

Estimated Creatinine Clearance—Cockcroft-Gault equation
Consult RH Pharmacy if required at 604-244-5114

Estimated Creatinine Clearance : CrCl (mL/min) =

$$\frac{140 - \text{age}}{\text{Serum Creatinine } (\mu\text{mol/L})} [\times 0.85 \text{ in females}] \times 90$$

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

Medication PO	Above 50 mL/min	30-50 mL/min	Below 30 mL/min
amoxicillin *	250-500 mg TID	250-500 mg TID	250-500 mg BID
amoxicillin - clavulanate* (clavulin®)	500 mg/125 mg TID 875 mg/125 mg BID	500 mg/125 mg TID 875 mg/125 mg BID	250-500 mg amoxicillin component BID
azithroMYCIN	250-500 mg daily	250-500 mg daily	250-500 mg daily
ceFUXime	400 mg daily	400 mg daily	200 mg daily
ceFUROxime axetil	250-500 mg BID-TID	250-500 mg BID-TID	250-500 mg BID
cephalexin *	250-500 mg QID	250-500 mg TID-QID	250-500 mg BID-TID
ciprofloxacin *	250-500 mg BID	250-500 mg BID	500 mg daily
clarithromycin XL	1g daily	1g daily	500 mg daily
clindamycin	150-600 mg TID	150-600 mg TID	150-600 mg TID
cloxacillin	250-500 mg QID	250-500 mg QID	250-500 mg QID
cotrimoxazole (DS ¹ = TMP ² 160mg) (SS ³ = TMP ² 80mg)	DS BID ⁴	DS BID ⁴	DS daily ⁴ or SS BID ⁴
doxycycline	100 mg daily-BID	100 mg daily-BID	100 mg daily-BID
erythromycin	250-500 mg QID	250-500 mg QID	250-500 mg QID
fluCONazole *	100-400 mg daily	100-200 mg daily (400 mg daily *)	100-200 mg daily
linezolid	600 mg BID	600 mg BID	600 mg BID
metronidazole	500 mg BID-TID	500 mg BID-TID	500 mg BID-TID
moxifloxacin	400 mg daily	400 mg daily	400 mg daily
nitrofurantoin	50-100 mg QID (MacroBID® 100 mg BID)	Avoid	Avoid
penicillin VK	300-600 mg BID-QID	300-600 mg BID-QID	300-600mg BID-QID
tetracycline	Above 80mL/min: 250-500 mg QID; 50-80 mL/min: BID-TID	250-500mg BID-daily	250-500 mg BID-daily; Below 10mL/min: Avoid
valACYClovir	500-1000 mg Q8-12H	500-1000 mg Q8-12H	500-1000 mg Q12H Below 10 mL/min: Q24H

¹DS = Double Strength; ²TMP = trimethoprim; ³SS = Single Strength; ⁴refer to IV dosing for treatment of severe systemic infections.

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

VCH PHARMACIST PRESCRIBING AUTHORITY

As part of the regional VCH pharmacist authority policy, 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.

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

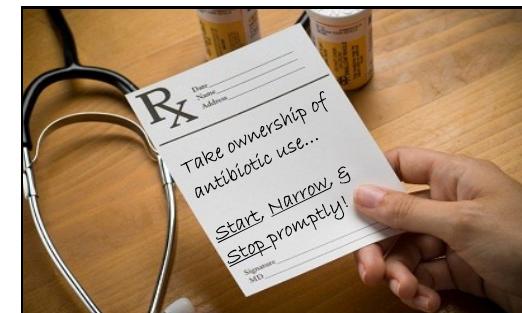
Medication IV	Above 50 mL/min	30-50 mL/min	Below 30 mL/min
acyclovir	5-10 mg/kg ⁵ Q8H	5-10 mg/kg ⁵ Q12H	5-10 mg/kg ⁵ Q24H
ampicillin	1-2 g Q4-6H	1-2 g Q6-8H	1-2 g Q8-12H
azithroMYCIN	500 mg Q24H	500 mg Q24H	500 mg Q24H
ceFAZolin	1-2 g Q8H	1-2 g Q12H	1-2 g Q12-24H
cefAZIDime	1-2 g Q8H	1-2 g Q12H	1-2 g Q12-24H
ceftrIAZONE	1-2g Q24H	1-2g Q24H	1-2g Q24H
ceFUROxime	0.75-1.5 g Q8H	0.75-1.5 g Q8-12H	0.75-1.5 g Q8-12H; Below 10 mL/min: Q24H
ciprofloxacin	200-400 mg Q12H	200-400 mg Q12H	400 mg Q24H
clindamycin	300-600 mg Q8H	300-600 mg Q8H	300-600 mg Q8H
cloxacillin	0.5-2 g Q4-6H	0.5-2 g Q4-6H	0.5-2 g Q4-6H
cotrimoxazole (mg/kg TMP ²)	2.5-5 mg/kg/dose Q6H ³	2.5-5 mg/kg/dose Q8H ³	2.5-5 mg/kg/dose ⁴ Q12H
ertapenem	1 g Q24H	1 g Q24H	500 mg Q24H
fluCONazole	100-400 mg Q24H	100-200 mg Q24H (400mg Q24H ¹)	100-200 mg Q24H
gentamicin	*	*	*
imipenem	500 mg Q6-8H	500 mg Q8H	250-500 mg Q12H
linezolid	600 mg Q12H	600 mg Q12H	600 mg Q12H
meropenem	0.5 g Q6H or 1-2 g Q8H	0.5-1 g Q8-12H	0.5-1 g Q12H ; Below 10 mL/min: Q24H
metronidazole	500 mg Q8-12H	500 mg Q8-12H	500 mg Q8-12H
moxifloxacin	400 mg Q24H	400 mg Q24H	400 mg Q24H
penicillin G	0.5-4 million units Q4-6H	0.5-4 million units Q6H	0.5-4 million units Q8-12H; Maximum 6-9 million units/day
piperacillin - tazobactam	3.375 g Q6H or 4.5 g Q6-8H	2.25-3.375 g Q6H	2.25 g Q6H Below 20 mL/min: Q8H
tobramycin	*	*	*
vancomycin	**	**	**

¹For more aggressive therapy; ²TMP = trimethoprim; ³give q12h for UTIs; ⁴up to 10 mg/kg/dose for more aggressive therapy; ⁵up to 15 mg/kg/dose for herpes encephalitis, VZV infection.

* See Aminoglycoside Dosing Guidelines.

** See Vancomycin Dosing Guidelines.

**ANTI-INFECTIVE COMPARISON CARD
FOR ADULTS**
Richmond Hospital



TIPS FOR USING ANTI-INFECTIVES WISELY

- Culture prior to starting empiric therapy
- Correlate the Gram stain with the culture result
- Treat the patient—not the laboratory result
- Consider duration of treatment when starting therapy
- Change to a narrow spectrum agent when appropriate
- Stepdown IV to PO when appropriate
- Stop 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 prepared by the Richmond Hospital Pharmacy Department (as adapted from the collaborative effort of the VGH 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:

Richmond Hospital Pharmacy

604-244-5114

ASPIRES:

604-871-1670

Medical Microbiologist (on-call):

604-875-5000

Richmond Hospital, 7000 Westminster Hwy, Richmond, B.C., Canada V6X 1A2

Published October 2019

Copyright 2019

RH Antibiogram 2018

In cases where data were insufficient, data from larger sample were used (e.g. VCH). Compiled by Medical Microbiology, Pharmacy, and ASPIRES



GRAM POSITIVE ORGANISMS

	N	Penicillin*	Ampicillin/ Amoxicillin†	Cefazolin/ Cephalexin‡	Cloxacillin‡	Ceftriaxone	Doxycycline	Macrolides	Clindamycin	Trimethoprim- Sulfamethoxazole	Moxifloxacin	Vancomycin
<i>Staphylococcus aureus</i> (all)	511			81	81		99	67	79	93	95	100
methicillin-susceptible	415			100	100		99	75	81	93	99	100
methicillin-resistant	96			0	0		99	31	72	90	82	100
<i>Staphylococcus lugdunensis</i>	56			95	95		98	98	80	100	100	100
<i>Staphylococcus epidermidis</i>	63			56	56		92	52	62	74	86	100
Coagulase negative <i>Staphylococcus</i>	125			58	58		94	48	68	80	85	100
Viridans group <i>Streptococcus</i>	50	98	98			100						100
<i>Streptococcus pneumoniae</i> (non-meningitis)	VCH	99	99			100	56	69		98	100	
<i>Streptococcus pneumoniae</i> (meningitis)	VCH	79				100					100	
<i>Streptococcus pyogenes</i> (GAS)	76	100	100	100		100	62	85	83		100	100
<i>Streptococcus agalactiae</i> (GBS)	61	100	100	100		100	20	56	56		95	100
<i>Enterococcus faecalis</i>	212		100				28					100
<i>Enterococcus faecium</i>	44		18				40					78
vancomycin-susceptible <i>E. faecium</i>	VCH		25				51					100
vancomycin-resistant <i>E. faecium</i>	VCH		1				52					0

* penicillin predicts all beta lactams for *streptococci* †= ampicillin predicts piperacillin and imipenem for *Enterococci*
 ‡ cloxacillin predicts amoxicillin-clavulanate, piperacillin-tazobactam and carbapenems for *Staphylococci*

GRAM NEGATIVE ORGANISMS

	N	Amoxicillin/ Ampicillin	Amoxicillin- Clavulanate	Cefazolin*	Ceftriaxone	Ceftazidime	Trimethoprim- Sulfamethoxazole	Ciprofloxacin	Gentamicin	Piperacillin- Tazobactam	Meropenem	Nitrofurantoin (urine)
<i>Escherichia coli</i>	997	49	81	84	86		76	78	88	98	100	99
<i>Klebsiella pneumoniae</i>	111	0	93	93	93		92	95	97	98	98	40
<i>Klebsiella oxytoca</i>	VCH	0	87	76	90		91	99	95	91	99	86
<i>Proteus mirabilis</i>	99	71	96	67	98		71	73	91	100	99	0
<i>Citrobacter koseri</i>	VCH	0	93	90	97		99	100	100	96	100	20
<i>Citrobacter freundii</i>	VCH	0	0	0	63		70	81	76	84	95	86
<i>Enterobacter cloacae</i>	VCH	0	0	0	56		86	94	94	69	97	35
<i>Klebsiella aerogenes</i> (prev. <i>Enterobacter</i>)	VCH	0	0	0	69		95	95	98	71	97	25
<i>Morganella morganii</i>	VCH	0	0	0	93		77	81	81	100	100	0
<i>Serratia</i> spp.	38	0	0	0	89		100	97	92	95	90	0
<i>Pseudomonas aeruginosa</i>	79	0	0	0	0	93		90	96	93	89	
<i>Acinetobacter</i> (all)	VCH					88	92	95	92	91	93	
<i>calcoaceticus-baumanii</i> complex	VCH					81	93	95	90	81	91	
NON- <i>calcoaceticus baumanii</i> -complex	VCH					90	92	94	93	94	94	

*cefazolin predicts ceftriaxone if not reported

Fastidious Organisms

Haemophilus spp.
Haemophilus influenzae
Pasteurella spp.

N	Amoxicillin	Amoxicillin- Clavulanate	Cefuroxime	TMP-SMX	Ciprofloxacin	Ceftriaxone	Penicillin	Amoxicillin- clavulanate	Clindamycin	Metronidazole	Piperacillin- Tazobactam	Meropenem
18	75	94	94	88	94	100						
LIFE	67	98	98	58	100	99						
54	100	100	100	100			100					
N	Amoxicillin	Amoxicillin- Clavulanate	Cefuroxime	TMP-SMX	Ciprofloxacin	Ceftriaxone	Penicillin	Amoxicillin- clavulanate	Clindamycin	Metronidazole	Piperacillin- Tazobactam	Meropenem
39	0	95	74	100	95	95						
77	96	100	63	100	100	97						
33	94	100	42	100	100	100						
61	98	100	94	0	98	98						
97	97	100	86	0	99	99						

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 form (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 BID (750 mg BID severe)
- clindamycin → 300-450 mg TID (600 mg TID severe)
- cotrimoxazole → 1-2 DS BID (2 DS TID-QID severe)
- fluCONazole → 200 mg Daily (400-800 mg Daily severe)
- linezolid → 600 mg BID
- moxifloxacin → 400 mg Daily
- metronidazole → 500 mg BID-TID
- voriconazole → 3 mg/kg BID (4 mg/kg 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 → valACYClovir: Dose based on indication
- ampicillin → amoxicillin 250-500 mg TID (1 g TID severe)
- azithroMYCIN → clarithromycin XL 500-1000 mg Daily OR azithroMYCIN 250-500 mg Daily
- ceFAZolin → cephalexin 250-500 mg QID (1 g QID severe)
- ceFUroxime → ceFUroxime axetil 250-500 mg BID (TID severe)
- penicillin → penicillin V 300-600 mg QID mild infections only