

VANCOUVER ACUTE
PHARMACIST PRESCRIBING AUTHORITY

As part of the regional Vancouver Coastal Health pharmacist authority policy, unit-based clinical pharmacists may:

- (1) Modify the dose and/or frequency of oral or parenteral anti-infective drugs based on renal function and clinical status of the patient (as per the attached "Anti-infectives Dosage Adjustments" tables);
- (2) Order serum concentrations for all measurable drug levels, including but not limited to aminoglycosides and vancomycin;
- (3) Modify the dosages of intravenous aminoglycosides and vancomycin based on levels; and
- (4) Order any laboratory test to guide in drug therapy decision making.

For the complete policy, please refer to the VA Formulary at
[http://www.vhpharmsci.com/VHFormulary/Policies/4.7 PHARMACIST AUTHORITY.pdf](http://www.vhpharmsci.com/VHFormulary/Policies/4.7%20PHARMACIST%20AUTHORITY.pdf)

ORAL ANTI-INFECTIVES DOSAGE ADJUSTMENTS
(Based on Estimated Creatinine Clearance)

Medication PO	>50mL/min	30-50mL/min	<30mL/min	HD ¹	CAPD ²
Amoxicillin *	250-500mg TID	250-500mg TID	250-500mg BID	250-500mg BID ³	250mg BID
Amoxicillin/Clavulanate * (Clavulin [®])	250-500mg TID or 875mg BID-TID	250-500mg TID or 875mg BID-TID	250-875mg BID	250-875mg BID ³	250-875mg BID
Azithromycin	250-500mg daily	250-500mg daily	250-500mg daily	250-500mg daily	250-500mg daily
Cefixime	400mg daily	400mg daily	200mg daily	200mg daily	200mg daily
Cefuroxime axetil	250-500mg BID-TID	250-500mg BID-TID	250-500mg BID	250-500mg BID ³	250-500mg BID
Cephalexin *	250-500mg QID	250-500mg TID-QID	250-500mg BID-TID	250-500mg BID ³	250-500mg BID
Ciprofloxacin *	250-750mg BID	250-750mg BID	500-750mg daily	500-750mg daily ³	500-750mg daily
Clarithromycin XL	1g daily	1g daily	500mg daily	500mg daily	500mg daily
Clindamycin	150-600mg TID	150-600mg TID	150-600mg TID	150-600mg TID	150-600mg TID
Cloxacillin	250-500mg QID	250-500mg QID	250-500mg QID	250-500mg QID	250-500mg QID
Cotrimoxazole (DS ⁴ = TMP ⁵ 160mg; SS ⁶ = TMP ⁵ 80mg)	DS BID ⁷	DS BID ⁷	DS daily ⁷ or SS BID ⁷	DS daily ^{3,7} or SS BID ^{3,7}	SS BID ⁷
Doxycycline	100mg daily-BID	100mg daily-BID	100mg daily-BID	100mg daily-BID	100mg daily-BID
Erythromycin	250-500mg QID	250-500mg QID	250-500mg QID	250-500mg QID	250-500mg QID
Fluconazole *	100-400mg daily	100-200mg daily (400mg daily *)	100-200mg daily	100-200mg q24h ³ or 200-400mg DAD ³	100-200mg daily
Linezolid	600mg BID	600mg BID	600mg BID	600mg BID ³	600mg BID
Metronidazole	500mg BID-TID	500mg BID-TID	500mg BID-TID	500mg BID-TID	500mg BID-TID
Moxifloxacin	400mg daily	400mg daily	400mg daily	400mg daily	400mg daily
Nitrofurantoin	50-100mg QID (MacroBID [®] 100mg BID)	(MacroBID [®] 100mg BID) <40mL/min: Avoid	Avoid	Avoid	Avoid
Penicillin VK	300-600mg BID-QID	300-600mg BID-QID	300-600mg BID-QID	300-600mg BID-QID ³	300-600mg BID-QID
Tetracycline	>80mL/min: 250-500mg QID; 50-80 mL/min: B-TID	250-500mg BID-daily	250-500 mg BID-daily; <10mL/min: Avoid	Avoid	Avoid
Valacyclovir	500-1000mg q8-12h	500-1000mg q8-12h	500-1000mg q12h	500-1000mg daily ³	500-1000mg daily

¹HD = hemodialysis; ²CAPD = continuous ambulatory peritoneal dialysis; ³on dialysis days, give at least one dose after dialysis; ⁴DS = Double Strength; ⁵TMP = trimethoprim; ⁶SS = Single Strength; ⁷refer to IV dosing for treatment of severe systemic infections.

* For invasive infections, higher doses and/or intervals may be required.

INTRAVENOUS ANTI-INFECTIVES DOSAGE ADJUSTMENTS
(Based on Estimated Creatinine Clearance)

Medication IV	>50mL/min	30-50mL/min	<30mL/min	HD ¹	CAPD ²
Acyclovir	5-10mg/kg ³ q8h	5-10mg/kg ³ q12h	5-10mg/kg ³ q24h	2.5-5mg/kg q24h ³	2.5-5mg/kg q24h
Amikacin	5mg/kg q8h or 7.5mg/kg q12h guided by levels	7.5mg/kg q24h guided by levels	7.5mg/kg guided by levels	5-7.5mg/kg DAD ³ guided by levels	
Ampicillin	1-2g q4-6h	1-2g q6-8h	1-2g q8-12h	1-2g q12h	1g q12h
Azithromycin	500mg q24h	500mg q24h	500mg q24h	500mg q24h	500mg q24h
Cefazolin	1-2g q8h	1-2g q12h	1-2g q12-24h	1-2g DAD ³ or 1g q24h ^{3,4}	1g q24h or 500mg q12h
Cefotaxime	1-2g q8h (Meningitis: 2g q6h)	10-50mL/min: 1-2g q8-12h (Meningitis: 2g q8h)	<10mL/min: 1-2g q24h (Meningitis: 2g q12h)	1-2g DAD ³ or 1-2g q24h ³	1g q24h
Cefoxitin	1-2g q6-8h	1-2g q8h	1-2g q8-12h	1-2g DAD ³ or 1-2g q24h ³	1g q24h
Ceftazidime	1-2g q8h	1-2g q12h	1-2g q12-24h	1-2g DAD ³ or 1g q24h ^{3,4}	1g q24h
Ceftriaxone	1-2g q24h	1-2g q24h	1-2g q24h	1-2g q24h ³	1-2g q24h
Cefuroxime	0.75-1.5g q8h	0.75-1.5g q8-12h	0.75-1.5g q12h	0.75-1.5g q24h ³	0.75-1.5g q24h
Ciprofloxacin	200-400mg q12h	200-400mg q12h	400mg q24h	400mg q24h ³	400mg q24h
Clindamycin	300-600mg q8h	300-600mg q8h	300-600mg q8h	300-600mg q8h	300-600mg q8h
Cloxacillin	0.5-2g q4-6h	0.5-2g q4-6h	0.5-2g q4-6h	0.5-2g q4-6h	0.5-2g q4-6h
Cotrimoxazole (mg/kg TMP ⁵)	2.5-5mg/kg/ dose q6h ⁶	2.5-5mg/kg/ dose q8h ⁶	2.5-5mg/kg/ dose ⁷ q12h	2.5-5mg/kg/ q24h ³	2.5-5mg/kg/ q24h
Daptomycin	4-6mg/kg q24h	4-6mg/kg q24h	4-6mg/kg q24h	4-6mg/kg q48h or 6mg/kg DAD ³	4-6mg/kg q48h
Ertapenem	1g q24h	1g q24h	500mg q24h	500mg q24h ³	500mg q24h
Erythromycin	0.5-1g q6h	0.5-1g q6h	0.5-1g q6h	0.5-1g q6h	0.5-1g q6h
Fluconazole	100-400mg q24h	100-200mg q24h (400mg q24h ⁴)	100-200mg q24h	100-200mg q24h ^{3,4} or 200-400mg DAD ³	100-200mg q24h
Ganciclovir	>70mL/min: 5mg/kg q12h; 50-69mL/min: 2.5mg/kg q12h	2.5mg/kg q24h	1.25mg/kg q24h	1.25mg/kg 3x/ week DAD ³	1.25mg/kg 3x/ week
Gentamicin	*	*	*	2mg/kg load, then 1-1.5mg/kg DAD ³	
Imipenem	500mg q6-8h	500mg q8h	500mg q12h	250-500mg q12h	250-500mg q12h
Levofloxacin	750mg q24h	20-50mL/min: 750mg q48h	<20mL/min: 750mg, then 500mg q48h	750mg, then 500mg qHD ¹	750mg, then 500mg q48h
Linezolid	600mg q12h	600mg q12h	600mg q12h	600mg q12h ³	600mg q12h
Meropenem	0.5g q6h or 2g q8h ⁴	0.5g q8h or 2g q12h ⁴	0.5-1g q12h (<25mL/min)	0.5-1g q24h ³	0.5-1g q24h
Metronidazole	500mg q8-12h	500mg q8-12h	500mg q8-12h	500mg q8-12h	500mg q8-12h
Moxifloxacin	400mg daily	400mg daily	400mg daily	400mg daily	400mg daily
Penicillin G	0.5-4MU q4-6h	0.5-4MU q6h	Maximum 6-9MU/day	Maximum 6MU/day ³	Maximum 6MU/day
Piperacillin-Tazobactam	3.375g q6h or 4.5g q6-8h	3.375g q6h	2.25g q6h	2.25g q8h ³	2.25g q8h
Tobramycin	*	*	*	2mg/kg load, then 1-1.5mg/kg DAD ³	
Vancomycin	**	**	**	25mg/kg load, then 500-750mg qHD ¹	25mg/kg q4-7 days
Voriconazole	6mg/kg q12h x 2, then 4mg/kg q12h	Avoid IV formulation (may use PO)	Avoid IV formulation (may use PO)	Avoid IV formulation (may use PO)	Avoid IV formulation (may use PO)

¹HD = hemodialysis; ²CAPD = continuous ambulatory peritoneal dialysis; ³DAD = on dialysis days, give dose after dialysis; ⁴For more aggressive therapy; ⁵TMP = trimethoprim; ⁶give q12h for UTIs; ⁷up to 10 mg/kg/dose for more aggressive therapy; ⁸up to 15 mg/kg/dose for herpes encephalitis, VZV infection.

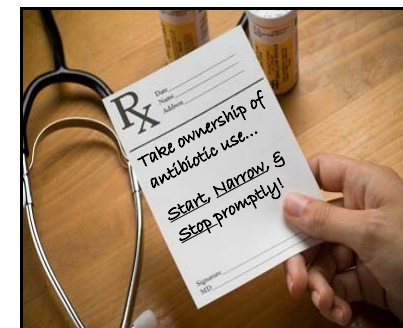
* See Aminoglycoside Dosing Guidelines.

** See Vancomycin Dosing Guidelines.

ANTI-INFECTIVE COMPARISON CARD

Vancouver General Hospital, University of British Columbia Hospital
& G F Strong Rehabilitation Centre

August 2017
Originally published 1984
UPDATE NO. XXXX



TIPS FOR USING ANTI-INFECTIVES WISELY

- **Sample:** Obtain appropriate cultures
- **Match:** Correlate cultures with clinical picture
- **Antibiotics:** Choose empiric antibiotics based on syndrome and local susceptibilities
- **Review:** Revisit empiric antibiotic choice at 2-3 days
- **Taper:** Stepdown IV to PO when appropriate
- **Stop** antibiotic therapy once infection resolved; avoid prolonged treatment

THE BEST METHOD TO PREVENT THE SPREAD OF INFECTIONS IS GOOD HAND HYGIENE!

Choice of anti-infective should be selected based on efficacy, toxicity, and cost considerations. This reference card provides select *in vitro* bacterial susceptibility patterns and common drug dosing regimens. Clinical response and patient factors must also be assessed when selecting an appropriate agent.

The Anti-Infective Comparison Card has been produced as a collaborative effort of Pharmaceutical Sciences, ASPIRES (*Antimicrobial Stewardship Programme: Innovation, Research, Education and Safety*), the Division of Medical Microbiology and Infection Control, and the Division of Infectious Diseases.

For more information, please contact:

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PHARMACIST-MANAGED IV-PO CONVERSION PROGRAM

As part of the regional Vancouver Coastal Health Pharmacist Authority Policy, Clinical Pharmacists will review and change the route of parenteral anti-infectives in accordance to established criteria.

Oral conversion should be considered if patient:

- continues to need medication;
- is clinically stable;
- is capable of tolerating the oral dosage from (e.g. taking other oral medications & full liquid diet or solids) ; and
- has no factors affecting oral absorption (e.g. presence of gastrointestinal abnormalities or drug interactions).

LIST OF IV ANTI-INFECTIVES ELIGIBLE FOR PO CONVERSION

Group 1

THESE ANTI-INFECTIVES ARE EQUIVALENT GIVEN IV OR PO (Similar drug levels achieved with oral dosage form of same drug)

- Ciprofloxacin → 250-500 mg PO BID (750 mg PO BID severe)
- Clindamycin → 300-450 mg PO TID (600 mg PO TID severe)
- Co-trimoxazole → 1-2 DS PO BID (2 DS PO TID-QID severe)
- Fluconazole → 200 mg PO Daily (400-800 mg PO Daily severe)
- Linezolid → 600 mg PO BID
- Moxifloxacin → 400 mg PO Daily
- Metronidazole → 500 mg PO BID-TID
- Voriconazole → 3 mg/kg PO BID (4 mg/kg PO BID severe)

Group 2

(Lower drug levels achieved with oral dosage form of same drug)
Note: Patient must be clinically improving prior to step-down

- Acyclovir to Valacyclovir → Dose based on indication
- Ampicillin to Amoxicillin → 250-500 mg PO TID (1 g PO TID severe)
- Azithromycin to Clarithromycin XL → 500-1000 mg PO Daily
OR Azithromycin → 250-500 mg PO Daily
- Cefazolin to Cephalexin → 250-500 mg PO QID (1 g PO QID severe)
- Cefuroxime to Cefuroxime axetil → 250-500 mg PO BID (TID severe)
- Penicillin G to Penicillin V → 300-600 mg PO QID mild infections only

RESERVED ANTIMICROBIAL DRUGS (RAD)

These drugs have a 3-day automatic stop date (unless a specific duration is indicated).

Refer to the VA Formulary for more details at

[http://www.vhpharmsci.com/VHFormulary/Policies/3.5 RESERVED ANTIMICROBIAL DRUGS.pdf](http://www.vhpharmsci.com/VHFormulary/Policies/3.5%20RESERVED%20ANTIMICROBIAL%20DRUGS.pdf)

Ceftazidime	Ceftriaxone	Ciprofloxacin IV	Daptomycin	Imipenem
Linezolid	Meropenem	Moxifloxacin IV	Piperacillin-tazobactam	Tigecycline

ANTI-INFECTIVES RESTRICTIONS

Amphotericin B Liposomal:	Restricted to ID, L/BMT, SOT, & ICU for contraindications to amphotericin B deoxycholate
Cefoxitin:	Restricted to OB/GYN or <i>Mycobacterium abscessus</i> infections
Colistin:	Restricted to ID & SOT for pneumonia in cystic fibrosis
Daptomycin:	Restricted to ID & ICU for resistant Gram positive organisms resistant or for intolerance to vancomycin or linezolid
Ganciclovir:	Restricted to transplant, hematology, oncology, or ophthalmology
Linezolid:	Restricted to Gram positive infections resistant to vancomycin or for intolerance to vancomycin
Meropenem:	Restricted to multi-drug resistant organisms where other agents cannot be used due to intolerance or resistance
Micafungin:	Restricted to ID, L/BMT, SOT, & ICU for fungal infections resistant to fluconazole or for intolerance to fluconazole
Posaconazole:	Restricted to L/BMT for fungal prophylaxis and zygomycetes treatment
Tigecycline:	Restricted to ID & ICU as last-line for multi-drug resistant organisms or for intolerance to other antibiotics
Valganciclovir:	Restricted to transplant, hematology, oncology, or ophthalmology
Voriconazole:	Restricted to prophylaxis/treatment of <i>Aspergillus</i> , <i>Scedosporium</i> , <i>Fusarium</i> , or for intolerance to amphotericin B deoxycholate or fluconazole

VGH ANTIMIOGRAM 2014-2015

Compiled by Medical Microbiology, Pharmaceutical Sciences, and

ANTIMICROBIAL	% SUSCEPTIBLE																				
AMOXICILLIN/CLAVULANATE	100	100	85	100	0	0	99	16	100	78	91	91	0	0	0	0	0	0	0	90	100
AMOXICILLIN	100	100	85	19	0	0	99	16	83	52	0	74	0	0	0	0	0	0	0	0	96
AMPICILLIN	100	100	85	19	0	0	99	16	83	52	0	74	0	0	0	0	0	0	0	0	96
CLOXACILLIN	—	0	0	100	0	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PENICILLIN G SOD	100	100 ^(a)	85	19	0	0	99	16	0	0	0	0	0	0	0	0	0	0	0	0	96
PENICILLIN V POT	100	100	85	19	0	0	99	16	0	0	0	0	0	0	0	0	0	0	0	0	96
PIPERACILLIN/TAZOBACTAM ^(b)	—	—	—	100	0	0	99	16	—	98	96	99	74	100	82	92 ⁽ⁱ⁾	95	0	0	98	98
IMIPENEM/CLASTATIN ^(b)	—	—	—	—	0	0	99	0	—	100	99	95	99	97	100	99	87	0	98	100	100
MEROPENEM ^(b)	—	—	—	—	0	0	—	0	—	100	99	100	99	97	100	99	93	0	96	100	100
CEPHALEXIN	100	0	0	100	0	31	0	0	0	81	87	39	0	0	0	0	0	0	0	0	—
CEFAZOLIN	100	0	0	100	0	31	0	0	0	83	88	39	0	0	0	0	0	0	0	0	—
CEFUROXIME ^(e)	100	0	100	—	0	0	0	0	0	97	—	—	0	0	0	0	0	0	0	0	—
CEFTAZIDIME	—	0	0	0	0	0	0	0	0	100	88	94	98	72 ⁽ⁱ⁾	98 ⁽ⁱ⁾	72 ⁽ⁱ⁾	85 ⁽ⁱ⁾	89	56	0	—
CEFTRIAXONE	100	100	97	—	0	0	0	0	0	100	88	94	96	70 ⁽ⁱ⁾	98 ⁽ⁱ⁾	72 ⁽ⁱ⁾	30 ⁽ⁱ⁾	0	0	0	—
CIPROFLOXACIN	—	0	—	—	—	—	—	—	—	100	74	94	85	98	99	94	95	83	0	0	0
MOXIFLOXACIN ⁽ⁱ⁾	—	99	—	—	—	—	—	—	—	100	—	—	—	—	—	—	—	0	0	65	63
COTRIMOXAZOLE	0	0	—	—	95	95	41	0	0	70	73	90	83	93	100	86	94	0	99	0	0
GENTAMICIN	0	0	0	0	—	—	—	—	—	—	—	—	—	—	—	—	—	0	0	0	0
TOBRAMYCIN	0	0	0	0	—	—	—	—	—	—	87	95	90	99	81	96	97	98	0	0	0
AZITHROMYCIN ⁽ⁱ⁾	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CLARITHROMYCIN XL ⁽ⁱ⁾	80	68	—	—	0	0	0	0	0	95	0	0	0	0	0	0	0	0	0	0	0
ERYTHROMYCIN ⁽ⁱ⁾	—	84	—	95	89	89	—	—	95	69	82	0	88	0	100	91	0	0	0	0	—
DOXYCYCLINE	—	59	—	95	89	89	22	31	95	69	82	0	88	0	80	91	0	0	0	0	—
TETRACYCLINE	80	—	67	84	40	44	0	0	0	0	0	0	0	0	0	0	0	0	0	72	63
CLINDAMYCIN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	96	96
METRONIDAZOLE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NITROFURANTOIN ^(m)	0	0	0	0	—	—	—	—	—	0	99	0	0	18	0	95	0	0	0	0	0
LINEZOLID	—	—	—	100	100	100	—	—	—	0	0	0	0	0	0	0	0	0	0	0	—
VANCOMYCIN ^(h)	100	100	100	100	100	100	100	100	100	>95	0	0	0	0	0	0	0	0	0	0	—

CANDIDA SPECIES

ASPERGILLUS

OTHER

ANTIMICROBIAL	C. albicans	C. glabrata	C. tropicalis	C. parapsilosis	C. krusei	C. guilliermondii	C. lusitanae	A. fumigatus	A. flavus	A. terreus	Cryptococcus	Fusarium	Scedosporium	Mucormycetum	Blastomycosis	Coccidioides	Histoplasma
FLUCONAZOLE	+++	+/-	+++	+++	-	+++	+	-	-	-	+++	+	-	-	+++	+++	+++
TRACONAZOLE	+++	+/-	+++	+++	+	+++	+	+++	+++	+++	+++	+/-	-	-	+++	+++	+++
VORICONAZOLE	+++	+	+++	+++	++	+++	++	+++	+++	+++	+++	++	+/-	-	+++	+++	+++
POSACONAZOLE	+++	+	+++	+++	++	+++	++	+++	+++	+++	+++	++	+	-	+++	+++	+++
MICAFUNGIN	+++	+++	+++	+	+++	++	++	++	++	++	++	++	++	++	++	++	++
AMPHOTERICIN B	+++	+++	+++	+++	++	++	++	++	++	++	++	++	++	++	++	++	++
AMPHOTERICIN B LIPOSOMAL	+++	++	+++	+++	++	++	++	++	++	++	++	++	++	++	++	++	++

LEGEND

— Not considered first-line therapy, but may be appropriate in specific clinical situations.
 + Organism is inherently resistant or not recommended due to poor clinical response.
 Contact Medical Microbiologist on-call, ASPRES, or Pharmaceutical Sciences for details.

- a) For meningitis infections, *S. pneumoniae* is 78% susceptible to penicillin.
- b) MSSA represents 71% of all *Staphylococcus* isolates at VGH.
- c) Includes hospital- and community-associated MRSA.
- d) Consider synergy with aminoglycosides for serious infections (e.g. endocarditis).
- e) Based on community and literature susceptibility data.
- f) ESB. *E. coli* rate is 13% at VGH.
- g) ESB. *Klebsiella* rate is 6% at VGH.
- h) Please use this agent judiciously to prevent emergence of antibiotic-resistant organisms. In vitro tests may over estimate susceptibility to beta-lactam/beta-lactam inhibitor combination.
- i) Prolonged use of cephalosporins may result in development of resistance.
- j) For urine, *E. faecalis* is 49% susceptible.
- k) Active against atypical pathogens (*Mycoplasma*, *Chlamydia*, *Legionella*), although not routinely tested
- m) Only indicated for urinary tract infections and *qSFR* greater than 40 mL/min.