ANITMICROBIAL	CLCr 50—20 ml/min	CLCr 19—10 ml/min	CLCr <10 ml/min
Acyclovir 5—15 mg/kg Q8H^^^	5—15 mg/kg Q12H	5—15 mg/kg Q24H	2.5mg/kg Q24H 5 mg/kg Q24H (VZV)
Acyclovir-VZV 800 mg po q4 h (5x/day)	No change	800 mg po Q8—12 H	400—800 mg po Q12H
Ampicillin 2 gm Q6H / 2 gm Q4H~	No Change	1—2 gm Q6—**8**H	1—2 gm Q**8**—12H
Amp/Sulbactam 3 gm Q6H	3 gm Q8H	1.5—3 gm Q12H	1.5 gm Q12H, or 1.5—3 gm Q24H
Amox/clavulanate 875/125 mg Q12H	No Change	875/125 mg Q24H	500/125 mg Q24
Aztreonam 1—2 gm Q6—8H	No Change	1—2 gm Load then 0.5—1 gm Q8H	1—2 gm Load then 125—500 mg Q8 H
Cefazolin 2 gm Q8H~	1 gm Q8	1—2 gm Q12H	1—2 gm Q24H
Cefepime 1—2 gm Q12H / 2g Q8H*	1 gm Q12H / 2 gm Q12H*	1 gm Q24H (if MIC ≤ 2) / 1 gm Q12H* otherwise	500 mg Q24H / 1 gm Q24H*
Cefixime 400 mg Q24H or 200 mg Q12H	No Change	300 mg Q24H	200 mg Q24H
Cefotetan 1—2 gm Q12H / ~	No Change	1—2 gm Q24H	1—2 gm Load then 1 mg Q 48 (or 500 mg Q12)
Cefoxitin 1—2 gm Q6H / 2 gm Q4H~	1—2 gm Q8H	1—2 gm Q12H	0.5—1 gm Q12—24H
Ceftaroline fosamil 600mg Q12H (Q8H for bloodstream)	400mg Q12H	300mg Q12H	200mg Q12H
Ceftazidime 1—2 gm Q8H	1 gm Q12H	1 gm Q24H	0.5 gm Q24H
Ceftizoxime 1—2 gm Q8H	1 gm Q12H	0.5—1 gm Q12H	0.5—1 gm Q24H
Ceftriaxone 1—2 gm Q12—24H	No Change	No Change	No Change, consider 2 gm Max/d if liver liver + renal
Cefuroxime 0.75—1.5 gm Q8H	No Change	0.75 gm Q12H	0.75 gm Q24H
Cephalexin 250—500 mg po Q6H	No Change	250—500 mg po Q8—12 H	250—500 mg po Q 12—24H
Cidofovir 5 mg/kg Q Week x2 (Induction)	Not Recommended	Not Recommended	Not Recommended
Ciprofloxacin 400 mg Q8—12H 500—750 mg po Q 12 H	No Change 500 mg po Q12H	400 mg IV Q18H 500 mg po Q12H	400 mg IV Q24H (Q18--20?) 500 mg po Q18H
Clarithromycin 250—500 mg po Q12H OR 1 gm po Q24H of XL	No Change	250 mg po Q 12H	250—500 mg q 24
Colistin; CMS; PME (colistin base activity in mg)¯¯ 5mg/kg load for all (ideal body weight)	>50=> 2.5mg/kg/dose Q12H 20-50=> 2.5mg/kg/dose Q24h	2.5mg/kg/dose Q48H	2.5mg/kg/dose Q48H
Colistin; CMS; PME (alternate)¯¯¯ load 9 MU (ideal body weight)	4.5 MU/day divided Q12H	4.5 MU Q48H	4.5 MU Q48H
Ertapenem 1gm Q24H	<30 => 500 mg Q24H	500 mg Q24H	500 mg Q24H
Ethambutol (E) (ideal body weight) 15—25 mg/kg Q day	No Change	15—25 mg/kg Q 36	15—25 mg/kg Q 48
Ethionamide 0.5—1 gm Q24H	No Change	No Change	No Change
Fluconazole 12 mg/kg IV load on day one, 400 mg Q 24H	200—400 mg Q 24	200 mg q 24	100—200 mg Q24H
Foscarnet~~ 60 mg/kg Q8H / 90 mg/kg Q12H (I) 90 mg/kg Q24H (M)	Complicated		
Flucytosine 25—37.5 mg/kg Q 6H	25 mg/kg Q12H	25 mg/kg mg/kg Q24H	25 mg/kg Q24—48H (adjust using Cp)
Ganciclovir (IV) 5 mg/kg Q12H induction (I) 5 mg/kg Q24H maintanence (M)	50—70=> 2.5 mg/kg Q12(I) 2.5 mg/kg Q24(M) 20—50=>2.5 mg/kg Q24H (I) 1.25 mg/kg Q24H (M)	1.25 mg/kg Q24H (I) 0.625 mg/kg Q24H (M)	1.25 mg/kg TIW (I) 0.625 mg/kg TIW (M)
Ganciclovir (PO) maintenance 1000 mg Q8H	50—70=> 1000 mg Q12H 25—50=> 1000 mg Q24H	10—25=> 500 mg Q24H	500 mg TIW
Gatifloxacin 400 mg Q24H	< 40—400 mg load then 200 mg Q24H	400 mg load then 200 mg Q24H	400 mg load then 200 mg Q24H
Imipenem 0.5 gm Q6H	500 mg Q8 OR 250 mg Q6H 20—40=> 250 mg Q6—8H	0.25—0.5 gm Q8—12H	0.25 gm Q12H
Isoniazid (H) 300 mg po q 24	No Change	No Change	150 mg in slow acetylators
Itraconazole Load x4 doses 200 mg Q12H; then Q24H (PO or IV)	No Change	No Change (IV not recommended Cr Cl < 30 (cyclodextrin))	IV not recommended Cr Cl < 30 (cyclodextrin)
Levofloxacin 500—750 mg Q24H	500—750 mg x1, then 250—375 mg Q24H or 750 mg Q48H	500—750 mg x1, then 250 mg Q24H	500—750 mg x1, then 250—500 mg Q48H
Meropenem 1—2 gm Q8—12H / 2 gm Q8H (meningitis)~	1 gm Q8—12H	1 gm Q12H	0.5 Q24H
Penicillin G 1—4 MU Q4H	40—60 =1—2 MU Q4 20—40 =1—2 MU Q6	1 MU Q6	1 MU Q6—8H
Pentamidine 4 mg/kg/d Q24H	4 mg/kg Q24	4 mg/kg Q36H	4 mg/kg Q48H
Piperacillin 3—4 gm Q 4 H	4 gm Q6H	3—4 gm Q8H	3 gm Q8H or 3—4 gm Q12
Pip/Tazo 3.375—4.5 gm Q6H / Pseudomonas—3.375 gm Q4H	2.25—3.375 gm Q6H or 4.5 gm Q8 H	3.375 gm Q8H or 4.5 gm Q12	2.25 gm Q8H
Pyrazinamide (ideal body weight) 20—25mg/kg/day PO Q24H	<30 => 25-35mg/kg 3x/week; same dose for CRRT	<30 => 25-35mg/kg 3x/week	<30 => 25-35mg/kg 3x/week; same dose for HD, give dose after HD when possible
Quinine 7.5—10 mg/kg Q8H (650 mg po Q8H)	No Change	7.5—10 mg/kg Q12H Metabolic Cl; inc binding to AAP; 3OH accumulates—dec dose by 1/3 after 3 day	7.5—10 mg/kg Q24H Metabolic Cl; inc binding to AAP; 3 OH accumulates —dec dose by ½ after 3 days
Quinupristin/Dalfopristin 7.5 mg/kg Q8—12H	No Change	No Change	No Change
Ticarcillin/Clavulanate 3.1 gm Q4—6H	2 gm Q4H OR 3.1 gm Q6H	2 gm Q8H OR 3.1 gm Q12H	2 gm Q12H
Tigecycline 100 mg x1, then 50-100 mg Q12H	No Change	No Change	No Change
Trimethoprim/Sulfa ** 10 mg TMP/kg/d divided Q8H	< 30 => 7.5 mg TMP/kg/d divided Q12H < 30 => PCP 12 mg TMP/kg/d divided Q12H	5 mg TMP/kg/d Q24H PCP 7.5 mg/kg TMP Q24H	3 mg TMP/kg/d Q24H PCP 5—7.5 mg/kg TMP Q 24
Trimetrexate 1.2 mg/kg Q24H/ 45 mg/m2 Q24H +Leucovorin	100%	50-100%	No Data; ? avoid
Valacyclovir variable	No Change	0.5—1 gm Q12—24H	500 mg Q24H
Valganciclovir – Induction 900 mg BID x 3 wks	Normal to ¾ Dose	½ Dose	450 mg Q48H x3 wks, then 450 mg BIW

ANITMICROBIAL	CLCr 50—20 ml/min	CLCr 19—10 ml/min	CLCr <10 ml/min
Valganciclovir – Maintenance 900 mg Q24H	40—59=> 450 mg Q24H 25—39=> 450 mg Q48H	10—24=> 450 BIW	Use ganciclovir PO dosing for CLCr < 10
Vancomycin (ideal body weight) § 1—1.5 gm Q12H (based on TBW, 15—25 mg/kg)	40—60=> 15 mg/kg Q24H 20—40=> 15 mg/kg load then 7.5 mg/kg Q24H	15 mg/kg Q48—72H	15 mg/kg Q4—7d
Voriconazole 4—6 mg/kg Q12H (6 mg/kg load)	No Change	No Change (IV NOT recommended for CLcr < 50, cyclodextran)	No Change (IV NOT recommended for CLcr < 50, cyclodextran)

The following drugs do NOT need dosage adjustment in renal failure: amphotericin B (any formulation), atovaquone, azithromycin, caspofungin, chloramphenicol (increased bioavailability of chloramphenicol from succinate ester, target 5—20µg/mL), clindamycin, clofazamine dapsone, dicloxacillin, dirithromycin, doxycycline, linezolid, mefloquine, metronidazole, micafungin, miconazole, minocycline, moxifloxacin, nafcillin, oxacillin, polymyxin B (3mg/kg/d; <150mg/d divided q12h to protect kidney; JAC;70:1552–1557, doi:10.1093/jac/dku561), primaquine, pyrimethamine, quinupristin/dalfopristin, rifampin, rifabutin, rifapentine, tigecycline

*Neutropenic Dosing. Pip/tazo 3.375 gm Q4H better than continuous infusion (CI) of 13.5 gm (PMID: 16029947). Cefepime 4 gm CI > 1 gm Q8H (2 gm Q8H not assessed, use for CNS & ESBL with ≤ 16 mg/L)

**TMP/SMX listed dosing is for GNR infections other than Stenotrophomonas. Pneumocystis treatment dose is 15 mg TMP/kg/d divided Q6-8H. Stenotrophomonas infection dose is 15-20 mg TMP/kg/d divided Q6H.

^Dosages are not necessarily appropriate for Endocarditis.

^^Dosages given are for parenteral therapy unless otherwise specified.

^^^Acyclovir dose is for HSV infections. VZV dose is 12.5-15 mg/kg Q8H. Infectious Disease Consultation is recommended for disseminated disease or encephalitis.

~Maximum recommended dose is 12gm per day [CID;52:917—924, doi:10.1093/cid/cir031]. Ampicillin can push to 18—24g/day

~~Foscarnet hydration: 1 L NS + 10 gm mannitol, 250 mL pre-Rx, 500 mL with-Rx (over 1.5—2H), 250 mL post-Rx hydration.

~~~Colistin dosing as "colistin base activity" (CBA) in mg rather than international units. For colistin base 1mg = 30,000 IU. CMS 1mg = 12,500 IU. $C_{ss,avg}$ = target blood level [AAC;55:3284, doi:10.1128/AAC.01733-10]

~~~~Colistin dosing based on prior data. No PK evaluation, but validated in [CID;54:1720. 2012]. load CBA (mg) = ($C_{ss,avg}$)*2*(weight in kg); Daily dose CBA (mg) = ($C_{ss,avg}$)(1.5*CrCL+30). Using UCLA guide now.

§Vancomycin continuous infusion calculation following 1g load. (g/24h) = [0.0261 x CL_{cr} (ml/min) + 1.78] x target C_{ss} (mg/L) X (24/1000) [IntJAntmicrobAgents;37:75, doi:10.1016/j.ijantimicag.2010.09.004]

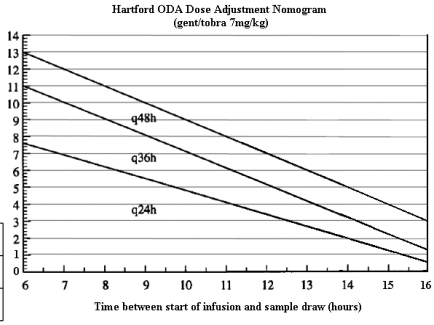
The following drugs may require dosage adjustment in ***hepatic*** failure: aztreonam (20—25% reduction +/-), carbenicillin (2g/d max ren+hep), caspofungin (35 mg Q24H moderate disease), cefoperazone (max 4g/d or monitor lvl, 2g/d ren+hep), ceftriaxone (2g/d ren+hep), chloramphenicol (target 5—20µg/mL), clindamycin (+/- if severe), itraconazole (caution, 2-fold increased T½), metronidazole (+/-, target peak 10—20 µg/mL), mezlocillin (dec 50%), nafcillin (+/- if ren+hep), rimantidine (max 100mg/d), ticarcillin (2g/d if ren+hep), tigecycline (100mg load, then 25mg q12H), voriconazole (6mg/kg Q12H x2, then 2 mg/kg Q12H).

Intraperitoneal Dosing. Dose per each 2 liter exchange, IP unless otherwise noted.

Ampicillin	load 250 mg, maintenance 125 mg
Aztreonam	load 1 gm, maintenance 500 mg
Cefamandole	load 1 gm, maintenance 500 mg
Cefazolin	load 1 gm, maintenance 250—500 mg
Cefepime	load 1 gm, maintenance 250 mg
Cefoxitin	load 1 gm, maintenance 200 mg
Ceftriaxone	load 1 gm, maintenance 250—500 mg
Ciprofloxacin	load 0.5 gm PO, then maintenance 50 mg IP
Clindamycin	load 300 mg, maintenance 150 mg
Colistin	2mg/kg/d
Fluconazole	150 mg QOD
Flucytosine	load 2 gm PO, then maintenance 1 gm PO QD
Gentamicin	load 2 mg/kg, maintenance 8-12 mg
Nafcillin	load 250 mg(?), maintenance 125 mg
Imipenem	load 1 gm, maintenance 200 mg
Piperacillin	load 4 gm IV, then maintenance 500 mg
Vancomycin	2 gm (30 mg/kg) Q5—7 days

ANTIMICROBIAL	INTRATHECAL DOSING
Amikacin	5—7.5 mg Q24H
Colistin	3.2—10 (20) mg Q24H
Gentamicin/Tobramycin	4—8 mg Q24H
Vancomycin	5—20 mg Q24H

Aminoglycoside Dosing CVVH/D/DF	Maintenance Dosage
Gentamicin/Tobramycin 3mg/kg load IBW	2 mg/kg Q24—48H
Amikacin 10 mg/kg load IBW	7.5 mg/kg Q24—48H



ANITMICROBIAL	HEMODIALYSIS (HD) DOSING	CVVH DOSING	CAVHD / CVVHD / CVVHDF DOSE	CAPD DOSING
Acyclovir	Dose for CLCr <10, supplement 2.5-5mg/kg after HD	5—7.5 mg/kg Q24H	5—7.5 mg/kg Q24H	Dose for CLCr <10
Aminoglycosides IBW	½ Full Dose AD & Follow Levels		Follow Levels	Follow Levels
Ampicillin	Dose AD		Dose for CLCr 20—50	250 mg Q12H
Ampicillin/Sulbactam	Dose AD	3 gm Q12H	3 gm Q8H	1.5-3 gm Q24H
Amoxicillin/clavulanate	Dose AD		Dose for CLCr 20—50	250/125 mg Q12H
Aztreonam	Supplement 0.5 gm AD	1—2 gm Q12H	2 gm Q12H or Dose for CLCr 20—50	Dose for CLCr <10
Cefazolin	Dose AD or Supplement 1 gm AD or 20mg/kg/HD	1—2 gm Q12H	2 gm Q12H or Dose for CLCr 20—50	0.5 gm Q12H
Cefepime	2 gm load, then 0.5 gm Q24H; 2 gm AD supplement	1—2 gm Q12H	2 gm Q12H	Dose for CLCr <10
Cefixime	Supplement 300 mg AD		No Data	Dose for CLCr <10
Cefotetan	Supplement 1 gm AD		0.75 gm Q12H	Dose for CLCr <10
Cefoxitin	Dose AD or Supplement with 1 gm AD		Dose for CLCr 20—50	1 gm Q24H
Ceftazidime	Supplement 1 gm AD	1—2 gm Q12H	Dose for CLCr 20—50	0.5 gm Q24H
Ceftizoxime	Supplement 1 gm AD		Dose for CLCr 20—50	0.5-1 gm Q24H
Ceftriaxone	No Change	No Change	No Change	No Change
Cefuroxime	Dose AD		1 gm Q12H	Dose for CLCr <10
Cidofovir	No Data		Avoid Use	No Data
Ciprofloxacin	Dose for CLCr <10	200 mg Q12H	200—400 mg Q12H	Dose for CLCr <10
Clarithromycin	Dose AD		Dose for CLCr <10	Dose for CLCr <10
Colistin (use PMB instead)	5mg/kg x1 then 30mg Q12H	5mg/kg x1 then 100mg IV Q12H	5mg/kg x1 then 100mg IV Q12H	
Daptomycin	4—6 mg/kg Q48H	4—6 mg/kg Q48H	4—8 mg Q48H	
Ertapenem	500mg Q24H, 150 mg AD supplement			1 gm Q24H
Ethambutol	25 mg/kg 4H before HD 3x/week		Dose for CLCr 20—50	Dose for CLCr <10
Ethionamide	No Change		No Change	No Change
Famciclovir	Dose AD		Dose for CLCr 20—50	No Data
Fluconazole	Dose AD	400 mg Q24H	800 mg Q24H	
Foscarnet	Dose AD		Dose for CLCr 20—50	Dose for CLCr <10
Flucytosine	Dose AD; usual load, then follow levels		Dose for CLCr 20—50	0.5—1 gm Q24H
Ganciclovir	Dose AD		Dose for CLCr 20—50	Dose for CLCr <10
Imipenem	Dose AD/ Not Recommended	250 mg Q6H or 500 mg Q8H	500 mg Q8—6H	Dose for CLCr <10
Itraconazole	Dose for CLCr <10		100 mg Q12—24H	100 mg Q12—24H
Levofloxacin		500 mg x1, then 250 mg Q24H	500 mg x1, then 250 mg Q24H	
Linezolid	Supplement 200 mg AD	No Change	No Change	No Change
Meropenem	Dose AD	1 gm Q12H or Dose for CLCr 20—50	1 gm Q12H or Dose for CLCr 20—50	Dose for CLCr <10
Metronidazole	Dose AD		Dose for CLCr 20—50	Dose for CLCr <10
Penicillin G	Supplement 0.5 MU AD		Dose for CLCr 20—50	Dose for CLCr <10
Pentamidine	No Dosage Adjustment			
Piperacillin	Supplement 1 gm AD		Dose for CLCr 20—50	Dose for CLCr <10
Pip/Tazo	Supplement 1/3 Dose AD	2.25 gm Q6H	2.25—3.375 gm Q6H or Dose for CLCr 20—50	Dose for CLCr <10
Quinine	Dose AD		Dose for CLCr 20—50	Dose for CLCr <10
Quinupristin/Dalfopristin	No Dosage Adjustment			
Ticarcillin/Clavulanate	Supplement 3.1 gm AD	2 gm Q6—8H	3.1 gm Q6H or Dose for CLCr 20—50	Dose for CLCr <10
Trimethoprim/Sulfa **	Dose AD		No Data	0.16/0.8 gm Q48H
Trimetrexate	No Data		No Data	No Data
Vancomycin	Dose for CLCr <10	15—25 mg/kg load, 1 gm Q48H, check levels	15—25 mg/kg load, 1 gm Q24H, check levels	Dose for CLCr <10
Voriconazole	IV Not recommended, PO usual dose	6 mg/kg Q12H x2, load, then 4 mg/kg PO Q12H	6 mg/kg Q12H x2, load, then 4 mg/kg PO Q12H	Dose for HD

JUNE 2002 ORIGINAL [A. Gregson]; JUNE/AUGUST 2006 Slight modifications (included updates from CID;41:1159—66, CID;40:1333—41, PMID: 12760858) [A. Gregson]; FEBRUARY 2007 (minor mod) [A. Gregson]; JANUARY 2008 (minor mod) [A. Gregson]; MARCH 2008 (updated colistin dosing RF & IT from G&G 4th Ed. 1970 p1290—1) [A. Gregson]; MARCH 2011 [A. Gregson]; March—May 2012 [A. Gregson]; January, July 2013 [A. Gregson]; March 2015 [A. Gregson]; January 2016 [A. Gregson]