
ANTIMICROBIAL POLICIES

PURPOSE

To optimize antimicrobial use to curb RQHR emergence of antibiotic resistant organisms, including MRSA & VRE. These policies have been approved by the RQHR Antimicrobial Utilization Committee (AUC) and the Pharmacy & Therapeutics (P&T) Committee.

RQHR Antimicrobial Stop Order

IV: 4 days Inpatients; 3 days Outpatients

All other routes (e.g. po, pr, topical, including ophthalmic preparations): 7 days

Surgical Prophylaxis Guidelines - Refer to Antimicrobial Policies on RQHR Pharmacy Home Page

Hold Ctrl key and click here: [RQHR Antibiotic Prophylaxis for Patients Undergoing Surgery](#)

Autosubstitutions

RQHR pharmacists will indicate the following substitutions in the Physician's orders of the chart "as per RQHR policy"

1. Cefazolin/Metronidazole IV for Cefoxitin *except*:
 - ◆ Cefoxitin may be used for PID, pregnancy, nursing mothers, <12yo and if organism resistant to 1st generation cephalosporin, or possibly for extended spectrum β -lactamase-(ESBL) producing organisms to which all other cephalosporins are resistant
 2. Cefazolin for Cephalothin
 3. Cefazolin q8h for orders with more frequent dosing (i.e. q6h)
 4. Metronidazole IV/po q12h* *except for*:
 - ◆ Amebiasis, brain abscesses, immunomodulating effect in Crohn's disease, or pediatrics

*Note: *If initiated on metronidazole t.i.d. oral therapy, it is not required to autosub to q12h*
 5. Levofloxacin IV/po q24h for orders with more frequent dosing (e.g. q12h)
-

Any PRINTED version of this document is only accurate up to the date this document was developed. RQHR can not guarantee the currency or accuracy of any printed policy. RQHR accepts no responsibility for use of this material by any person or organization not associated with RQHR. No part of this document may be reproduced in any form for publication without permission of RQHR.

Automatic IV to PO Step-Down

Many patients may be initiated on oral antimicrobial therapy, however, those on IV antimicrobials may be stepped down to comparable oral therapy after 2 - 3 days of IV therapy

Patients on the following IV antimicrobial agents will *automatically* be switched to oral therapy when the following criteria is met:

- ✓ Clinical diagnosis is compatible with oral therapy (e.g. NOT meningitis, endocarditis, infections in neutropenic patients)
- ✓ No evidence of abnormal GI absorption [eg. tolerating oral or nasogastric (NG) nutrition, or receiving meds by mouth or NG tube, functioning GIT, no diarrhea]
- ✓ Patient is clinically stable

Note: *These criteria apply to patients on the RQHR Home IV Program and exclude ICU patients*

Azithromycin 500mg IV once daily	Azithromycin 250mg po once daily
Ciprofloxacin 200 - 400mg IV q12h	Ciprofloxacin 250 - 500mg po q12h
Clindamycin 450 - 600mg IV q8h	Clindamycin 300mg po <u>q6h</u>
Fluconazole IV once daily	Fluconazole po once daily
Levofloxacin 250-500mg IV once daily	Levofloxacin 250-500mg po once daily
Linezolid 600mg IV q12h	Linezolid 600mg po q12h
Metronidazole 500mg IV q8h or q12h	Metronidazole 500mg po q12h
Moxifloxacin 400mg IV once daily	Moxifloxacin 400mg po once daily
Voriconazole IV as per monograph/indication	Voriconazole po a.c. as per monograph/indication

May be adjusted based on renal function. For regimens outside this, consult physician.

Miscellaneous

1. **Amikacin:** when an aminoglycoside is required & organism is resistant to both gentamicin & tobramycin
2. **Azithromycin oral:** maximum duration of therapy is 5 days for acute respiratory infections; no reorders accepted
3. **Demeclocycline:** treatment of SIADH
4. **Erythromycin estolate suspension:** in Pediatrics only
5. **Erythromycin IV:** Pediatric patients < 16y old where IV azithromycin is less well studied; in diabetic gastroparesis, or to enhance gastric emptying in critically ill patients intolerant of nasogastric feeding after failure of metoclopramide, or in whom metoclopramide is not tolerated or is contraindicated
6. **Fusidic acid topical:** treatment of methicillin-resistant *Staphylococci* (MRSA) & limited to 7 days therapy to decrease potential for resistant organisms (i.e. No reorders accepted without ID approval)
7. **Mupirocin 2% topical:** treatment of *Staphylococcus aureus* (MSSA & MRSA) & limited to 7 days therapy to decrease potential for resistant organisms (i.e. No reorders accepted without ID approval)
8. **Polysporin topical:** treatment limited to 7 days therapy to decrease potential for resistant organisms (i.e. No reorders accepted without ID approval)

Any PRINTED version of this document is only accurate up to the date this document was developed. RQHR can not guarantee the currency or accuracy of any printed policy. RQHR accepts no responsibility for use of this material by any person or organization not associated with RQHR. No part of this document may be reproduced in any form for publication without permission of RQHR.

Cephalosporins, *Third Generation*

Ceftriaxone in *Adult patients*:

For adult patients requiring a parenteral third generation cephalosporin, ceftriaxone should be prescribed *instead of cefotaxime* (NOTE: if Pseudomonal coverage desired, consider ceftazidime - See below). No RQHR therapeutic substitution for cefotaxime is being proposed for pediatric patients *of any age* at this time.

1. Bacterial meningitis, pending results of culture & sensitivity results (NOTE: Add ampicillin in elderly &/or if immunocompromised)
2. Spontaneous bacterial peritonitis (SBP)
3. Serious infections where the pathogen is resistant, or likely to be resistant to narrower spectrum antibiotics, [e.g. coverage of *S. pneumoniae* in ICU patients with community-acquired pneumonia (CAP) unless C&S results show susceptibility to narrower spectrum agent], or where an aminoglycoside should be avoided (e.g. Clcr < 30mL/min ± > 65yo, or need for extended therapy)
4. Patients in which there is clinical deterioration or no improvement in infectious signs/symptoms after 72 hours of appropriate empiric therapy or where increased CNS penetration is desirable.

Cefotaxime in *Pediatric patients*:

1. Bacterial meningitis, pending results of culture & sensitivity results (NOTE: Add ampicillin in neonates & if immunocompromised)
2. Necrotizing enterocolitis (NEC) in neonates
3. Serious infections where the pathogen is resistant, or likely to be resistant to narrower spectrum antibiotics, or where an aminoglycoside should be avoided (e.g. Clcr < 30mL/min, or need for extended therapy)
4. Patients in which there is clinical deterioration or no improvement in infectious signs/symptoms after 72 hours of appropriate empiric therapy or where increased CNS penetration is desirable.

Cefixime 400mg tablets are available at no charge through the STI clinic for treating sexually transmitted infections (STIs) and cefixime suspension from RQHR Pharmacy for pediatric sexual assault cases

Ceftazidime

Note: Increasing resistance has reduced the utility of ceftazidime for monotherapy in febrile neutropenic patients with cancer. 2002 Guidelines for the use of antimicrobial agents in neutropenic patients with cancer. CID 2002:34:736.

1. Suspected or confirmed Pseudomonas infections in combination with another antipseudomonal agent (unless infection restricted to bladder, then single agent may be used)
-
-

Any PRINTED version of this document is only accurate up to the date this document was developed. RQHR can not guarantee the currency or accuracy of any printed policy. RQHR accepts no responsibility for use of this material by any person or organization not associated with RQHR. No part of this document may be reproduced in any form for publication without permission of RQHR.

Fluoroquinolones

- ◆ IV formulations are only for hospitalized patients who meet the indications below AND who do not meet the RQHR criteria for Automatic IV-PO Step-down
- ◆ For patients who've received a fluoroquinolone in previous 3 months, consider alternative agent(s) due to increased risk of treatment failure
- ◆ Cancer patients: Quinolones cannot be recommended for routine initial IV monotherapy due to the use of these agents for prophylaxis among *afebrile* neutropenic patients, nor in combination with β -lactams or glycopeptides for patients who've received quinolone prophylaxis. For afebrile neutropenic patients, antibiotic prophylaxis should not be routine because of emerging antibiotic resistance. (2002 Guidelines for the use of antimicrobial agents in neutropenic patients with cancer. CID 2002;34:737.)

Ciprofloxacin IV/po

TREATMENT

1. Infection with suspected/documentated *Pseudomonas aeruginosa* (e.g. Cystic Fibrosis, previous culture for *Pseudomonas*, bronchiectasis) in combination with another anti-pseudomonal agent. If infection is limited to the bladder may use as a single agent.
2. Urinary tract infection (UTIs), sexually transmitted infections (STIs) or prostatitis in patients allergic, unresponsive, or with contraindications to alternative agents
3. Patients with severe diabetic foot infections when *Pseudomonas* is a concern, in combination with an anti-anaerobic agent
4. Oral ciprofloxacin may be used in combination with amoxicillin/clavulanate (Clavulin®) for low-risk neutropenic adult patients with cancer ($<500\text{cell}/\text{mm}^3$) & unexplained fever (single oral temp $\geq 38.3^\circ\text{C}$ or temp $\geq 38^\circ\text{C}$ for $\geq 1\text{h}$) and who have NOT received quinolone prophylaxis.

PROPHYLAXIS

1. Transrectal prostatic biopsy, as a single pre-procedure dose, if aminoglycoside contraindicated
2. Recurrent UTI in whom alternatives are contraindicated (e.g. allergies, decreased Clcr, etc.)

Levofloxacin IV/po & Moxifloxacin IV/po

- Moxifloxacin NOT recommended for treatment of *Pseudomonas* infections, or urinary tract infections (UTIs) due to its limited concentration in the urinary tract
- Levofloxacin 750mg formulation not on RQHR Formulary: Consider moxifloxacin for lower MICs vs *S. pneumoniae*, or ciprofloxacin for *Pseudomonas* as indicated in criteria below
- Moxifloxacin shall NOT be prescribed with an anti-anaerobic agent (i.e. clindamycin or metronidazole) as it has the indication for anaerobic coverage, including *B. fragilis*.
- Levofloxacin will automatically be changed to ONCE daily dosing for orders written as TWICE daily. Should the physician wish twice daily dosing, it would first have to be approved by an ID specialist.

1. Acute exacerbation of COPD (i.e. at least 2/3 of the following: \uparrow dyspnea, \uparrow sputum production, \uparrow sputum purulence) in patients with risk factors ($\text{FEV}_1 \leq 50\%$ predicted, $>65\text{yo}$, comorbid medical illness, chronic corticosteroid use, antibiotic use in previous 3 months or ≥ 4 exacerbations/year)
2. Pneumonia in patients who have NOT been on a fluoroquinolone in the previous 3 months [azithromycin or clarithromycin are considered 1st line agents for community-acquired pneumonia for those NOT in a long-term care facility.]
3. Infections where the pathogen is resistant to narrower spectrum antibiotics AND there is documented immediate hypersensitivity reaction, or concern for a serious drug interaction to antibiotic alternatives
4. Infections where an aminoglycoside cannot be used or should be avoided (e.g. $\text{Clcr} < 30\text{mL}/\text{min}$ and/or > 65 years old and need for extended therapy) and *Pseudomonas* is NOT a concern
5. For Moxifloxacin only: As a *single* agent in patients with severe diabetic foot infections where *Pseudomonas* NOT a concern

Any PRINTED version of this document is only accurate up to the date this document was developed. RQHR can not guarantee the currency or accuracy of any printed policy. RQHR accepts no responsibility for use of this material by any person or organization not associated with RQHR. No part of this document may be reproduced in any form for publication without permission of RQHR.

Fosfomycin

1. Treatment of symptomatic patients with extended spectrum beta-lactamase (ESBLs) producing organisms (primarily *E. coli*) causing a urinary tract infection, after susceptibility confirmed.
-

Piperacillin/Tazobactam (Tazocin®)

- | |
|--|
| <ul style="list-style-type: none">• NOT for respiratory tract infections other than where indicated below• Not to be combined with other anti-anaerobic agents as Pip/Tazo covers anaerobes |
|--|
-

1. Severe diabetic foot infections requiring parenteral therapy (e.g. polymicrobial infection)
 2. Febrile neutropenics at low risk in which a single agent is desired, or those at higher risk in combination with an aminoglycoside (e.g. empiric coverage of both *Staph* & *Pseudomonas*)
 3. Septic patients who've failed conventional therapy and require anaerobic and/or Staphylococcal coverage and/or when an aminoglycoside cannot be used or should be avoided (e.g. Clcr < 30mL/min ± > 65 years old and need for extended therapy)
 4. For patients with suspected or documented *Pseudomonas aeruginosa* infection
-

Vancomycin IV/po

TREATMENT

1. Infections caused by gram-positive microorganisms in patients who have serious allergies to beta-lactam antibiotics
2. Bacterial meningitis *pending results of culture & sensitivity (C&S) data*
3. Sepsis in neonates *pending results of C&S*
4. Serious infections (e.g. endocarditis, peritonitis, septicemia) caused by beta-lactam-resistant gram-positive bacteria (e.g. suspected or documented MRSA, coagulase negative *Staphylococcus*)
5. Endophthalmitis - as a single intravitreal dose
6. Antibiotic-associated colitis* (e.g. *C. difficile*) failing to respond to metronidazole therapy, or when severe & potentially life-threatening. [*Note: the injectable form will be used *orally* for treatment of *C. difficile*]

PROPHYLAXIS

1. As recommended by the American Heart Association following certain procedures in patients at high risk for endocarditis - Refer to latest guidelines
 2. Patients with a history of MRSA, or exposure to individuals with MRSA, for major surgical procedures involving implantation of prosthetic materials or devices (e.g., cardiac & vascular procedures & total joint replacement). A single dose of vancomycin administered immediately before surgery is sufficient unless the procedure exceeds 6 hours, in which case the dose should be repeated. Prophylaxis should be discontinued after a maximum of two doses.
-

<p>Any PRINTED version of this document is only accurate up to the date this document was developed. RQHR can not guarantee the currency or accuracy of any printed policy. RQHR accepts no responsibility for use of this material by any person or organization not associated with RQHR. No part of this document may be reproduced in any form for publication without permission of RQHR.</p>
--

NOTE: If the criteria for the antimicrobial agents listed below are not met, an ID consult must be written before the agent may be dispensed.

Antifungal Agents

Amphotericin Lipid Formulation (Abelcet®)

1. Organism Resistant to fluconazole, voriconazole & caspofungin and,
2. Amphotericin B deoxychoate (AMB) can no longer be used due to infusion-related toxicities despite pre-treatment with diphenhydramine, acetaminophen and meperidine, OR baseline SCr greater than 200 µmol/L or SCr increases more than 2 - 3 times baseline, provided baseline SCr was within normal limits while on AMB

Caspofungin (Cancidas®)

1. For invasive candidiasis as per [RQHR Empiric Treatment of Invasive Candidiasis](#) - Hold Ctrl key & click
2. Empiric therapy in persistently febrile patients with neutropenia (or recent episode of neutropenia) despite > 5 days of broad spectrum antibiotics AND with intolerance or nephrotoxicity or at risk of nephrotoxicity to AMB as defined in #1.

Voriconazole IV/po (Vfend®)

1. Treatment of invasive aspergillosis
2. As an alternate as indicated in the algorithm for [RQHR Empiric Treatment of Invasive Candidiasis](#)

Itraconazole (Sporanox®)

1. For dermatological infections:
 - severe, extensive tinea versicolour unresponsive to topical therapy
 - severe, extensive seborrhoeic dermatitis
 - biopsy-proven pityrosporum folliculitis
 - mixed toenail infections proven on mycological culture
 - cases where high index of suspicion of sporotrichosis or North American blastomycosis where biopsies for tissue culture are pending
2. To treat infections where fluconazole is less likely or unlikely to be effective (e.g. aspergillosis, blastomycosis)

Cefepime, a fourth generation cephalosporin

1. An alternative to fluoroquinolones (Refer to criteria) and other broad spectrum agents in critically ill and/or immunosuppressed adult & pediatric patients

Linezolid (Zyvox®) (NOTE: May NOT be combined with vancomycin as it may be antagonistic)

1. For gram-positive organisms resistant to all other agents, or *Staphylococcus aureus* lung infections with increasing vancomycin MIC as indicated by RQHR Microbiology
 2. To facilitate discharge (i.e. an oral agent to treat resistant G+ve organisms)
-

Any PRINTED version of this document is only accurate up to the date this document was developed. RQHR can not guarantee the currency or accuracy of any printed policy. RQHR accepts no responsibility for use of this material by any person or organization not associated with RQHR. No part of this document may be reproduced in any form for publication without permission of RQHR.

Carbapenems (Note: The carbapenems have a greater cross reactivity to penicillins than the cephalosporins, so are not necessarily an alternative for patients with allergies to penicillin)

Ertapenem (Invanz®)

1. For outpatients with prior approval by an Infectious Disease Specialist in cases where single agent coverage of gram positive, gram negative and anaerobic organisms is required AND the organism is resistant to 1st & 2nd generation cephalosporins or in patients with severe beta-lactam allergies
2. For multi-drug resistant organisms such as gram-negative organisms producing ESBL or AMP-C when reported susceptible by Microbiology AND where IV therapy is required

Meropenem (Merrem®)

Refer to [Automatic Dosing Adjustments](#) [Meropenem Automatic Dosing Policy](#) (Hold Ctrl key & click)

1. When Piperacillin/Tazobactam (Tazocin®) cannot be used (e.g. documented resistance or allergy to pip/tazo)

MEROPENEM DOSING POLICY

The following autosubstitution policy for dosing of meropenem (Merrem®) from Hartford, Ct [Am J Health-Syst Pharm. 2003; 60: 565-8.] will be implemented in RQHR:

Background: Many institutions in Canada have a meropenem autosubstitution policy for dosing patients to decrease cost without decreasing efficacy (e.g.: 500mg IV q6h for \$90/day vs. 1g IV q8h for \$142.00/day; a savings of approx. \$50/day).

Non-neutropenic Patients

- 500mg IV q6h for most patients with CrCl \geq 50mL/min, including infections caused by *Pseudomonas aeruginosa*. When treating *Pseudomonas* infections with meropenem, combination therapy with an aminoglycoside is recommended.
- 500mg IV q8h for patients with CrCl 25 - 49mL/min
- 500mg IV q12h for patients with CrCl 10 - 24mL/min
- 500mg IV q24h for patients with CrCl <10mL/min
- 1g doses should follow similar dosing intervals as above and are only appropriate in the following:
 - Patients whose actual body weight is greater than two times calculated ideal body weight
 - Patients with CNS or eye infections
 - Patients with cystic fibrosis

Neutropenic Patients

- When used as monotherapy, 1g IV q6h for most patients with CrCl \geq 50mL/min
- For patients with CrCl <50mL/min, similar percent dosage reductions and dosing interval extensions apply as for non-neutropenic patients

Hemodialysis Patients

- 500mg IV q24h, administered after the dialysis session
- Because of a lack of available data for peritoneal dialysis patients, meropenem is not recommended in this population.

Tigecycline

1. Restricted to orders from Infectious Disease specialist only.
-

Any PRINTED version of this document is only accurate up to the date this document was developed. RQHR can not guarantee the currency or accuracy of any printed policy. RQHR accepts no responsibility for use of this material by any person or organization not associated with RQHR. No part of this document may be reproduced in any form for publication without permission of RQHR.