## SHC Formulary Restricted Antimicrobials

<table>
<thead>
<tr>
<th>Anti-infective</th>
<th>Restriction Criteria/Acceptable Use</th>
<th>Unacceptable Uses</th>
</tr>
</thead>
</table>
| Ceftaroline            | Infectious Disease consult required unless it is a continuation of therapy from outside hospital or outpatient use, which will require ASP review within 72 hours. Examples of use by ID:  
  • Salvage for sustained MRSA bacteremia/endocarditis  
  • Salvage for mixed infection that includes MRSA with susceptible gram negatives | 1. Selected over vancomycin in patients with renal failure solely as a reason to avoid vancomycin  
  2. Selected solely for convenience |
| Ceftazidime/avibactam  | Infectious Disease consult required. Example of use by ID:  
  • For patients with empiric or proven Klebsiella pneumoniae carbapenemase (KPC) producing bacteria |                                                                                   |
| Ceftolozane/tazobactam | Infectious Disease consult required. Example of use by ID:  
  • For patients with multidrug resistant (MDR) organisms without other safe alternatives |                                                                                   |
| Colistin IV            | Must meet one of the following requirements:  
  1. ID consult required (note: polymyxin B preferred unless treatment of urinary tract infections)  
  2. Inhalation route | Prophylaxis                                                                        |
| Dalbavancin            | Must meet one of the following requirements:  
  1. Infectious Disease consult required  
  2. OPAT (Outpatient parenteral antimicrobial therapy) consult required – Pager 27190 | 1. Inpatient use when alternatives are available  
  2. Continuation of therapy from outside hospital or outpatient use, ID Clinic- use requires re-evaluation upon admission |
| Daptomycin             | ID consult required except for approved indications:  
  1. Serious infections due vancomycin resistant gram-positive organisms or serious allergy/intolerance of vancomycin or linezolid  
  2. Probable (conditional 72 hour empiric use allowed) or proven vancomycin-resistant organisms (VRE), MRSA/CoNS endocarditis or bacteremia with suspected endocarditis; treatment of persistent MRSA bacteremia  
  3. Continuation of therapy from outside hospital or outpatient use | 1. Pneumonia due to inactivation by pulmonary surfactant  
  2. VRE colonization of urine, respiratory tract, wounds (or drains)  
  3. Surgical prophylaxis  
  4. An alternative for Vancomycin induced Red Man’s syndrome  
  5. Use in place of vancomycin for patients with elevated Scr (unless vancomycin induced nephrotoxicity†)  
  6. Meningitis due to poor CNS penetration/inadequate drug levels |
| Fidaxomicin            | ID consult required except for:  
  1. Continuation of therapy from outside hospital or outpatient use for proven c.diff disease  
  2. Approved indication  
    a. Proven C. difficile disease AND  
    b. Relapsed disease AND  
    c. Limited to a standard 10-day course | 1. C.diff prophylaxis  
  2. Empiric for C.diff (must have proven c.diff) |
| Fosfomycin             | ID consult or OPAT consult (pager 27190) required except for:  
  1. Management of uncomplicated UTI with:  
    a. No other oral options are available AND  
    b. Susceptibility confirmed (call lab to add on) | 1. Pyelonephritis  
  2. Infections outside the urinary tract |
| Isavuconazole          | ID consult required unless continuation of therapy from outside hospital or outpatient use |                                                                                   |
| Linezolid              | ID consultation is required except for:  
  1. Treatment of proven VRE/VISA/VRSA infection  
  2. Treatment of proven MRSA pneumonia (including CF patients colonized with MRSA) or other MRSA | 1. Use in place of vancomycin for patients with elevated Scr (unless vancomycin induced nephrotoxicity†) |
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<tr>
<td></td>
<td>infections with no other acceptable treatment options</td>
<td>2. Enterococcus faecalis that is susceptible to ampicillin (piperacillin) or vancomycin</td>
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<td>3. Linezolid may be considered for use in patients severely allergic to (not including Red Man’s Syndrome) or failing vancomycin</td>
<td>3. VRE colonization of urine/foley, respiratory tract, wounds, or drains</td>
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<tr>
<td></td>
<td>a. Allergy consult may be recommended to assess vancomycin allergy/intolerance</td>
<td>4. Prophylaxis</td>
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<td></td>
<td>4. Continuation of therapy from outside hospital or outpatient use</td>
<td>5. An alternative for Vancomycin induced Red Man’s syndrome</td>
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<td></td>
<td>5. Treatment of atypical mycobacterial or nocardial infections (not 1st line therapy)</td>
<td>For isolates with a vancomycin MIC ≤ 2 mcg/mL (e.g., susceptible according to CLSI breakpoints), the patient’s clinical response should determine the continued use of vancomycin, independent of the MIC. (IDSA MRSA Guidelines 2011)</td>
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<td>6. Conditional 72 hour empiric use for:</td>
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<td></td>
<td>a. Necrotizing fasciitis for MRSA and other gram positive bacteria, when anti-toxin properties are needed (in lieu of clindamycin)</td>
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<td></td>
<td>b. GPCs in blood or enterococcus in cultures while pending speciation/susceptibilities</td>
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<td></td>
<td>c. Suspected VRE infection</td>
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<td>*If no microbiological target is identified by 48-72h, ID consultation is required to continue linezolid.</td>
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<tr>
<td>Inhaled Ribavirin</td>
<td>Lung Transplant or Bone Marrow Transplant patients with RSV infection (confirmed by viral PCR)</td>
<td>Parainfluenza virus, metapneumovirus: may consider oral ribavirin</td>
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<td>Peramivir</td>
<td>For treatment of influenza virus. Must meet both criteria:</td>
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<td>1. Patients who cannot tolerate oral medications</td>
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<td>2. Patient is located in the ICU or has an ID consult</td>
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<td>2nd dose requires ID consultation</td>
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<td>Polymyxin B</td>
<td>ID consult required unless use by Cystic fibrosis service /Lung Transplant service</td>
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<td>• Note: colistin is preferred over polymyxin B for urinary tract infections</td>
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<td>Posaconazole IV</td>
<td>ID consultation is required except:</td>
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<td></td>
<td>1. IV may be used in NPO patients if previously on PO posaconazole or intolerant to voriconazole</td>
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<td>• Due to high cost of IV posaconazole, screen daily for eligibility for switch back to PO</td>
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<td>Tedizolid IV/PO</td>
<td>ID consultation is required except:</td>
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<td></td>
<td>1. Alternative to linezolid in patients with significant drug interactions or toxicities (particularly with anticipated use &gt; 14 days) for vancomycin-resistant gram positive organisms</td>
<td>1. See linezolid</td>
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<td>2. Caution in bacteremia: limited data exists</td>
<td>2. Caution with UTIs: less than 3% excreted as parent drug</td>
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<td>3. Caution with UTIs: more than 3% excreted as parent drug</td>
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<tr>
<td>Tigecycline</td>
<td>ID consult is required (use of tigecycline has been associated with increased mortality in comparison with other agents)</td>
<td>1. Bacteremia and endocarditis</td>
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<td>2. Pneumonia: high failure rates and higher mortality in VAP has been reported, see black box warnings</td>
<td>3. Pneumonia: high failure rates and higher mortality in VAP has been reported, see black box warnings</td>
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*Vancomycin induced nephrotoxicity: minimum of two or three consecutive documented increases in serum creatinine concentrations (defined as an increase of 0.5 mg/dL or a ≥50% increase from baseline, whichever is greater) after several days of vancomycin therapy (Rybak M et al, AJHP 2009. [http://dx.doi.org/10.2146/ajhp080434](http://dx.doi.org/10.2146/ajhp080434)).

Red-man’s Syndrome: Red man syndrome may occur if the infusion is too rapid. It is not an allergic reaction, but may be characterized by hypotension and/or a maculopapular rash appearing on the face, neck, trunk, and/or upper extremities. If this should occur, slow the infusion rate to over 1.5 to 2 hours per gram and increase the dilution volume. Reactions are often treated with antihistamines and steroids.
Advisory on the Use of Protected Antibiotics

- Appropriate use of these antibiotics should be reviewed in 48 to 72 hours
- Random audits of use will be performed by SASS-ASP pharmacists
- Clinical Pharmacists should routinely refer to these guidelines (I-vents not needed for these agents)
- Clinical Pharmacists should remind teams to order appropriate cultures (blood, sputum if considering pneumonia, urine if considering UTI) prior to starting antibiotics

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<tr>
<th>Antimicrobial</th>
<th>Empiric Criteria</th>
<th>Definitive Criteria</th>
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| Meropenem     | - Nosocomial and sepsis coverage in patients with risk factors for MDRs including ESBL producing organisms  
                 a. History of ESBL producing organism  
                 b. Recent prolonged exposure (>5 days) to Zosyn®, cefepime, or other broad spectrum antibiotic  
                 c. Recent hospitalization at an institution with a high rate of ESBLs  
                 d. Recent travel to areas with high rates of ESBLs (e.g. some countries in Asia)  
                 e. Clinically unstable (new or persistent fever, WBC increase, hemodynamic instability, etc) and already on broad spectrum gram negative agents (Zosyn®, cefepime)  
                 f. Meningitis when listeria plus nosocomial gram negative coverage is needed  
                 g. Infected pancreatic necrosis | Treatment of culture positive ESBL or de-repressed AmpC β lactamase infections  
                 - ESBLs:  
                   1. Zosyn®, Augmentin® potentially ineffective even if susceptible in in-vitro testing  
                   2. Consider fluoroquinolones or ertapenem if susceptible  
                 - De-repressed AmpC β lactamase  
                   1. Consider Zosyn®, cefepime, fluoroquinolones or ertapenem if susceptible  
                 - Caution with 3rd generation cephalosporins (e.g. ceftriaxone), aztreonam |
| Ertapenem     | - Nosocomial coverage in patients with risk factors for ESBL producing gram-negative bacteria  
                 o. History of ESBL producing organism  
                 o. Recent prolonged exposure (>5 days) to Zosyn®, cefepime, or other broad spectrum antibiotic  
                 o. Recent hospitalization at an institution with a high rate of ESBLs  
                 o. Recent travel to areas with high rates of ESBLs (e.g. some countries in Asia)  
                 - Intra-abdominal infections but in many cases other options are preferred  
                 Avoid if pseudomonas is a suspected or proven pathogen | Treatment of culture positive ESBL or de-repressed AmpC β lactamase infections if susceptible  
                 - May be an option for once-daily IV therapy for transitioning to outpatient IV therapy if no PO options available  
                 - Can be used for uncomplicated UTI due to ESBL or MDR bug in which it is the only reasonable option.  
                   Fluoroquinolone, TMP/SMX, or nitrofurantoin may be considered as alternatives for uncomplicated UTI if the organism is susceptible |
| Vancomycin    | Empiric use for suspected MRSA or ampicillin-resistant enterococcus infections.  
                 Empiric vancomycin should typically be stopped if no resistant GP organisms are recovered in cultures in 48 - 72 hours. | Proven infection with β-lactam resistant vancomycin-susceptible Gram positive organisms  
                 - Purulent skin and soft tissue infection with suspected MRSA when parenteral therapy is indicated  
                 - Treatment of infections caused by Gram-positive organisms in patients who have severe allergic reactions to beta-lactam antibiotics |
| Caspofungin   | 1. Empiric treatment of invasive candidiasis in high risk* patients  
                 o. *High risk: the presence of >2 of the following may be an indication for initiation of empiric anti-Candida therapy in persistently febrile patients despite receipt of broad spectrum antibacterials: prolonged central venous catheterization, recent major abdominal surgery, necrotizing pancreatitis, Candida colonization at more than one site, high dose | Proven infection due to candida species that is either resistant to azoles or when patients are intolerant to azoles or amphotericin  
                 - Salvage therapy for aspergillosis  
                 *Of note, echinocandins do not achieve therapeutic concentration in urine, eyes, and CNS |
(>20 mg prednisone equivalent per day) corticosteroid therapy, severe neutropenia.
  
  - **Note:** Based on the 2015 Stanford antibiogram, fluconazole is as active as caspofungin against *C. glabrata*. 89% of *C. glabrata* isolates are susceptible/susceptible-dose dependent to fluconazole (use fluconazole 800mg), compared to 92% of isolates susceptible to caspofungin.

2. Empiric treatment of invasive candidiasis in patients with recentazole exposure or history of fluconazole-resistant *Candida* (e.g., *C. krusei*).

3. Proven or suspected invasive fungal infection in the immunocompromised host
  
  - **Note:** that fluconazole should be used in susceptible *Candida* infections. *Candida* isolates that are fluconazole “susceptible, dose-dependent” may be treated with fluconazole dosed at ≥400mg daily. If you have questions, please discuss with SASS-ASP or ID team.

<table>
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<tr>
<th>Antifungal Drug</th>
<th>Conditions</th>
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| **Posaconazole** | 1. Suspected or proven invasive fungal infection due to susceptible organism  
2. Prophylaxis of fungal infections in select immunocompromised patients at significant risk |
| **Itraconazole** | 1. Suspected or proven invasive fungal infection due to susceptible organism  
2. Prophylaxis of fungal infections in select immunocompromised patients at significant risk |
| **Voriconazole** | 1. Suspected or proven invasive fungal infection due to susceptible organism  
2. Prophylaxis of fungal infections in select immunocompromised patients at significant risk |