SHC Antimicrobial Dosing Guidelines in Adults

These are general dosing guidelines. Doses may vary based on indications, severity, and/or patient factors.
Consider adequate loading doses in patients with moderate-severe renal dysfunction to ensure prompt attainment of steady state drug levels.

*Denotes ID restricted antimicrobials

Sections:

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	CrCL ≥50 mL/min	CrCL 49-30 mL/min	CrCL 29-10 mL/min	CrCL <10 mL/min or iHD[1]
ANTIBACTERIALS				
Amikacin IV	Recommend **dosing per pharmacy** to ensure appropriate dosing, serum level targeting and monitoring			
	Refer to P&P 43135 (Pharmacist Management of Aminoglycosides Therapy: Adults) for detailed dosing guidance			
Amoxicillin PO				
Usual dose	500 mg Q8 or 875 mg Q12	500 mg Q8 or 875 mg Q12	500 mg PO Q12	500 mg PO Q24
Pneumonia	1 g PO Q8	1 g PO Q8	1 g PO Q12	500 mg PO Q12
H. pylori	1 g PO Q12	1 g PO Q12	500 mg PO Q12	500 mg PO Q24
Amoxicillin/Clavulanate PO				
Dose based on amoxicillin	875mg PO Q12 Or 500 PO Q8	875mg PO Q12 Or 500 PO Q8	500 mg PO Q12	500 mg PO Q24
Extended Release dose for CAP, sinusitis, GI infection	2 g ER PO Q12	2 g ER PO Q12	ER tablets not recommended	ER tablets not recommended
Ampicillin IV				
UTI, Mild infection	1 g IV Q6	1 g IV Q8	1 g IV Q12	1 g IV Q12
PPROM,Chorioamnionitis/Endometritis[2]	2 g IV Q6	2 g IV Q8	2 g IV Q12	2 g IV Q24
Moderate-Severe infection, Bacteremia/Endocarditis, Meningitis	2 g IV Q4	2 g IV Q6	2 g IV Q8	2 g IV Q12
Ampicillin PO	Non-formulary. Recommend amoxicillin PO – preferred due to superior absorption/bioavailability			
Ampicillin/Sulbactam IV				
Standard dose	3 g IV Q6	3 g IV Q6	3 g IV Q12	3 g IV Q24
Acinetobacter baumannii (dose based on sulbactam – at least 6g/d)	6g IV Q8 over 8-hr infusion	6g IV Q8 over 8-hr infusion	3 g IV Q8 over 30 min	3 g IV Q12 over 30 min
Atovaquone PO				
PJP Treatment	750 PO Q12			
PJP Prophylaxis	1500 mg PO Q24			
Azithromycin IV/PO	Decreased oral bioavailability compensated by high tissue concentrations			
Treatment	500 mg x 1, then 250 – 500 mg IV/PO Q24 Alternative Dosing for MAC: 500 mg PO TIW			
Px COPD, CF, bronchiectasis, etc	250 – 500 mg PO TIW			

[1] Administer post-HD if on Q24+ hour interval.

[2] Ampicillin: PPROM (premature rupture of membranes) – doses applicable in presence/absence of sepsis

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Aztreonam IV				
Standard dose	2 g IV Q8	2 g IV Q8	1 g IV Q8	CrCL <10: 500 mg IV Q8 iHD: 2g Q24
ICU, Pseudomonas, >100kg	2 g IV Q6	2 g IV Q6	1 g IV Q6	CrCL <10: 500 mg IV Q6 iHD: 2g Q24
Cefazolin IV				
Cystitis	1 g IV Q8	1 g IV Q8	1 g IV Q12	500 mg IV Q24
All other indications including severe UTIs, >100kg	2 g IV Q8	2 g IV Q8	2 g IV Q12	1 g IV Q24 or 2 g IV TIW post-HD
Severe infection AND >120 kg	2 g IV Q6	2 g IV Q6	2 g IV Q8	2 g IV Q24
Cefdinir PO				
	300 mg PO Q12	300 mg PO Q12	300 mg PO Q24	300 mg PO x1 then 300 mg PO TIW post-HD
Cefepime IV (3-hr infusion)				
UTI, SSTI	1 g IV Q8	1 g IV Q12	1 g IV Q24	500 mg IV Q24
All Other Indications #: susceptible dose-dependent for MICs of 4-8 for certain GNRs. Higher dosing is required for target attainment	2 g IV Q8	2 g IV Q12	1 g IV Q12	1 g IV Q24 or 2 g IV TIW post-HD
*Cefiderocol IV (3-hr infusion)				
	CrCL ≥120: 2 gm IV Q6 **CrCL 50-119:** 2 gm IV Q8	1.5 gm IV Q8	1 gm IV Q8	750 mg IV Q12
Cefoxitin IV				
	2 g IV Q6	2 g IV Q8	2 g IV Q12	1 g IV Q24
*Ceftaroline IV				
Standard dose	600 mg IV Q12	400 mg IV Q12	300 mg IV Q12	200 mg IV Q12
Endocarditis, *S.aureus* bacteremia	600 mg IV Q8	400 mg IV Q8	300 mg IV Q8	200 mg IV Q8
Ceftazidime IV				
Pseudomonas	2 g IV Q8	2 g IV Q12	2 g IV Q24	1 g IV Q24 or 2 g IV TIW post-HD
*Ceftazidime/Avibactam IV				
	2.5 g IV Q8	1.25 g IV Q8	0.94 g IV Q12	0.94 g IV Q24

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*Ceftolozane/Tazobactam	3 hr-infusion			
All other indications	1.5 g IV Q8	750 mg IV Q8	375 mg IV Q8	750 mg IV x 1 dose, then 150 mg IV Q8
Pneumonia	3 g IV Q8	1.5 g IV Q8	750 mg IV Q8	2.25 g IV x 1 dose, then 450 mg IV Q8
Ceftriaxone IV	*Note: for weight <45 kg with CNS or endocarditis indications refer to ID pharmacist for dosing			
Standard Dose	2 g IV Q24			
Meningitis, Enterococcal endocarditis, Weight > 120 kg with deep-seated infection (e.g. bone/joint)	2 g IV Q12			
Weight <45 kg*	1 g IV Q24			
Cefuroxime IV				
	1.5 g IV Q8	1.5 g IV Q8	1.5 g IV Q12	1.5 g IV Q24
Cefuroxime axetil PO				
	500 mg PO Q12	500 mg PO Q12	250 mg PO Q12	250 mg PO Q24
Cephalexin PO				
Standard dose, including cystitis	500 mg PO Q8-Q6	500 mg PO Q8-Q6	500 mg PO Q12	500 mg PO Q24
High dose for SSTI, Pyelonephritis	1 g PO Q8	1 g PO Q8	1 g PO Q12	1 g PO Q24
SSTI and >80 kg	1 g PO Q6	1 g PO Q6	1 g PO Q8	1 g PO Q24
Ciprofloxacin IV				
Standard dose, UTI	400 mg IV Q12	400 mg IV Q12	400 mg IV Q24	400 mg IV Q24
PNA, PsA, Severe Infection, or >100kg	400 mg IV Q8	400 mg IV Q8	400 mg IV Q12	400 mg IV Q24
Ciprofloxacin PO				
Standard dose, UTI	500 mg PO Q12	500 mg PO Q12	500 mg PO Q24	500 mg PO Q24
PNA, Bone/Joint	750 mg PO Q12	750 mg PO Q12	750 mg PO Q24	500 mg PO Q24
Clarithromycin PO				
	500 mg PO Q12 (Alternative MAC dose: 500mg PO BID 3x/wk)	500 mg PO Q12 (Alternative MAC dose: 500mg PO BID 3x/wk)	250 mg PO Q12	250 mg PO Q12
Clindamycin IV				
	600 – 900 mg IV Q8H Use higher end for patients with severe infection and/or > 100 kg			

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Clindamycin PO				
	300 – 450 mg PO Q6—8 or 600 mg PO Q8			
*Colistimethate sodium IV	Please see Colistin/Polymyxin B IV Dosing Guideline for additional details. Dose based on IBW or actual if <IBW			
Loading Dose for all patients	300 mg x1			
Maintenance Dose Adjust per 10mL/min per pharmacy	Refer to Polymyxin B and Colistin Dosing Guideline			
*Colistimethate sodium INHALATION	No adjustment needed			
	75 mg nebulized BID (NTE 150 mg nebulized BID)			
*Dalbavancin IV	*Restricted to outpatient infusion*			
Single-dose regimen	1.5 g IV x 1 dose	1.5 g IV x 1 dose	1.125 g IV x 1 dose	CrCL <10: 1.125 g IV x 1 iHD: 1.5 g IV x 1 dose
Osteomyelitis	1.5 g IV on days 1 & 8	1.5 g IV on days 1 & 8	1.125 g IV on days 1 & 8	CrCL <10: 1.125 g IV on days 1 & 8 iHD: 1.5 g IV on days 1 & 8
*Daptomycin IV	Dose based on TBW. Consider adjusted BW if morbidly obese & using 8-12 mg/kg. Round to nearest 50 mg.			
STAPHYLOCOCCUS/STREPTOCOCCUS				
Bacteremia/Endocarditis/Bone/Joint	8-10 mg/kg IV Q24	8-10 mg/kg IV Q24	8-10 mg/kg IV Q48	8-10 mg/kg IV Q48[3]
Other indications (e.g. SSTI)	6-8 mg/kg IV Q24	6-8 mg/kg IV Q24	6-8 mg/kg IV Q48	6-8 mg/kg IV Q48[3]
ENTEROCOCCUS	*SDD=susceptible dose-dependent for MIC=4 for Enterococcus. Dapto dosing of 8-12mg/kg is needed*			
Bacteremia/Endocarditis	10-12 mg/kg IV Q24	10-12 mg/kg IV Q24	10-12 mg/kg IV Q48	10-12 mg/kg IV Q48[3]
UTI	4-6 mg/kg IV Q24	4-6 mg/kg IV Q24	4-6 mg/kg IV Q48	4-6 mg/kg IV Q48[3]
Other indications or SDD	8-12 mg/kg IV Q24	8-12 mg/kg IV Q24	8-12 mg/kg IV Q48	8-12 mg/kg IV Q48[3]
Dicloxacillin PO				
	500 mg PO Q6			
Doxycycline IV/PO				
	100 mg Q12			
*Eravacycline IV				
Standard dose	1 mg/kg IV Q12 (or 1.5 mg/kg Q24 ok for outpatient) Child-Pugh C: 1 mg/kg Q12 x2 doses, then 1 mg/kg Q24			
Concomitant strong CYP3A inducers (ex: rifampin)	1.5 mg/kg IV Q12			

[3] Daptomycin: See Lexi-Comp® for TIW post-HD alternative dosing for outpatient convenience

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	CrCL ≥50 mL/min	**CrCL 49-30 mL/min**	**CrCL 29-10 mL/min**	**CrCL <10 mL/min or iHD[1]**
Ertapenem IV	Consider meropenem for obese patients (>100kg) WITH severe deep-seated infection			
	1 g IV Q24	1 g IV Q24	500 mg IV Q24	500 mg IV Q24 or 1g TIW post-HD
Ethambutol PO	Round to nearest 200 mg. Do not give doses below 15 mg/kg. For obesity (BMI>30) use lean body weight Serum level checking for renal insufficiency recommended.			
	CrCL ≥ 30 mL/min		CrCL <30 mL/min or iHD	
	<40 kg	400-600 mg daily or 5x/week	<40 kg	800 mg 3x/week
	40-49 kg	800 mg daily or 5x/week	40-49 kg	1000 mg 3x/week
	50-59 kg	1000 mg daily or 5x/week	50-59 kg	1200 mg 3x/week
	60-69 kg	1200 mg daily or 5x/week	60-69 kg	1400 mg 3x/week
	70-79 kg	1400 mg daily or 5x/week	70-79 kg	1600 mg 3x/week
	>80 kg	1600 mg daily or 5x/week	80-89 kg	1800 mg 3x/week
			>90 kg	2000 mg 3x/week
Fidaxomicin PO				
	200 mg PO Q12			
Fosfomycin PO				
Uncomplicated Cystitis	3 g PO x 1 dose			
Complicated Cystitis	3 g PO Q48 x 3 doses			
Gentamicin IV	Recommend **dosing per pharmacy** to ensure appropriate dosing, serum level targeting and monitoring			
	Refer to P&P 43135 (Pharmacist Management of Aminoglycosides Therapy: Adults) for detailed dosing guidance			
*Imipenem/Cilastatin IV (3hr infusion)	CrCL ≥ 60mL/min	CrCL 59-30 mL/min	CrCL 29-15 mL/min	CrCL <15 or iHD
Standard Dose	500 mg IV Q6 **>100 kg:** 1 g IV Q8	500 mg IV Q8	500 mg IV Q12	500 mg IV Q12 Must institute HD within 48 hrs
Severe infections AND MIC ≥2 (NTE 50mg/kg/d or 4g/d)	1 g IV Q6	500 mg IV Q6	250 mg IV Q6	
*Imipenem/Cilastatin/Relebactam	CrCL ≥ 60mL/min	CrCL 59-30 mL/min	CrCL 29-15 mL/min	CrCL <15 or iHD
	CrCL ≥90: 1.25 g IV Q6 CrCL 89-60: 1 g IV Q6	750 mg IV Q6	500 mg IV Q6	500 mg IV Q6 Must institute HD within 48 hrs
Isoniazid PO/IM				
	5 mg/kg PO (up to 300 PO mg, round to nearest 50 mg) Q24. Alternative: same dose 5 days/week			
Levofloxacin IV/PO	CrCL ≥50 mL/min	CrCL 49-20 mL/min	CrCL 19-10 mL/min	CrCL <10 mL/min, iHD

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	CrCL ≥50 mL/min	**CrCL 49-30 mL/min**	**CrCL 29-10 mL/min**	**CrCL <10 mL/min or iHD[1]**
All other indications	750 mg Q24	750 mg Q48	750 mg x1, then 500 mg Q48	750 mg x1, then 500 mg Q48
Cystitis or weight <45 kg	500 mg Q24	500 mg Q48	500 mg x1, then 250 mg Q48	500 mg x1, then 250 mg Q48
Linezolid IV/PO				
	600 mg Q12			
Meropenem IV (30min infusion)				
Standard dose	500 mg IV Q6	500 mg IV Q8	500 mg IV Q12	500 mg IV Q24
Meningitis, Cystic Fibrosis, or >100kg	2 g IV Q8	2 g IV Q12	1 g IV Q12	1 g IV Q24
*Meropenem/Vaborbactam IV	**MDRD eGFR** ≥50 mL/min	**eGFR** 49-30 mL/min	**eGFR** 29-15 mL/min	**eGFR** <15 mL/min or iHD
	4 g IV Q8 over 3hrs	2 g IV Q8 over 3hrs	2 g IV Q12 over 3hrs	1 g IV Q12 over 3hrs
Metronidazole IV/PO				
Usual Dose	500 mg Q8-12 CNS infection or *C. difficile*: 500 mg Q8			500 mg Q12 if HD AND >14 days or Child-Pugh C
Amoebic/Parasitic Infections	500-750 mg Q8			500-750 mg Q12 if HD AND >14 days or Child-Pugh C
*Minocycline IV				
MDR Acinetobacter, Steno, Norcardia	200 mg IV Q12			
Nafcillin IV				
Endocarditis, Meningitis, Bone/Joint	2 g IV Q4			
Nitrofurantoin PO	**CrCL ≥ 30 mL/min**			
MacroBID®	Cystitis: 100 mg PO BID Px: 100 mg PO daily	CrCL <30 mL/min: Use not recommended. Drug will not reach bladder to treat cystitis		
Furandantin Susp®	50 – 100 mg PO QID Px: 50 - 100 mg PO daily	CrCL <30 mL/min: Use not recommended. Drug will not reach bladder to treat cystitis		
Penicillin G IV				
Standard Dose	2 – **4** mu IV Q4	2 – **4** mu IV Q6	2 – **4** mu IV Q6	1 – **2** mu IV Q6
Penicillin V Potassium PO				
Usual Dose	500 mg PO Q6	500 mg PO Q8	500 mg PO Q8	500 mg PO Q12
Piperacillin/Tazobactam IV	4-hr infusion: CrCL >20 mL/min		4-hr infusion: CrCL ≤20 mL/min	iHD: 4-hr infusion
Standard dose	4.5 g IV Q8	4.5 g IV Q8	4.5 g IV Q12	4.5 g IV Q12

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	CrCL ≥50 mL/min	**CrCL 49-30 mL/min**	**CrCL 29-10 mL/min**	**CrCL <10 mL/min or iHD[1]**
MIC=16 (non-urinary) AND wt >100 kg	4.5 g IV Q6	4.5 g IV Q6	4.5 g IV Q12	4.5 g IV Q12
Patients <45kg	3.375 g IV Q8	3.375g IV Q8	3.375g IV Q12	3.375g IV Q12
Line access / compatibility issues	4.5g IV Q6 over 30min	CrCL 39-20mL/min: 4.5g IV Q8 over 30min	4.5g IV Q12 over 30min	4.5g IV Q12 over 30min
*Polymyxin B	Please see Colistin/Polymyxin B IV Dosing Guideline for additional details. Dose based on TBW, use ABW for obesity. 1mg = 10,000 units			
Loading Dose for all patients	2.5 mg/kg IV x 1 (max 300 mg)			
Maintenance dose	1.25 mg/kg (max 300 mg) Q12. Begin 12-hrs after loading dose			
Pyrazinamide PO	Round to nearest 250 mg. Do not give doses < 20 mg/kg. For obesity (BMI>30) use lean body weight. Serum level checking for renal insufficiency recommended.			
	CrCL ≥ 30 mL/min		CrCL <30 mL/min or iHD	
	<38 kg	750 mg daily	<38 kg	25 mg/kg 3x/week
	38-49 kg	1000 mg daily	38-49 kg	
	50-59 kg	1250 mg daily	50-59 kg	
	60-69 kg	1500 mg daily	60-69 kg	
	70-79 kg	1750 mg daily	70-79 kg	
	>80 kg	2000 mg daily	>80 kg	
Rifampin IV/PO				
TB	10 mg/kg PO daily, up to 600 mg PO daily (or 5 days/week). Round to nearest 150 mg			
MAC	600 mg MWF or daily			
Adjunctive for *S. aureus*	Endocarditis: 300 mg Q8 Others: 600 mg Q24			
*Sulbactam/durlobactam (3 hour infusion)	**CrCL ≥ 45 mL/min**	**CrCL 30-44 mL/min**	**CrCL 15-29 mL/min**	**CrCL <15 mL/min, iHD**
1g of sulbactam and 1g of durlobactam	2g IV Q6H	2g IV Q8H	2g IV Q12H	2g IV Q12h for 3 doses then 2g IV daily
*Tedizolid IV/PO				
	200 mg IV/PO Q24			
Tobramycin IV	Recommend **dosing per pharmacy** to ensure appropriate dosing, serum level targeting and monitoring			
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	CrCL ≥50 mL/min	CrCL 49-30 mL/min	CrCL 29-10 mL/min	CrCL <10 mL/min or iHD[1]
TMP/SMX (Bactrim/Septra) IV. Use TBW, for obesity (>120% IBW) use ABW			Reduce dose by 50%	Reduce dose by 50-75%
UTI	Equivalent to 1 DS tab Q12	Equiv to 1 DS tab Q12	Equiv to 1 SS tab Q12	Equiv to 1 SS tab Q12-24
SSTI or Systemic GNR	4-6 mg/kg of TMP Q12	4-6 mg/kg of TMP Q12	2-3 mg/kg of TMP Q12	2-3 mg/kg of TMP Q24
Stenotrophomonas, Norcardia, Severe MRSA infections	5 mg/kg of TMP Q8	5 mg/kg of TMP Q8	2.5 mg/kg of TMP Q8	5mg/kg of TMP Q24
PJP Treatment	5 mg/kg of TMP Q6-8	5 mg/kg of TMP Q6-8	5 mg/kg of TMP Q12	5 mg/kg of TMP Q24
TMP/SMX PO			Reduce dose by 50%	Reduce dose by 50-75%
UTI	1 DS tab PO Q12	1 DS tab PO Q12	1 SS tab PO Q12	1 SS tab PO Q12-24
SSTI	1-2 DS tab PO Q12	1-2 DS tab PO Q12	1 SS or 1 DS tab PO Q12	1 SS or 1 DS tab PO Q12
PJP Prophylaxis	1 DS/SS tab PO Q24 or 1 DS tab PO MWF	1 DS/SS tab PO Q24 or 1 DS tab PO MWF	1 SS tab PO Q24 or MWF	1 SS tab PO Q24 or MWF
PJP Treatment	5 mg/kg of TMP Q8 Or 2 DS tab PO Q8	5 mg/kg of TMP Q8 Or 2 DS tab PO Q8	2.5 mg/kg of TMP Q8 Or 2 DS tab PO Q12	5 mg/kg of TMP Q24 Or 2 DS tab PO Q24
Vancomycin	Recommend **dosing per pharmacy** to ensure appropriate dosing, serum level targeting and monitoring			
	Refer to P&P 43134 (Pharmacist Management of IV Vancomycin Therapy: Adults) for detailed dosing guidance			

	CrCL ≥50 mL/min	CrCL 49-30 mL/min	CrCL 29-10 mL/min	CrCL <10 mL/min or iHD[1]
ANTIFUNGALS				
*Amphotericin Liposomal IV	**Dose based on TBW. Use ABW for obesity (>120% of IBW)**			
	3-5 mg/kg IV Q24			
Fluconazole IV/PO for **CANDIDA**	**LOADING DOSE 12mg/kg (round to nearest 200mg, NTE 1600mg). Use actual BW**			
Prophylaxis or Suppression	400 mg daily	200 mg daily	200 mg daily	200 mg daily
Cystitis, Thrush *(LD not required)*	200 mg Q24	100 mg Q24	100 mg Q24	100 mg Q24 Or 200mg TIW post-HD
Systemic Infections or Neutropenia *(round to nearest 200mg, NTE 1600mg)*	6 mg/kg Q24	3 mg/kg mg Q24	3 mg/kg mg Q24	3mg/kg mg Q24 Or 6 mg/kg TIW post-HD
Meningitis or C. glabrata *(round to nearest 200mg, NTE 1600mg)*	12 mg/kg Q24	6 mg/kg Q24	6 mg/kg Q24	6 mg/kg Q24 Or 6 mg/kg TIW post-HD
OTHER FUNGI	***Refer to Lexi-Comp® as dosing varies by fungal pathogen, site of infection, comorbidities, severity, etc.***			

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	CrCL ≥50 mL/min	**CrCL 49-30 mL/min**	**CrCL 29-10 mL/min**	**CrCL <10 mL/min or iHD[1]**
Pulmonary Coccidioidomycosis Tx	400 – 800 mg Q24	200 – 400 mg Q24	200 – 400 mg Q24	200 – 400 mg Q24
Consolidation Tx for Cryptococcal Meningitis	400 – 800 mg Q24	200 – 400 mg Q24	200 – 400 mg Q24	200 – 400 mg Q24
Flucytosine (5-FC)	**CrCL≥40 mL/min**	**CrCL 39-21 mL/min**	**CrCL 20-10 mL/min**	**CrCL<10 mL/min or iHD**
	Dosed on IBW. Consider checking serum levels if patients factors (e.g. obesity, unstable renal/hepatic function, etc.) indicate possible unpredictable PK			
	25 mg/kg PO QID	25 mg/kg PO BID	25 mg/kg PO daily	25 mg/kg PO Q48
Itraconazole PO	PO formulations not bioequivalent. If dosed on Tolsulra® 65 mg capsules (typical dose 130 mg PO Q12-24), interchange to general/Sporanox capsules dosing per protocol → Tolsura 130 mg approx. equiv to 200 mg			
Blastomycosis, Histoplasmosis	200 mg PO Q8 x 3 days, then 200 mg PO Q8-12			
All other indications	Refer to Lexi-Comp but generally 200 mg PO 12-24			
Isavuconazole IV/PO	Expressed as mg of isavuconazole sulfate (372 mg of sulfate = 200 mg isavuconazole)			
Aspergillosis, Mucormycosis, Px	372 mg Q8 x6 doses, then 372 mg Q24			
Refractory esophageal candidiasis	744 mg x 1, then 186 mg Q24			
Micafungin IV				
Standard dose	100 mg IV Q24			
Esophagitis, Pulm Aspergillosis, Endocarditis	150 mg IV Q24			
Prophylaxis	50-100 mg IV Q24			
Posaconazole PO				
Prophylaxis	DR Tablet: 300 mg PO BID x 2 doses, then 300 mg PO Q24 IR PO Suspension: 200 mg PO Q8			
*Treatment	DR Tablet: 300 mg PO BID x 2 doses, then 300 mg PO Q24 IR PO Suspension: 200 mg PO Q6-8 or 400 mg PO Q12			
Voriconazole IV/PO	IV for CrCL <50 mL/min: assess benefits versus risk of potential accumulation/toxicity of SBECD vehicle. Not a contraindication for use in HD or CrCL<50			
Prophylaxis	200 mg Q12			
*Treatment	6 mg/kg Q12 x 2 doses followed by 4 mg/kg Q12 (target trough 1.5-5 mcg/mL) Use Adjusted BW if patient is >120% ideal BW. Round to nearest 50 mg			

	CrCL ≥50 mL/min	**CrCL 49-26 mL/min**	**CrCL 25-10 mL/min**	**CrCL <10 mL/min or iHD[1]**
ANTIVIRALS				

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	CrCL ≥50 mL/min	**CrCL 49-26 mL/min**	**CrCL 25-10 mL/min**	**CrCL <10 mL/min or iHD[1]**
Acyclovir[4] IV				
Genital / Oral HSV	5 mg/kg IV Q8	5 mg/kg IV Q12	5 mg/kg IV Q24	2.5 mg/kg IV Q24
HSV Zoster (shingles), VZV, CNS disease	10 mg/kg IV Q8	10 mg/kg IV Q12	10 mg/kg IV Q24	5 mg/kg IV Q24
Acyclovir PO				
HSV Suppression / Prophylaxis	400 mg PO Q12	400 mg PO Q12	400 mg PO Q12	200 mg PO Q12
Genital / Oral HSV	400 mg PO Q8	400 mg PO Q8	400 mg PO Q12	200 mg PO Q12
Bells Palsy (severe)	400 mg PO 5x/day PLUS steroids & within 3 days of sx onset	400 mg PO 5x/day	400 mg PO Q8	400 mg PO Q12
HSV/VZV Zoster (shingles)	800 mg PO 5x/day	800 mg PO 5x/day	800 mg PO Q8	CrCL <10: 400 mg PO Q12 HD: 400 mg PO x1, then 200 mg PO Q12 PLUS 400 mg post each HD session
*Cidofovir[5] IV	Unless inappropriate, premedicate with probenecid and NS (refer to Lexi-Comp®) for details			
Other dosing schemes may be acceptable. See Lexi-Comp®	5 mg/kg IV Induction: Q week Maintenance: Q2 weeks	Pre-existing renal impairment: Contraindicated for Scr >1.5 mg/dL, CrCL <55 mL/min, or urine protein ≥100 mg/dL (≥2+) If SCr ↑ by 0.3-0.4 mg/dL or >30% of baseline, reduce cidofovir dose to 3 mg/kg; discontinue therapy if SCr ↑ ≥0.5 mg/dL or development of ≥3+ proteinuria		Use not recommended
*Foscarnet IV	Varies based on indication, renal function by CrCL, etc.			
	Consult pharmacy / manufacturer's package insert / Lexi-Comp®			
*Ganciclovir IV[6]	**CrCL ≥50 mL/min**	**CrCL 49-26 mL/min**	**CrCL 25-10 mL/min**	**CrCL <10 mL/min or iHD[1]**
CMV Induction	**CrCL ≥70:** 5 mg/kg IV Q12 **CrCL 50-69:** 2.5 mg/kg IV Q12	2.5 mg/kg IV Q24	1.25 mg/kg IV Q24	1.25 mg/kg IV Q48 or TIW post-HD
Maintenance Tx or Px	**CrCL ≥70: 5** mg/kg IV Q24	1.25 mg/kg IV Q24	0.625 mg/kg IV Q24	0.625 mg/kg IV Q48 or TIW post-HD

[4] Use lesser of actual or ideal body weight. Use adjusted body weight if patient is > 120% ideal body weight or life-threatening illness. Round to the nearest 50 mg.
[5] Use total body weight. Consult ID or ID pharm for alternative dosing regimens. Pre-med: IV hydration, probenecid.
[6] Use adjusted body weight if patient is >120% ideal body weight

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	CrCL ≥50 mL/min	**CrCL 49-26 mL/min**	**CrCL 25-10 mL/min**	**CrCL <10 mL/min or iHD[1]**
	CrCL 50-69: 2.5 mg/kg IV Q24			
Oseltamivir PO	**CrCL ≥60 mL/min**	**CrCL 59-31 mL/min**	**CrCL 30-11 mL/min**	**CrCL <10 mL/min or iHD**
Treatment (Typical duration 5 days)	75 mg PO Q12	75 mg PO x once, then 30 mg PO Q12	30 mg PO Q24	30 mg PO x 1, then 30 mg PO post-HD
Prophylaxis	75 mg PO Q24	30 mg PO Q24	30 mg PO Q48	30 mg PO x 1, then 30 mg PO post every other HD
Remdesivir				
Treatment, Inpatient	200 mg x1 IV, then 100 mg IV Q24 x4 days			
Paxlovid® (Nirmatrelvir/ritonavir)	**eGFR (CKD-EPI) ≥60 mL/min**	**eGFR 59-30 mL/min**	**eGFR <30mL/min**	**eGFR <10 or iHD**
Under EUA. Initiate w/in 5 days of sx onset	300/100 mg PO BID x5 days	150/100 mg PO BID x5 days	Not recommended	Not recommended
*Peramivir IV *Restricted to ID or ICU. Courses >5 days restricted to ID*	**CrCL ≥50 mL/min**	**CrCL 49-30 mL/min**	**CrCL 29-10 mL/min**	**CrCL <10 mL/min or iHD[1]**
Single dose	600 mg IV x 1 dose	200 mg IV x 1 dose	100 mg IV x 1 dose	100 mg IV x 1 dose post HD
Daily regimen	600 mg IV Q24	150 mg IV Q24	100 mg IV Q24	**CrCL <10:** 100 mg IV on day 1, then 15 mg IV Q24 **HD:** 100 mg IV on day 1, then 100 mg IV 2hrs post each HD
Valacyclovir PO	**CrCL ≥50 mL/min**	**CrCL 49-30 mL/min**	**CrCL 29-10 mL/min**	**CrCL <10 mL/min or iHD[1]**
HSV Suppression	500mg PO BID	500mg PO BID	500 mg PO 24	500 mg PO Q24
Genital/Oral herpes	1 g PO Q12	1 g PO Q12	1 g PO Q24	500 mg PO Q24
HSV/VZV Zoster (shingles), Meningitis	1 g PO Q8	1 g PO Q12	1 g PO Q24	500 mg PO Q24
Valganciclovir PO	**CrCL ≥60 mL/min**	**CrCL 59-40 mL/min**	**CrCL 39-10 mL/min**	**CrCL <10 mL/min or iHD[1]**
*CMV Induction	900 mg PO Q12	450 mg PO Q12	CrCL 39-25: 450 mg PO Q24 CrCL 24-10: 450 mg PO Q48	Not recommended. Consider Ganciclovir IV. May consider 200 mg (induction) or 100 mg (MD/Px) of oral solution PO TIW (pls discuss with MD)
CMV Maintenance / Px	900 mg PO Q24	450 mg PO Q24	CrCL 39-25: 450 mg PO Q48 CrCL 24-10: 450 mg PO twice weekly	

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Considerations for Dose Selection	Acute Kidney Injury (AKI)	General Guidelines
- Indication - Severity of illness and clinical progress - Renal function +/- presence of renal replacement therapy - Weight/Height For critically ill patients, medication dosing can be particularly complex given acute physiologic changes that accompany multi-system organ failure, which can be further complicated by any renal replacement therapies.	Function Criteria for AKI i. ↑ SCr by 50% within 7 days OR ii. ↑ SCr by 0.3 mg/dL within 2 days OR iii. Oliguria (UOP <0.5mL/kg/hr) Changes in pharmacokinetics/pharmacodynamics i. ↑ Vd of hydrophilic drugs, alters protein binding, alters tissue penetration, ↓ systemic clearance ii. ↑ non-renal clearance that is often not measurable	1. No adjustment for initial dose often needed (e.g. loading dose) 2. Limit nephrotoxins, if possible 3. Renal replacement therapy may be initiated for: a. severe Acidosis (A) b. Electrolyte abnormalities c. Intoxicates (I) d. refractory volume Overload (O) e. Uremia (U)

Comparison of Renal Replacement Therapies					
Modality		**Clinical Utility**	**Factors ↑ Drug Removal**	**Calculation of CrCL**	**Estimation of CrCl**
Conventional HD Traditional HD Circuit	IHD	▪ Diffusion ▪ Rapid & efficient solute removal ▪ 3-4 hour sessions, usually 3x/week ▪ Advantage: rapid & large drug/toxins removal	MW <500 kDa Low protein binding (PB) Vd <0.8-1 L/kg	Assumed	<10mL/min

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		▪ Can also be used for ultrafiltration				
	SLED	▪ Diffusion ▪ Gradual solute & volume removal ▪ Typically 8-12 hour sessions; may be continuous for 24 hours/day ▪ Advantage over IHD: ↑ hemodynamic control ▪ Advantage over CRRT: allows "time away" for procedures, no need for specialized solutions			Unknown – varies with dialysis time. Clearance may be greater than with CVVHD due to higher dialysate flow rates	~30-50 mL/min
Peritoneal Dialysis	PD	▪ Diffusion, osmolar gradient ▪ Home modality, patient convenience ▪ Available as CAPD and APD	N/A (minimal drug removal – dependent on non-renal clearance)		Assumed	<10 mL/min
Continuous Renal Replacement Therapies (CRRT)	CVVH	▪ Diffusion and convection ▪ Gradual solute removal with multiple modes ▪ Runs continuously ▪ Advantage: minimizes fluid shifts in hemo-dynamically unstable patients	Convection	MW <15,000 kDa Low PB (<80%) Small Vd (<0.6 L/kg)	CVVH = UF x SC (mL/min)	~30 mL/min
	CVVHD		Diffusion	MW <500 kDa Low PB Small Vd (<0.6 L/kg)	CVVHD = Qd x SA	
	CVVHDF		Convection & Diffusion		CVVHDF = (UF +Qd) x SA	
	SCUF	▪ Fluid removal only (no solute removal, cannot correct electrolyte abnormalities)	Ultrafiltration		No drug clearance	CG calculated CrCL

Definitions: Diffusion=solutes move from high concentration to low; removes low MW solutes. Convection=solute-drag; removes small and large MW solutes.
Abbreviations: IHD=intermittent hemodialysis, SLED=sustained low efficiency dialysis, PD=peritoneal dialysis, CAPD=continuous ambulatory peritoneal dialysis; APD=automated peritoneal dialysis, CVVH=continuous veno-venous hemofiltration, CVVHD=continuous veno-venous hemodialysis, CVVHDF=continuous veno-venous hemodiafiltration, SCUF=slow continuous ultrafiltration, MW=molecular weight, Da=Dalton, PB=protein binding, Vd=volume of distribution, UF=ultrafiltration rate, SC=sieving coefficient, Qd=dialysis flow rate, SA=saturation coefficient

Dosing Recommendations for Patients Receiving Renal Replacement Therapy

Drug	IHD	PD (IV or PO)	SLED[¥] <24 hrs/day
Acyclovir (IV)	2.5 – 5 mg/kg IV Q24	2.5 – 5 mg/kg IV Q24	[£]5 – 10 mg/kg IV Q12-24
*Amikacin (IV)	Refer to Aminoglycoside P&P	5 mg/kg IV x 1, then dose by levels	15 – 20 mg/kg IV Q48 Monitor levels and adjust dose
Ampicillin (IV)	1 – 2 g IV Q12	250 – 500 mg IV Q12	[£]1 – 2 g IV Q6-8
Ampicillin/sulbactam (IV)	3 g IV Q24	No data	[£]3 g IV Q8-12
Aztreonam (IV)	1 – 2 g IV Q24 500 mg IV Q6-8	1 – 2 g IV Q24	[£]1 – 2 g IV Q8-12
Cefazolin (IV)	500 mg – 2 g IV Q24 OR 2 g IV TIW post-HD	500 mg IV Q12	[£]1 – 2 g IV Q8-12
Cefepime (IV)	500 mg – 1 g IV Q24 OR 2 g IV TIW post-HD	1g IV Q24	[£]1 g IV Q8-12
Ceftaroline (IV)	200 mg IV Q12 (Standard Dose) 200 mg IV Q8 (Endocarditis, S. aureus bacteremia)	200 mg IV Q12 (Standard Dose) 200 mg IV Q8 (Endocarditis, S. aureus bacteremia)	200 mg IV Q12 (Standard Dose) 200 mg IV Q8 (Endocarditis, S. aureus bacteremia)
Ciprofloxacin (IV)	400 mg IV Q24	400 mg IV Q24	400 mg IV Q12-24

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Ciprofloxacin (PO)	500 mg PO Q24	500 mg PO Q24	500 mg PO Q12-24
*Daptomycin (IV)	4-10 mg/kg IV Q48	4-10 mg/kg IV Q48	6 mg/kg IV Q24
Ertapenem (IV)	500 mg IV Q24	500 mg IV Q24	1 g IV Q24
Fluconazole (IV/PO)	100-600 mg Q24	No recommendation	£200 – 400 mg IV Q24
Gentamicin (IV)	Refer to Aminoglycoside P&P	2 mg/kg IV x 1, then dose by levels	6 mg/kg IV Q48 Monitor levels and adjust dose
*Imipenem/cilastatin (IV)	500 mg IV Q12	250 mg IV Q12	500 mg IV Q6
Levofloxacin (IV/PO)	750 mg x 1 dose, then 500 mg Q48 500 mg x 1 dose, then 250 mg Q48	750 mg x 1 dose, then 500 mg Q48 500 mg x 1 dose, then 250 mg Q48	£500 – 750 mg Q48
Linezolid (IV/PO)	600 mg Q12	600 mg BID for 48 hrs, then 300 mg BID	£600 mg Q12
*Meropenem (IV)	500-1000 mg IV Q24	500-1000 mg IV Q24	1 g IV Q8
Oseltamivir (PO)	Treatment: 30 mg x 1, then 30 mg post HD Prophylaxis: 30 mg x1, then 30 mg post every other HD	Treatment: 75 mg x 1 dose only Prophylaxis: 30 mg x 1, then 30 mg once weekly for duration of prophylaxis	Treatment: £30 mg PO BID Prophylaxis: £30 mg PO daily
Penicillin G (IV)	1 – 2 MU IV Q6	No data	£2 – 4 MU IV Q6
Piperacillin/Tazobactam (IV)	4.5 g IV Q12 over 4 hours	4.5 g IV Q12 over 4 hours	£4.5 g IV Q8 over 4 hours
TMP/SMX PO	Refer to dosing on page 8	1 DS tab PO BID	
Tobramycin (IV)	Refer to Aminoglycoside P&P	2 mg/kg IV x 1, then dose by levels	6 mg/kg IV Q48 Monitor levels and adjust dose
Vancomycin (IV)	Load with 15-25 mg/kg and maintain with 5-10 mg/kg Monitor levels and adjust dose	Load with 15-20 mg/kg IV Monitor levels and adjust dose	15-20 mg/kg IV Q24 Monitor levels 12-18 hours after dose and adjust dose
¥Drug clearance, and therefore drug dosing, varies by number of hours per day patient is dialyzed. Literature reports frequent under-dosing. More aggressive dosing is recommended for patients being dialyzed longer hours/day and/or for severe infections. For patients on continuous SLED, dose as CrCL >50mL/min. Monitor patients closely for therapeutic failure and drug toxicity. £No clear recommendation in literature. Recommendations based on estimated CrCL 15-50mL/min, depending on hours per day of dialysis			

IntraPERITONEAL Administration of Antibiotics

- Intended only for local peritoneal infections (peritonitis) only. Antibiotics are administered via peritoneal dialysate fluid.
- For systemic infections or intravenous administration of antibiotics, please refer to "Dosing Recommendations for Patients Receiving Renal Replacement Therapy"
- Patients on systemic IV/PO antibiotics do not need intra-PD antibiotics.

Intraperitoneal Antibiotic Dosing Recommendations for Continuous Ambulatory PD (CAPD) Patients[1]

Drug	Intermittent[2] (dosed per exchange, give once daily unless specified)	Continuous[3] (dosed per mg/mL, give in all exchanges)
*Amikacin	2 mg/kg	Not advised
Ampicillin	4 g (not recommended for enterococcal peritonitis)	MD 125 mg/L
Ampicillin/sulbactam	3 g Q12	LD 1000 mg, MD 133.3 mg

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Aztreonam	2 g	LD 500 mg/L, MD 250 mg/L
Cefazolin[4]	15 mg/kg	LD 500 mg/L, MD 125 mg/L
Cefepime	1 g	LD 500 mg/L, MD 125 mg/L
Ceftazidime	1 to 1.5 g	LD 500 mg/L, MD 125 mg/L
Ceftriaxone	1 g	No data
Ciprofloxacin	No data	MD 50 mg/L
Clindamycin	No data	MD 600 mg/bag
*Daptomycin	300 mg	LD 100 mg/L, MD 20 mg/L
Fluconazole	150-200 mg IP q24-48h (PO pref)	No data
Gentamicin	0.6 mg/kg	Not advised
*Imipenem/cilastatin	500 mg in alternate exchange	LD 250 mg/L, MD 50 mg/L
*Meropenem	500 mg	MD 125 mg/L
Penicillin G	No data	LD 50,000 units/L, MD 25,000 units/L
Piperacillin/tazobactam	No data	LD 4.5 g, MD 1.125 g/bag
Tobramycin[5]	0.6 mg/kg	Not advised
Vancomycin[5,6]	15-30 mg/kg q5-7 days for CAPD 15 mg/kg q4 days for APD	LD 20–25 mg/kg, MD 25 mg/L
*Voriconazole	2.5 mg/kg (PO preferred)	No data

[1] For patients with residual renal function, defined as (>100 mL/day of urine output), dose should be empirically increased by 25%

[2] Intermittent dosing: Intraperitoneal antibiotics given once daily. Antibiotic-containing peritoneal dialysate should be allowed to **dwell for at least 6 hours** to allow adequate absorption

[3] Continuous dosing: Intraperitoneal antibiotics given in each exchange. Dosed by mg per L of dialysate (unless otherwise specified)

[4] For AUTOMATED PERITONEAL DIALYSIS patients, continuous dosing of first-generation cephalosporins is recommended instead of intermittent dosing to ensure sufficient concentrations

[5] Monitor serum levels to ensure drug is not accumulating and contributing to toxicity

[6] AUTOMATED PERITONEAL DIALYSIS patients may require supplemental doses

Dosing Recommendations for Patients Receiving Continuous Renal Replacement Therapy (CRRT)

- Recommendations assume that patients have minimum residual renal function, normal hepatic function, and CRRT circuit is running continuously.
- Currently, there is no standardized approach to delivering CRRT at SHC. The dosing recommendations provided below are based on high flux dialyzers and effluent flow rates for CVVH/CVVHD/CVVHDF of 20-25mL/kg/hr (or 1.5 – 3 L/hr) which approximates a CrCL of 30-50 mL/min. Close monitoring of clinical response and adverse drug reactions due to accumulation is important.
    - For flow rates >3L, consider extended infusion or continuous for beta-lactams for higher flow rates if stability and line-access allows for severe infections
    - For flow rates <1.5L, use the lower end of any dosing range recommendations and monitor closely for signs/symptoms of toxicity. For narrow therapeutic drugs with high toxicity, discuss with MD if alternative agent is feasible, increasing flow rates, and/or lower dosing based on patient's clinical picture
- Monitor patients for changing filtration rates or interruptions (e.g. clotting). When CRRT is off, adjust dose based on residual renal function
- *Volume of Distribution (Vd):* May be increased in CRRT patients. Loading dose is recommended, especially in patients with severe sepsis/septic shock. Also consider higher doses in the first 24-48 hrs in those patients.
- *Time-To-Steady-State Concentration*: Prolonged in renal failure. Monitor closely, especially for agents with narrow therapeutic windows
- Acute/chronic abnormalities such as hypoalbuminemia, liver failure, obesity, volume overload, and mechanical sequestration (i.e., presence of extracorporeal membrane oxygenation) can also affect therapeutic drug concentration and dosing

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- Provided recommendations should not replace clinical judgement and individualized, patient-centered decision-making. Doses outside of the recommendations below should be discussed with the provider and are not covered by any P&P.

Antimicrobials that DO NOT REQUIRE DOSE ADJUSTMENT during CRRT			
Amphotericin B	Eravacycline	Micafungin	Remdesivir
Azithromycin	Itraconazole	Moxifloxacin	Rifampin
Ceftriaxone	Linezolid	Nafcillin	Voriconazole PO (see below for IV)
Clindamycin	Metronidazole	Posaconazole	
Doxycycline	Minocycline	Polymyxin B	

CRRT Dosing Recommendations:

DRUG	Loading Dose	CRRT *CVVH/CVVHD/CVVHDF (effluent rate 1,500 - 3,000 mL/hr)*	Standard Anephric Dose
ANTIBACTERIALS			
Aminoglycosides			
Gram-negative infections		Refer to Aminoglycoside P&P	
Amikacin (IV)	10 mg/kg		
Gentamicin/Tobramycin (IV)	3 mg/kg		
Gram-positive synergy			
Gentamicin (IV)	2 mg/kg		
Ampicillin (IV)			
Cystitis, Mild infection	2 g	2 g Q8-12	1 g Q12-24
Bacteremia, Endocarditis, Meningitis, Prosthetic Joint, Osteomyelitis, Intra-abdominal		2 g Q6-8	2 g Q12
Ampicillin/Sulbactam (IV) [a]			
Systemic infections	3 g	3 g Q8	3 g Q24
Acinetobacter infection		Limited data. Consider alternative agent	3 g Q12 over 30min
Aztreonam (IV)			
Mild-Mod infection	2 g	1 g Q8 or 2 g Q12	1 g Q24
Severe infection			2 g Q24
Cefazolin (IV)			
Mild-Mod infection	2 g	1 g Q8 or 2 g Q12	500 mg Q24
Severe infection			1 g Q24
Cefepime (IV)			
Standard Dose	2 g	2 g Q12	500 mg Q24
Neutropenic fever, Meningitis, CF, Pseudomonas, Sepsis		2 g Q8	1 g Q24

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Cefiderocol (IV)*		*≤ 2,000 mL/hr*	*2,100 - 3,000 mL/hr*	*3,100 - 4,000 mL/hr*	*> 4,100 mL/hr*	
	2 g	1.5 g Q12	2 g Q12	1.5 g Q8	2 g Q8	750 mg Q12
Cefotetan (IV)						
	2 g	2 g Q24				500 mg Q24
Cefoxitin (IV)[17]						
	2 g	1-2 g Q8				1 g Q24
Ceftaroline (IV)*						
SSTI, w/o indication for MRSA	400 mg	400 mg Q12				200 mg Q12
Bacteremia/endocarditis, infections with known or suspected MRSA	600 mg	400mg Q8				200 mg Q8
Ceftazidime (IV)						
Empiric or pathogen directed therapy (*Pseudomonas aeruginosa*)	2 g	2 g Q8				1 g Q24
Ceftazidime/Avibactam (IV)*						
Empiric or pathogen directed therapy (*Multi-Drug Resistant Organisms*)	2.5 g	1.25 g Q8				0.94 g IV Q24
Ceftolozane/Tazobactam (IV)*						
	3 g	750mg Q8				150-300 mg IV Q8
Cefuroxime (IV)						
	NA	1.5 g Q12				1.5 g Q24
Ciprofloxacin (IV)						
Standard Dose	400 mg	400 mg Q12				400 mg Q24
Pneumonia, Severe Infection, *Pseudomonas aeruginosa*		400 mg Q8				
Ciprofloxacin (PO) [a]						
Mild-Mod infection	750 mg	500 mg Q12				500 mg Q24
Pneumonia, Severe Infection		750 mg Q12				750mg Q24
Colistin base (IV) [a*]						
	300 mg	220 mg Q12				See Polymyxin B & Colistin IV Dosing Guideline
Daptomycin (IV) [b*]						
	No Load	mg/kg dose based on indication *(see above dosing recs)* Q24				__ mg/kg Q48
Ertapenem (IV)						
	1 g	1 g Q24				500 mg Q24
Imipenem/Cilastatin *						
	1 g	500mg Q6-8				250 mg Q12H
Imipenem/Cilastatin/Relebactam (IV) [c*]						

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Refer to Dosing Considerations for more detail		1.25 g Q6		N/A
Levofloxacin (IV/PO)				
All other indications	750 mg	750 mg Q48 or 500 mg Q24		500 Q48
Cystitis or weight <45kg	500 mg	500 mg Q48 or 250 mg Q24		250 Q48
Meropenem (IV)				
Standard Dose	1 g	500 mg Q8		500 mg Q24
Meningitis, Cystic Fibrosis	2 g	1 g Q8		1 g Q24H
Meropenem/VABORBACTAM (IV)*				
	No Load	2 g Q8		1g Q12
Penicillin G (IV)				
	4 MU	2-3 MU Q6		1-2 MU Q6
Piperacillin/Tazobactam (IV)		**4-hr infusion (Extended Interval)**		
Standard dose	4.5 g	4.5 g Q8		4.5 g Q12
If <45 kg		3.375 g Q8		3.375 g Q12
Sulbactam/Durlobactam (IV)		**<2500 mL/hr**	**≥2500 mL/hr**	
3-hr infusion (Extended Interval)	N/A	2g Q8	2g Q6	N/A
TMP/SMX (IV/PO)				
UTI	No Load	**No dosage adjustment necessary** Sulfamethoxazole and trimethoprim are substantially removed by CRRT		1 SS tab Q12-24
Mild-Mod Infection				2-3 mg/kg Q24
Severe Infections, PCP				5 mg/kg Q24
Vancomycin (IV)				
	15-25 mg/kg	Refer to Vancomycin P&P		
ANTIFUNGALS				
Fluconazole (IV/PO)		Fluconazole clearance during CRRT is 1.5-2.3x that of normal healthy patients		
If recommended dose if 200 mg Q24H	400 mg	400 mg Q24		100 mg Q24
If recommended dose if 400 mg Q24H	800 mg	400 mg Q12		200 mg Q24
If recommended dose if 800 mg Q24H	1.2 g	600 mg Q12		400 -600 mg Q24
Flucytosine (PO) [a, 16]				
Recommend early and frequent serum level monitoring given limited data	No Load	25 mg/kg Q12-24		25 mg/kg Q48
Voriconazole (IV/PO)				
	No Load	**No dose adjustment necessary. Use of oral route is preferred.** IV formulation may be considered if benefit exceeds risks – SBECD (the carrier excipient in the IV formulation) is removed via CRRT.		N/A
ANTIVIRALS				
Acyclovir (IV)				
Genital HSV	No Load	5 mg/kg Q12		2.5 mg/kg Q24
HSV CNS Disease, VZV, Shingles		10 mg/kg Q12		5 mg/kg Q24

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Ganciclovir (IV)			
Induction	No Load	2.5 mg/kg Q24	1.25 mg/kg 3x/wk
Maintenance		1.25 mg/kg Q24	0.625 mg/kg 3x/wk
Oseltamivir (PO)			
Treatment	No Load	75 mg Q24	30 mg Q-HD
Prophylaxis		N/A	30 mg QO-HD

[a] Use ideal body weight in obesity.
[b] Use actual body weight.
[c] Limited data. Dosing based on an *Ex Vivo* study that found similar probability of MIC target attainment when comparing 1.25 g Q6 vs 1.5 g Q6. CRRT flow rates were assess from range 30-50 mL/min
[d] Due to high hydrophilicity, flucytosine is not well distributed through adipose tissue. Additionally, flucytosine is minimally protein bound. These factors increase the risk of harmful drug concentrations in patients undergoing CRRT. Therefore, recommend a conservative approach to dosing, and obtaining earlier peak/trough levels. Flucytosine goal ranges of 30-80 mcg/mL (2 hours post dose).

References:

1. Heintz BH, Matzke GR, Dager WE. Antimicrobial Dosing Concepts and Recommendations for Critically Ill Adult Patients Receiving Continuous Renal Replacement Therapy or Intermittent Hemodialysis. *Pharmacotherapy* 2009; 20(5):562-577
2. Lexicomp Online. http://online.lexi.com. Accessed October 30, 2017
3. Trotman RL, Williamson JC, Shoemaker DM, Salzer WL. Antibiotic Dosing in Critically Ill Adult Patients Receiving Continuous Renal Replacement Therapy. Clin Infect Dis. 2005;41(8):1159-1166.
4. Malone RS, et al. Pharmacokinetics of Cefepime during Continuous Renal Replacement Therapy in Critically Ill Patients. Antimicrobial Agents and Chemotherapy. 2011; 45(11): 3148-3155.
5. Aronoff G, Bennett W, Berns J, et al. Drug Prescribing in Renal Failure. 5th ed. Philadelphia, PA: American College of Physicians; 2007. B
6. Beumier M, et al. β-lactam antibiotic concentrations during continuous renal replacement therapy. Critical Care. 2014: 18(3): R105.
7. Roger CR, Wallis SC, Louart B, et al. Comparison of equal doses of continuous venovenous haemofiltration and haemodiafiltration on ciprofloxacin population pharmacokinetics in critically ill patients. *J Antimicrob Chemother* 2016; 71:1643-1650.
8. Malone RS, Fish DN, et al. Pharmacokinetics of Levofloxacin and Ciprofloxacin during Continuous Renal Replacement Therapy in Critically Ill Patients. Antimicrob Agents Chemotherapy. 2001. 45(10)2949-2954.
9. Markou N, Fousteri MR, Markantonis SL, et al. Colistin pharmacokinetics in intensive care unit patinets on continuous venovenous haemodiafiltration: an observational study. *Journal of Antimicrobial Chemotherapy*. 2012. 67: 2459-2462.
10. Honore PM, Jacobs R, et al. Continuous renal replacement therapy-related strategies to avoid colistin toxicity: a clinically orientated review. *Blood Purification.* 2014; 37:291-295.
11. Vilay AM, Grio M, DePestel DD, et al. Daptomycin pharmacokinetics in critically ill patients receiving continuous venovenous hemodialysis. Crit Care Med. 2011: 39(1): 19-25.
12. Preiswerk B, et al. Experience with daptomycin daily dosing in ICU patients undergoing continuous renal replacement therapy. *Infection*. 2013. 41:553-557.
13. Xu X, Khadzhynov D, et al. Population pharmacokinetics of daptomycin in adult patients undergoing continuous renal replacement therapy. Br J Clin Pharmacol. 2017. 83:498-509.
14. Eyler RF, et al. Pharmacokinetics of Ertapenem in Critically Ill Patients Receiving Continuous Venovenous Hemodialysis or Hemodiafiltration. Antimicrob Agents Chemother. 2014. 58(3): 1320-1326
15. Tegeder I, Bremer F, Oelkers R, et al. Pharmacokinetics of Imipenem-cilastatin in Critically Ill Patients Undergoing Continuous Venovenous Hemofiltration. Antimicrob Agents Chemotherapy. 1997. 41(12): 2640-2645
16. Fish DN, Teitelbaum I, and Abraham E. Pharmacokinetics and Pharmacodynamics of Imipenem during Continuous Renal Replacement therapy in Critically Ill Patients. Antimicrob Agents Chemotherapy. 2015. 49(6): 2421-2428.
17. Hansen E, Bucher M, Jakob W, et al. Pharmacokinetics of levofloxacin during continuous veno-venous hemofiltration. Intensive Care Med. 2001. 27:371-375.
18. Ulldemolins M, Soy D, Llaurado-Serra M, et al. Meropenem Population Pharmacokinetics in Critically Ill Patients with Septic Shock and Continuous Renal Replacement Therapy: Influence of Residual Diuresis on Dose Requirements. Antimicrobial Agents Chemotherapy. 2015. 59 (9): 5520-5528.
19. Isla A, Rodriguez-Gascon A, Troconiz IF, et al. Population Pharmacokinetics of Meropenem in Critically Ill Patients Undergoing Continuous Renal Replacement Therapy. Clin Pharmacokinet. 2008. 47(3): 173-180.
20. Jaruratansirikul S, Thengyai S, Wongpoowarak W, et al. Population Pharmacokinetics and Monte Carlo Dosing Simulation of Meropenem during the Early Phase of Severe Sepsis and Septic Shock in Critically Ill Patients in Intensive Care Units. Antimicrobial Agents Chemotherapy. 2015. 59 (6): 2995-3001.
21. Awissi DK, Beauchamp A, Herbert A, et al. Pharmacokinetics of an Extended 4-hour Infusion of Piperacillin-Tazobactam in Critically Ill Patients Undergoing Continuous Renal Replacement Therapy. Pharmacotherapy. 2015. 35(6):600-607.

22. Valtonen M, et al. Elimination of the piperacillin/tazobactam combination during continuous venovenous haemofiltration and haemodiafiltration in patients with acute renal failure. J Antimicrob Chemother. 2001. 48 (6): 881-5.
23. Kesner JM, Yardman-Frank JM, Mercier RC, et al. Trimethoprim and sulfamethoxazole transmembrane clearance during modeled continuous renal replacement therapy. Blood Purif. 2014. 38(3-4):195-202.
24. Pittrow L, Penk A. Dosage adjustment of fluconazole during continuous renal replacement therapy (CAVH, CVVH, CAVHD, CVVHD). Mycoses. 1999. 42(1-2): 17-19.
25. Muhl E, Martens T, Iven H, et al. Influence of continuous veno-venous haemodiafiltration and continuous veno-venous haemofiltration on the pharmacokinetics of fluconazole. Eur J Clin Pharmacol. 2000. 56:671-678.
26. Eyler RF, Heung M, Pleva M, et al. Pharmacokinetics of oseltamivir and oseltamivir carboxylate in critically ill patients receiving continuous venovenous hemodialysis and/or extracorporeal membrane oxygenation. Pharmacotherapy. 2012. 32(12): 1061-9
27. Lemaitre F, Luyt C, Roullet-Renoleau F et al. Impact of extracorporeal membrane oxygenation and continuous venovenous haemodiafiltration on the pharmacokinetics of oseltamivir carboxylate in critically ill patients with pandemic (H1N1) influenza. Ther Drug Monit 2012; 34:171-5
28. Peramivir EUA, Fact Sheet for HCP. Authorized by FDA on November 19, 2009.
29. Ahern JW, Lai C, Rebuck JA, et al: Experience with vancomycin in patients receiving slow low-efficiency dialysis. *Hosp Pharm* 2004; 39: 138–143
30. Ariano RE, Sitar DS, Zelenitsky SA, et al, "Enteric Absorption and Pharmacokinetics of Oseltamivir in Critically Ill Patients With Pandemic (H1N1) Influenza," *CMAJ*, 182(4):357-63
31. Aronoff GR, Bennett WM, Berns JS, et al. *Drug Prescribing in Renal Failure: Dosing Guidelines for Adults and Children*. 5th ed. Philadelphia, PA: American College of Physicians; 2007.
32. Bogard KN et al. Antibiotic dosing during sustained low-efficiency dialysis: special considerations in adult critically ill patients. Critical Care Medicine. 2011;39(3):560-569.
33. Burkhardt O et al. Elimination of daptomycin in a patient with acute renal failure undergoing extended daily dialysis. *J Antimicrob Chemother* 2008;61:224-5
34. Burkhardt et al. Pharmacokinetics of ertapenem in critically ill patients with acute renal failure undergoing extended daily dialysis. Nephrol. Dial. Transplant. 2009; 24(1): 267-271.
35. Cardone KE, et al, "Ertapenem Pharmacokinetics and Pharmacodynamics During Continuous Ambulatory Peritoneal Dialysis," *Antimicrob Agents Chemother*, 2011, 56(2):725-30.
36. Cardone KE et al. Pharmacokinetics and Pharmacodynamics of Intravenous Daptomycin during Continuous Ambulatory Peritoneal Dialysis. Clin J Am Soc Nephrol. 2011; 6(5): 1081-8.
37. Cardone KE et al. Reevaluation of Ceftazidime Dosing Recommendations in Patients on Continuous Ambulatory Peritoneal Dialysis. Antimicrob Agents Chemother. 2014; 58(1): 19–26.
38. Cirillo I et al. Influence of Continuous Venovenous Hemofiltration and Continuous Venovenous Hemodiafiltration on the Disposition of Doripenem. Antimicrob Agents Chemother. 2011 Mar; 55(3): 1187–1193.
39. *Churchwell MD et al. Daptomycin clearance during modeled continuous renal therapy. Blood Purif 2006;24:548-54.*
40. Eyler RF et al. Pharmacokinetics of ertapenem in critically ill patients receiving continuous venovenous hemodialysis or hemodiafiltration. Antimicrobial Agents and Chemotherapy. 2014;58(3):1320-1326.
41. Cousin L et al. Dosing guidelines for fluconazole in patients with renal failure. Nephrol. Dial. Transplant. 2003;18 (11): 2227-2231.
42. Hidaka S et al. Doripenem pharmacokinetics in critically ill patients receiving continuous hemodiafiltration. Yakugaku Zasshi. 2010;130(1):87–94.
43. John Hopskin Antimicrobial guidline 2013
44. Johnson CA et al. 2000 Dialysis of Drugs. Nephrology Pharmacy Associates. 2000. Accessed http://www.just.edu.jo/DIC/Manuals/Dialysis%20of%20Drugs.pdf
45. Kielstein JT, Czock D, Scho¨pke T, et al: Pharmacokinetics and total elimination of meropenem and vancomycin in intensive care unit patients undergoing extended daily dialysis. *Crit Care Med* 2006; 34:51–56
46. Kroh UF et al. Pharmacokinetics of ceftriaxone in patients undergoing continuous veno-venous hemofiltration. J Clin Pharmacol. 1996 Dec;36(12):1114-9.
47. Li PKT et al. ISPD guidelines Recommendations: Peritoneal Dialysis-Related Infections Recommendations: 2010 Update. Peritoneal Dialysis International, Vol. 30, pp. 393–423.
48. Lorenzen JM et al. Pharmacokinetics of Ampicillin/Sulbactam in Critically Ill Patients with Acute Kidney Injury undergoing Extended Dialysis. Clin J Am Soc Nephrol. 2012; 7(3): 385–390.
49. Manley HJ, Bailie GR, McClaran ML, et al: Gentamicin pharmacokinetics during slow daily home hemodialysis. *Kidney Int* 2003; 63:1072–1078
50. Matuszkiewicz-Rowińska J et al. Dosing of antibiotics in critically ill patients: are we left to wander in the dark? Pol Arch Med Wewn. 2012;122(12):630-40.
51. Oltrogge K et al. Phenytoin Removal by Continuous Venovenous Hemofiltration. Annals of Pharmacotherapy. 2013. 47(9) 1218– 1222.
52. Palma DM et al. The use of daptomycin in continuous renal replacement therapy. Journal of antimicrobial chemotherapy. 2010. doi: 10.1093/jac/dkq399
53. Pea F et al. Pharmacokinetic consideration for antimicrobial therapy in patients receiving renal replacement therapy. *Clin Pharmacokinet.* 2007;46(12):997-1038.
54. Roberts JA, Field J, Visser A, et al: Using population pharmacokinetics to determine gentamicin dosing during extended daily diafiltration in critically ill patients with acute kidney injury. *Antimicrob Agents Chemother* 2010; 54:3635–3640
55. Robson R. The pharmacokinetics and tolerability of oseltamivir suspension in patients on hemodialysis and continuous ambulatory peritoneal dialysis Nephrol Dial Transplant 2006;21:2556–62.
56. Sinnollareddy MG et al. Pharmacokinetics of fluconazole in critically ill patients with acute kidney injury receiving sustained low-efficiency diafiltration. Int J Antimicrob Agents. 2015 Feb;45(2):192-5.
57. Wieczorek et al. The doripenem serum concentrations in intensive care patients suffering from acute kidney injury, sepsis, and multi organ dysfunction syndrome undergoing continuous renal replacement therapy slow low-efficiency dialysis. 2014; Drug Des Devel Ther. 2014 Oct 23;8:2039-44
58. Drugs package insert.

59. Kielstein JT, et al. Risk of underdosing of ampicillin/sulbactam in patients with acute kidney injury undergoing extended daily dialysis – a single case. Nephrol Dial Transplant, 2009;24(7):2283-5
60. Golik Mahoney MV. Clarification of Trimethoprim/Sulfamethoxazole Dose in CAPD. Perit Dial Int, 2015; 35(1):116-8
61. Li, Philip Kam-Tao, et al. "ISPD peritonitis guideline recommendations: 2022 update on prevention and treatment." Peritoneal Dialysis International 42.2 (2022): 110-153.Gatti M, Pea F. Antimicrobial Dose Reduction in Continuous Renal Replacement Therapy: Myth or Real Need? A Practical Approach for Guiding Dose Optimization of Novel Antibiotics. Clinical Pharmacokinetics (2021) 60:1271–1289
62. Pistolesi P, et al. A Guide to Understanding Antimicrobial Drug Dosing in Critically Ill Patients on Renal Replacement Therapy. Antimicrobial agents and chemotherapy, 2019;63 (8): e00583-19
63. Li Lu et al. Recommendation of Antimicrobial Dosing Optimization During Continuous Renal Replacement Therapy. Frontiers in Pharmacology. 2020;11: Article 786
64. 2020 Kidney Disease: Improving Global Outcomes (KDIGO) definition and staging of AKI
65. 2021 CCSAP Acute Kidney Injury and Continuous Renal Replacement Therapy
66. Dosing Recommendations interpreted from Lexicomp
67. Roberts JA, Abdul-Aziz MH, Lipman J, Mouton JW, Vinks AA, Felton TW, Hope WW, Farkas A, Neely MN, Schentag JJ, Drusano G, Frey OR, Theuretzbacher U, Kuti JL; International Society of Anti-Infective Pharmacology and the Pharmacokinetics and Pharmacodynamics Study Group of the European Society of Clinical Microbiology and Infectious Diseases. Individualised antibiotic dosing for patients who are critically ill: challenges and potential solutions. Lancet Infect Dis. 2014 Jun;14(6):498-509. doi: 10.1016/S1473-3099(14)70036-2. Epub 2014 Apr 24. PMID: 24768475; PMCID: PMC4181663.
68. Wieczorkiewicz SM, Sincak CA. Antimicrobial Pharmacodynamics. In: The Pharmacist's Guide to Antimicrobial Therapy and Stewardship. Bethesda: ASHP;2016:174-186.
69. MacDougall C. Aminoglycosides. In: Goodman & Gilman's The Pharmacological Basis of Therapeutics. 13th Ed. New York: McGraw-Hill Education;2017:1039-1047.
70. Robin L. Trotman, John C. Williamson, D. Matthew Shoemaker, William L. Salzer, Antibiotic Dosing in Critically Ill Adult Patients Receiving Continuous Renal Replacement Therapy, Clinical Infectious Diseases, Volume 41, Issue 8, 15 October 2005, Pages 1159–1166
71. Fahimi, F., Emami, S., & Rashid Farokhi, F. (2012). The rate of antibiotic dosage adjustment in renal dysfunction. Iranian journal of pharmaceutical research : IJPR, 11(1), 157–161.
72. Li J, Rayner CR, Nation RL, et al. Pharmacokinetics of colistin methanesulfonate and colistin in a critically ill patient receiving continuous venovenous hemodiafiltration. Antimicrob Agents Chemother. 2005;49:4814-4815.
73. Hanson E, Bucher M, Jakob W, et al. Pharmacokinetics of levofloxacin during continuous veno-venous hemofiltration. Intensive Care Med. 2001;27:371-375.
74. Awissi D, Beauchamp A, Hebert E, Lavigne V, Munoz DL, Lebrun G, Savoie M, et al. Pharmacokinetics of an extended 4-hour infusion of piperacillin-tazobactam in critically ill patients undergoing continuous renal replacement therapy. Pharmacotherapy. 2015;35:600- 607
75. Wilson FP, Berns JS. Vancomycin levels are frequently subtherapeutic during continuous venovenous hemodialysis (CVVHD). Clin Nephrol. 2012;77(4):329-31.
76. Abdul-Aziz MH, Portunato F, Roberts JA. Prolonged infusion of beta-lactam antibiotics for Gram-negative infections: rationale and evidence base. Curr Opin Infect Dis. 2020 Dec;33(6):501-510. doi: 10.1097/QCO.0000000000000681. PMID: 33009140.
77. Böhler J, Donauer J, Keller F. Pharmacokinetic principles during continuous renal replacement therapy: drugs and dosage. Kidney Int Suppl. 1999 Nov;(72):S24-8. PMID: 10560800.
78. Jang SM, Yessayan L, Dean M, Costello G, Katwaru R, Mueller BA. Imipenem/Relebactam Ex Vivo Clearance during Continuous Renal Replacement Therapy. Antibiotics (Basel). 2021 Sep 29;10(10):1184. doi: 10.3390/antibiotics10101184. PMID: 34680765; PMCID: PMC8532761.
79. Kunka Me, Cady EA, et al. Flucytosine Pharmacokinetics in a Critically Ill Patient Receiving Continuous Renal Replacement Therapy. Case Reports in Critical Care. 2015. Volume 2015, Article ID 927496, 5 pages
80. Aronoff G, Bennett W, Berns J, et al. Drug Prescribing in Renal Failure. 5th ed. Philadelphia, PA: American College of Physicians; 2007. B