenem-cilastatin-relebactam IV **	1.25 g dose based on imipenem (500 mg) + cilastatin (500 mg) + relebactam (250 mg)	CrCl ≥ 90mL/min: 1.25 g q6h CrCl 60-89mL/min: 1 g q6h	CrCl 31- 60 mL/min: 750 mg IV q6h	500 mg IV q6h	Not recommended for CrCl <15 unless on HD	500 mg IV q6h
Levofloxacin IV/PO	Standard dosing	750 mg q24h	750 mg q48h	750 mg q48h	750 mg x1, then 500 mg q48h	750 mg x1, then 500 mg q48h *
Meropenem IV	Systemic Infection (CNS, Sepsis, severe infections)	2 g q8h	2 g q12h	1 g q12h	1 g q 24h	1 g q24h or 2 g 3x weekly post-HD *
	Less Severe Infection	1 g q8h	1 g q12h	500 mg q12h	500 mg q24h	500 mg q24h or 1 g 3x weekly post-HD *
Meropenem-vaborbactam IV **	Standard dosing	4 g q8h	2 g q8h	2 g q12h	1 g q12h	1 g q12h
Nirmatrelvir-ritonavir (Paxlovid) PO	Standard dosing	GFR >60: 2 nirmatrelvir tabs + 1 ritonavir tab q12h	GFR 30-60: 1 nirmatrelvir tab + 1 ritonavir tab q12h	Not recommended GFR < 30		
Nitrofurantoin PO	PO liquid (prefer caps)	50 – 100 mg q6h	50 – 100 mg q6h	Not recommended CrCl < 30		
	PO caps (Macrobid)	100 mg q12h	100 mg q12h	Not recommended CrCl < 30		
Oseltamivir PO	Treatment	CrCl >60: 75 mg q12h	CrCl 31- 59 mL/min: 30 mg q12h	30 mg q24h	30 mg q24h	30mg x 1, then 30 mg 3x weekly post-HD *
	Prophylaxis	75 mg q24h	30 mg q24h	30 mg q48h	30 mg once weekly	30 mg x 1 then 30 mg 3x weekly post-HD *
Penicillin G IV	Standard dosing	4 MU q4h	3 MU q4h	3 MU q4h	4 MU LD, then 2 MU q8h	2 MU q8h *
Piperacillin-tazobactam IV	Standard dosing (4h infusion)	4.5 g q8h	4.5 g q8h	CrCl 20-30 mL/min: 4.5 g q8h	CrCl <20 mL/min: 4.5 g q12h	4.5 g q12h
TMP/SMX IV or PO † (AdjBW) Dose in mg based on TMP. Round PO doses to the nearest DS tab (160 mg)	Systemic infection	2.5 - 5 mg/kg q12h [max of 320 mg (2 DS tabs) q12h]	2.5 - 5 mg/kg q12h [max of 320 mg (2 DS tabs) q12h]	2.5 - 5 mg/kg q24h [max of 320 mg (2 DS tabs) q24h]	2.5 mg/kg q24h [max of 320 mg (2 DS tabs) q24h]	2.5 mg/kg q24h * [max of 320 mg (2 DS tabs) q24h]
	Cystitis	1 DS tab q12h	1 DS tab q12h	1 DS tab q24h	1 DS tab q24h	1 DS tab q24h *
	Stenotrophomonas spp.	5 mg/kg q12h [max of 320 mg (2 DS tabs) q12h]	5 mg/kg q12h [max of 320 mg (2 DS tabs) q12h]	5 mg/kg q24h [max of 320 mg (2 DS tabs) q24h]	2.5 mg/kg q24h [max of 320 mg (2 DS tabs) q24h]	2.5 mg/kg q24h * [max of 320 mg (2 DS tabs) q24h]
	PJP Treatment	5 mg/kg q8h [max of 320 mg (2 DS tabs) q8h]	5 mg/kg q8h [max of 320 mg (2 DS tabs) q8h]	5 mg/kg q12h [max of 320 mg (2 DS tabs) q12h]	5 mg/kg q24h [max of 320 mg (2 DS tabs) q24h]	5 mg/kg q24h * [max of 320 mg (2 DS tabs) q24h]
	PJP Prophylaxis	1 DS tab 3x weekly	1 DS tab 3x weekly	1 DS tab 3x weekly	1 SS (80 mg) or DS (160 mg) tab 3x weekly	1 SS (80mg) or DS (160 mg) tab 3x weekly post-HD *

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Valacyclovir PO	HSV (1st episode treatment)	1 g q12h	1 g q12h	500 mg q24h	500 mg q24h	500 mg q24h
	HSV (recurrent episodes, immunocompetent)	500 mg q12h	500 mg q12h	500 mg q12h	500 mg q24h	500 mg q24h
	VZV, systemic HSV	1 g q8h	1 g q12h	1 g q24h	500 mg q24h	500 mg q24h
	Prophylaxis immunocompromised	500 mg q12h	500 mg q12h	500 mg q24h	500 mg q24h	500 mg q24h
	Suppression	1g q24h	1g q24h	500 mg q24h	500 mg q24h	500 mg q24h
Valganciclovir PO (see organ tx or oncology specific protocol for prophylaxis)	Induction	>60 mL/min: 900 mg q12h	40-59 mL/min: 450 mg q12h	25-39 mL/min: 450 mg q24h	10-24 mL/min: 450 mg q48h	<10 mL/min, anephric, HD: 450 mg 3x weekly post-HD*
	Maintenance	>60 mL/min: 900 mg q24h	40-59 mL/min: 450 mg q24h	25-39 mL/min: 450 mg q48h	10-24 mL/min: 450 mg 2x weekly	<10 mL/min, anephric, HD: 450 mg 2x weekly post-HD *
Vancomycin IV † (Actual BW) (Round to the nearest 250 mg)	PharmD to Dose per AUC See Pharmacy Protocol	15 mg/kg IV q12h	15 mg/kg q24h	CrCl 20-30 mL/min: 15 mg/kg IV q36h	CrCl <20 mL/min: 15 mg/kg x 1, then by AUC	20 mg/kg x 1, then re-dose by level on HD days * Check pre-HD on day of HD. (See vancomycin HD protocol)

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Agents not renally adjusted:

- Amphotericin
- Azithromycin
- Baloxavir *(not studied in CrCl <50, but limited risk given single dose)*
- Ceftriaxone
- Clindamycin
- Doxycycline
- Eravacycline
- Fosfomycin
- Itraconazole
- Isavuconazole
- Letermovir
- Linezolid
- Maribavir
- Metronidazole
- Micafungin
- Minocycline
- Molnupiravir
- Omadacycline
- Oxacillin/nafcillin
- Penicillin VK (PO
- Refer to Clinical Pharmacology for Polymyxin B Dosing
- Posaconzole
- Remdesivir
- Rifampin
- Tigecycline
- Voriconazole

Footnotes and References

* When dosing antibiotics for patients on intermittent hemodialysis (HD), recommend scheduling dosing to be giving after HD sessions (e.g., schedule Q 24h at 17:00)
Recommended order comment wording: “Give at the scheduled frequency (including non-HD days if scheduled. On HD days, give after HD”

† For obesity dosing, see Obesity Dosing for Weight-Based Antimicrobials

** ID consult required within 24 hours

Acronyms: HD = hemodialysis, PD = peritoneal dialysis, TMP/SMX = trimethoprim/sulfamethoxazole, MU = million units, URTI = upper respiratory tract infection, XR = extended release, AdjBW = adjusted body weight, IBW = ideal body weight, ActBW = actual body weight

References: Lexicomp and Clinical Pharmacology from ClinicalKey

For questions regarding this document (contact your primary pharmacist for patient specific concerns): NMHPharmAntimicrobialStewardship@nm.org

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