

## Special Considerations – Antibiotics

<b>Amoxicillin</b>	– Best activity of the oral beta-lactam agents against <i>Streptococcus pneumoniae</i>
<b>Cephalexin</b>	– Recommended for skin / soft tissue infections. Add TMP / SMX if abscesses and MRSA suspected – <b>Not</b> recommended for Gram negative infections other than uncomplicated cystitis – <b>Not</b> effective for bite wounds – amoxicillin / clavulanate is drug of choice for human / animal bite wounds
<b>Ceftazidime</b>	– Should be reserved for treatment of <i>Pseudomonas aeruginosa</i> infections – <b>No</b> reliable Gram positive coverage ( <i>Staphylococcus / Streptococcus</i> or <i>Enterococcus</i> )
<b>Piperacillin / tazobactam</b>	– Empiric agent of choice for febrile neutropenia, severe polymicrobial infections
<b>Ertapenem / Imipenem / Meropenem</b>	– <b>Restrict use to prevent selection of carbapenem resistance</b> – <b>NOT INDICATED</b> as empiric therapy of community acquired infections – <b>NOT INDICATED</b> as first line therapy of nosocomial infections – Indicated for severe sepsis in patients with previous ceftriaxone resistant organisms or recent travel to South Asia – Excellent anaerobic coverage <b>Note:</b> Imipenem has activity against <i>Enterococcus faecalis</i> but meropenem / ertapenem do not. – <b>Ertapenem is restricted to outpatient therapy</b>
<b>Macrolides (azithromycin / clarithromycin)</b>	– Not recommended as monotherapy for pneumonia. Add ceftriaxone or amoxicillin +/- clavulanate – Inferior to amoxicillin for otitis media / sinusitis / acute exacerbation COPD – <b>NOT INDICATED</b> for acute bronchitis (viral illness)
<b>Doxycycline</b>	– Alternative for community acquired pneumonia if penicillin / amoxicillin allergy
<b>Vancomycin (IV)</b>	– Beta-lactams have better clinical outcome. Switch to beta-lactam if organism is susceptible. – <b>Dosing:</b> Loading dose 25-30 mg/kg. Maintenance dose 15 mg/kg Q8-12H. – Refer to the Vancomycin Dosing Guidelines document (insideNet / Clinical Care Resources / Pharmacy / Antimicrobial Stewardship / Guidelines & Clinical Practice Standards / Antimicrobial Agents)
<b>Vancomycin (oral)</b>	– Agent of choice for moderate / severe / hospitalized <i>C. difficile</i> infection
<b>Ciprofloxacin</b>	– <b>No</b> reliable Gram positive activity ( <i>Staphylococcus / Streptococcus / Enterococcus</i> ) – Not recommended as empiric therapy for serious Gram negative infections (increased resistance) – Only oral agent with activity against <i>Pseudomonas aeruginosa</i> (750 mg bid)
<b>Moxifloxacin</b>	– No reliable <i>Staphylococcus / Enterococcus</i> / anaerobic coverage – No <i>Pseudomonas aeruginosa</i> activity – Not recommended for UTI as insufficient drug levels in urine
<b>Fosfomycin (oral therapy)</b>	– Alternative agent to nitrofurantoin for acute, uncomplicated <i>E. coli</i> cystitis in patients with decreased renal function (eGFR < 60 mL / min) – No activity against <i>Staphylococcus saprophyticus</i> <b>Note:</b> not recommended for upper urinary tract infection / systemic infections

Anti-infective	Route	Dose*	Interval	Cost / day
Amoxicillin	PO	500 mg – 1 g	Q8H	\$0.27 – 0.54
Ampicillin	IV	2 g	Q4 – 6H	\$14.16 – 21.24
Amoxicillin / clavulanate	PO	875 / 125 mg	Q12H	\$0.50
Cloxacillin	PO	500 mg – 1 g	Q6H	\$1.79 – 3.60
	IV	2 g	Q4H	\$26.10
Penicillin V	PO	300 mg	Q6H	\$0.89
Penicillin G	IV	3 million units	Q4H	\$23.04
Piperacillin / tazobactam	IV	3.375 – 4.5 g (use 4.5 g for <i>P. aeruginosa</i> )	Q6H	\$12.53 – 15.46
Cephalexin	PO	500 mg – 1 g	Q6H	\$0.57 – 1.04
Cefazolin	IV	2 g (use 3 g if BMI > 35)	Q8H	\$7.02
Cefuroxime	IV	1.5 g	Q8H	\$22.59
Cefuroxime axetil	PO	500 – 750 mg	Q12H	\$0.64 – 0.95
Ceftriaxone	IV	2 g	daily	\$3.57
		2 g (meningitis / CNS infection)	Q12H	\$7.14
Cefixime	PO	400 mg	daily	\$2.11
Ceftazidime	IV	2 g	Q8H	\$33.60
Meropenem <sup>R</sup>	IV	500 mg	Q6H	\$13.44
	IV	1 g (2 g meningitis / CNS infection)	Q8H	\$16.02 – 32.04
Ertapenem <sup>R</sup>	IV	1 g	daily	\$33.10
Imipenem / cilastatin <sup>R</sup>	IV	500 mg	Q6H	\$34.57
Ciprofloxacin**	PO	500 – 750 mg (use 750 mg for <i>P. aeruginosa</i> )	Q12H	\$0.16 – 0.24
	IV	400 mg	Q12H	\$7.50
	PO	750 mg	daily	\$0.79
Levofloxacin**	IV	750 mg	daily	\$52.16
Moxifloxacin**	PO	400 mg	daily	\$0.51
	IV	400 mg	daily	\$15.70
Sulfamethoxazole / trimethoprim**	PO	800 / 160 mg	Q12H	\$0.23
	IV	800 / 160 mg (10 mL)	Q6H	\$67.52
Nitrofurantoin	PO	100 mg	Q12H	\$0.66
Fosfomycin <sup>R</sup>	PO	3 g	One dose	\$10.72
Gentamicin	IV	480 mg (7 mg / kg)	daily	\$81.82
Tobramycin	IV	480 mg (7 mg / kg)	daily	\$11.70
Azithromycin	PO	500 mg	daily x 3	\$0.33
	IV	500 mg	daily x 3	\$4.54
Clarithromycin XL	PO	1 g	daily	\$2.39
Doxycycline	PO	100 mg	Q12H	\$0.40
Clindamycin**	PO	300 – 450 mg (use 450 mg for osteomyelitis)	Q6 – 8H	\$0.77 – 1.54
	IV	600 mg	Q8H	\$9.48
Vancomycin	IV	1 g (15 mg / kg)	Q8 – 12H	\$7.76 – 11.64
	PO	125 mg (capsule) [ <i>C. difficile</i> infection]	Q6H	\$15.53
Daptomycin <sup>R</sup>	IV	300 – 400 mg (4 – 6 mg / kg)	daily	\$32.00 – 42.66
Linezolid <sup>R**</sup>	PO	600 mg	Q12H	\$32.61
	IV	600 mg	Q12H	\$31.24
Metronidazole**	PO	500 mg (use Q8H for <i>C. difficile</i> infection)	Q8 – 12H	\$0.64 – 0.96
	IV	500 mg	Q12H	\$6.25
Amphotericin B	IV	50 mg	daily	\$93.19
Fluconazole**	PO	400 mg	daily	\$1.39
	IV	400 mg	daily	\$23.76
Voriconazole <sup>R</sup>	PO	200 mg	Q12H	\$3.26
	IV	200 mg	Q12H	\$43.34
Micafungin <sup>R</sup>	IV	100 mg	daily	\$83.00
Acyclovir	IV	750 mg	Q8H	\$20.18
Valacyclovir	PO	1 g	Q8H	\$1.45

\*Based on a 70 kg adult with normal renal and hepatic function

\*\*Agents with > 80% bioavailability – Use oral route whenever possible

**NOTE:** Automatic stop of antibiotics at **7 days (exception: azithromycin 3 days)** –

Indicate on orders if longer duration required.

**R – Restricted Antimicrobial** – refer to the Inside Net / Clinical Resources / Pharmacy / Antimicrobial Stewardship Program Website: “Restricted and Non-formulary Antimicrobial Agents-Criteria for Use” or contact Pharmacy



Interior Health

## Antimicrobial Susceptibility Report 2021

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**Gram Positive Organisms • Interior Health – 2021**

% Susceptible	# of Isolates	Amoxicillin	Ampicillin	Cefazolin	Ceftazoxone	Clindamycin	Cloxacillin	Erythromycin	Linezolid <sup>NR</sup>	Gen <sup>U</sup> synergy	Nitrofurantoin <sup>U</sup>	Penicillin (IV)	Penicillin (oral)	Ciprofloxacin <sup>U</sup>	Doxycycline	Trimeth/Sulfa	Vancomycin
<i>Enterococcus faecalis</i>	1198	100	100	R	R	R	R	R	R	86	99			85	R	R	100
<i>Enterococcus faecium</i>	235	R	R	R	R	R	R	R	R	47	R			R	R	R	77
<i>Aerococcus urinae</i>	203	100	100				NR				99					NR	
<i>Staphylococcus aureus</i>	4611			82		87	82		100					NR	97	94	100
<i>S. aureus</i> (MRSA)	804	R	R	R	R	77	R		100					NR	97	85	100
<i>S. aureus</i> (MSSA)	3807			100		89	100		100					NR	96	96	100
<i>Staph lugdunensis</i>	263			97		93	97		100					NR	97	99	100
<i>Staph epidermidis</i>	306			34		66	36		100					NR	87	68	100
<i>Streptococcus pneumoniae</i>	152	99			100	87		74				90 †	84	NR	70	78	100
												91 ‡	100	NR			100
<i>Strep agalactiae</i> (Group B)	1235	100	100		100	53		64				100	100	NR		R	100
<i>Strep pyogenes</i> (Group A)	885	100	100		100	78		76				100	100	NR	85	R	100
<i>Strep anginosus group*</i>	251		100		100	84						100	100	NR			100
<i>Strep viridans group**</i> (blood cultures)	61				100							93					100

† Data based on meningitis

‡ Data based on non-meningitis breakpoints

\* *Streptococcus anginosus* group includes: *Streptococcus anginosus*,

*Streptococcus constellatus* and *Streptococcus intermedius*

\*\* *Streptococcus viridans* group includes: *Streptococcus mitis* group,

*Streptococcus mutans* group, *Streptococcus salivarius* group and

*Streptococcus sanguinis* group

**Legend**

**U** urinary tract infections only

**R** inherent resistance

**NR** not recommended / poor activity

**NF** non-formulary, restricted to specific indications

**Gram Negative Organisms • Interior Health – 2021**

% Susceptible	# of Isolates	Ampicillin	Amox/Clav	Cephalixin <sup>U</sup>	Ceftime	Ceftazoxone	Ceftazidime	Ciprofloxacin	Fosfomycin <sup>U</sup>	Gentamicin	Meropenem	Nitrofurantoin <sup>U</sup>	Pip / Tazo	Doxycycline	Tobramycin	Trimeth/Sulfa
<i>Citrobacter freundii</i> complex	221	R	R	R	R	R	R	86	R	96	100	95	R	97	86	
<i>Citrobacter koseri</i>	125	R	95	R	98	98	NR	97		100	100	86	96	100	99	
<i>Klebsiella aerogenes</i>	153	R	R	R	R	R	R	94	R	100	100	R	R	99	99	
<i>Enterobacter cloacae</i> complex	503	R	R	R	R	R	R	97	R	99	100	R	R	99	96	
<i>Escherichia coli</i>	10384	69	86		93	94	NR	79	99	95	100	98	92		95	85
<i>Klebsiella oxytoca</i> group	474	R	91	R	82	93	NR	95	R	99	100	83	91	98	93	
<i>Klebsiella pneumoniae</i>	1264	R	95	R	97	97	NR	91	R	98	100	NR	95		98	95
<i>Morganella morganii</i>	160	R	R	R	R	83	R	83	R	92	99	R	98		93	84
<i>Proteus mirabilis</i>	545	82	96		98	98	NR	94	NR	94	100	R	97		95	90
<i>Serratia marcescens</i>	108	R	R	R	R	R	R	94	R	99	99	R	R		80	100
<i>Salmonella</i> spp	58	91		NR	95	95	NR	91		NR	100				NR	100
<i>Acinetobacter</i> species	57	R	R	R	R	R	R	90	R	100	98				100	100
<i>Pseudomonas aeruginosa</i>	934	R	R	R	R	R	R	89	R	97	91		91	R	99	R
<i>Stenotrophomonas maltophilia</i>	48														100	

**Miscellaneous Organisms • Interior Health – 2021**

% Susceptible	# of Isolates	Amoxicillin	Azithromycin	Ceftriaxone	Cefuroxime	Ciprofloxacin	Clindamycin	Doxycycline	Meropenem	Metronidazole	Piperacillin/tazobactam	Trimeth/Sulfa	Vancomycin
<i>Actinotignum schalii</i>	45	98	98			100	R				R		
<i>Bacteroides fragilis</i> group	63						50		92	98	R	79	
<i>Campylobacter</i> spp	69				100		80						
<i>Haemophilus influenzae</i>	76	64	76	100	82			72				51	
<i>Cutibacterium acnes</i>	39	100		100			91		R	100			100

**Yeast**

% Susceptible	# of Isolates	Amphotericin B	Fluconazole	Micafungin	Voriconazole
<i>Candida albicans</i>	69	100	99	100	99

**Special Considerations – Organisms**

<b>Gram Positive Organisms</b>	<b>S. aureus</b> – Consult Infectious Diseases for <i>S. aureus</i> bacteremia – Restrict vancomycin to MRSA/ severe ceftazidime allergy. Vancomycin has inferior efficacy against MSSA. – <i>S. aureus</i> in urine (non catheterized) may indicate systemic/ distal site infection. Refer to the "Staphylococcus aureus Bacteremia Management Guidelines-Adults" document (inside/Net/Clinical Care Resources/ Pharmacy/Antimicrobial Stewardship/Guidelines & Clinical Practice Standards / <i>S. aureus</i> Bacteremia)
	<b>S. pneumoniae</b> – Penicillin/ amoxicillin effective for the vast majority of infections. – Significant macrolide and doxycycline resistance
<b>Gram Negative Organisms</b>	<b>E. faecalis</b> – Synergistic therapy ampicillin (2 g Q4H IV) and ceftriaxone (2 g Q12H IV) OR gentamicin (3 mg/kg/day, divided, Q8-12H). recommended for endovascular infection (endocarditis) Note: cephalosporins, meropenem, ertapenem, clindamycin and TMP-SMX have NO enterococcal activity
	<b>Streptococcus anginosus group (S. anginosus, S. constellatus, S. intermedius)</b> – Cause deep seated abscesses often in association with anaerobes.
<b>Gram Negative Organisms</b>	<b>E. coli</b> – Quinolones not recommended empirically due to significant resistance and adverse event profile
	<b>Citrobacter freundii, Enterobacter species</b> – Produce an inducible cephalosporinase (AmpC) and are predictably resistant to most beta-lactam antibiotics except carbapenems (imipenem, meropenem, ertapenem)
<b>Yeast</b>	<b>P. aeruginosa</b> – Consult Infectious Diseases for <i>P. aeruginosa</i> bacteremia – Isolation from superficial wounds may represent colonization not infection.
	<b>Yeast</b> – Consult Infectious Diseases for yeast in blood cultures. – Never dismiss yeast in blood culture as a contaminant. – Yeast in sputum culture – not likely pathogen unless <i>Cryptococcus</i> spp. – Micafungin - empiric therapy if yeast isolated from sterile body site.