# Stanford Health Care Antimicrobial Dosing Reference Guide

This document is also located on the SHC Intranet (http://portal.stanfordmed.org/depts/AntimicrobialStewardshipProgram) and http://bugsanddrugs.stanford.edu ABX Subcommittee Approved: March 2017

**Formulas for dosing weights:** Ideal body weight IBW (male) = 50kg + (2.3 x height in inches > 60 inches) · Ideal body weight IBW (female) = 45kg + (2.3 x height in inches > 60 inches) · Adjusted Body Weight ABW (kg) = IBW + 0.4 (TBW – IBW)

<table>
<tr><th>Drug</th><th>CrCl > 50 mL/min</th><th>CrCl 10 – 50 mL/min</th><th>CrCl < 10 mL/min</th><th>Intermittent Hemodialysis (IHD)</th><th>CRRT</th></tr>
<tr><td>Acyclovir (IV)[1–6]<br>(Use adjusted BW for obese)</td><td>HSV: 5 mg/kg q8h<br>HSV encephalitis/zoster: 10 mg/kg q8h</td><td>Same dose<br>CrCl 25 – 50: q12h<br>CrCl 10 – 25: q24h</td><td>HSV: 2.5 mg q24h<br>HSV encephalitis/zoster: 5 mg/kg q24h</td><td>HSV: 2.5 mg/kg q24h<br>HSV encephalitis/zoster: 5 mg/kg q24h<br>Dose daily, but after HD on HD days</td><td>CVVH: 5 – 10 mg/kg q24h<br>CVVHDF: 5 – 10 mg/kg q12h<br>HSV encephalitis/zoster: 10 mg/kg q12h</td></tr>
<tr><td>Acyclovir (PO)[1,2]</td><td colspan="3"><table><tr><th></th><th>CrCl > 25</th><th>CrCl 10 – 25</th><th>CrCl < 10</th></tr><tr><td>HSV mucocutaneous</td><td>400 mg q8h<br>Alt: 200 mg 5x daily</td><td>200 mg q8h</td><td>200 mg q12h</td></tr><tr><td>VZV</td><td>800 mg q4h (or 5x daily)</td><td>800 mg q8h</td><td>800 mg q12h</td></tr></table></td><td>See CrCl < 10 mL/min</td><td>No data</td></tr>
<tr><td>Amikacin[1,2,5,7,8]<br>(Use adjusted BW in obese)<br>See appendix for complete guidelines</td><td colspan="3"><table><tr><th></th><th>CrCl > 60</th><th>CrCl 40 – 60</th><th>CrCl 20 – 40</th><th>CrCl < 20</th></tr><tr><td>Conventional dosing</td><td>5 – 7.5 mg/kg q8h</td><td>5 – 7.5 mg/kg q12h</td><td>5 – 7.5 mg/kg q24h</td><td rowspan="2">5 mg/kg load, then by level<br>alt: 7.5 mg/kg q48–72h</td></tr><tr><td>High-dose extended-interval dosing</td><td>15 – 20 mg/kg q24h</td><td>15 mg/kg q36h</td><td>CrCl > 30: 15 mg/kg q48h<br>CrCl < 30: Not recommended</td></tr></table>Timing of levels: Draw trough 30 min prior to 4th dose. Draw peak 30 min after infusion ends<br>Once daily dosing: goal peak 35 – 60 mcg/mL; goal trough < 4 mcg/mL<br>Conventional dosing: goal peak 25 – 35 mcg/mL for serious infections; 15 – 20 mcg/mL for UTI; goal trough < 4 – 8 mcg/mL</td><td>5 – 7.5 mg/kg post HD only<br>consult pharmacist</td><td>10 mg/kg load, then 7.5 mg/kg q24–48h<br>Severe/MDR organism: 25 mg/kg q48h<br>consult pharmacist</td></tr>
<tr><td>Amoxicillin (PO)[1,2]</td><td>Usual dose: 250 – 500 mg q8h or 875 mg q12h<br>H pylori: 1,000 mg q12h<br>Procedural ppx: 2,000 mg x 1</td><td>CrCl 10–30: 250 – 500 mg q12h</td><td>250 – 500 mg q24h</td><td>250 – 500 mg q24h; administer additional dose at the end of dialysis</td><td>No data</td></tr>
<tr><td>Amoxicillin/clavulanate (PO)[1,2]</td><td>Usual dose: 250 – 500 mg q8h or 875 mg q12h<br>CAP: 2,000 mg ER q12h</td><td>CrCl <30: Do not use 875 mg tablet or ER tab<br>CrCl 10 – 30: 250 – 500 mg q12h</td><td>250 – 500 mg q24h</td><td>250 – 500 mg q24h; administer additional dose at the end of dialysis</td><td>No data</td></tr>
<tr><td>Amphotericin B Liposomal[1,2]<br>(Consider adjusted BW in obese)</td><td>3 – 6 mg/kg/day</td><td>No change</td><td>No change</td><td>No change</td><td>No change</td></tr>
<tr><td>Ampicillin (IV)[1–3]</td><td>Mild/uncomplicated: 1 – 2 g q6h<br>Meningitis/endovascular/PJI: 2 g q4h</td><td>Mild/uncomplicated: 1 g q6–8h<br>Meningitis/endovascular /PJI: 2 g q6–12h</td><td>Mild/uncomplicated: 1 g q12h<br>Meningitis/endovascular /PJI: 2 g q12–24h; or 1 g q8h</td><td>Mild/uncomplicated: 1 g q12h<br>Meningitis/endovascular/PJI: 2 g q12–24h</td><td>CVVH: 2 g q8–12H<br>CVVHDF: 2 g q6–8h<br>Meningitis/endovascular /PJI: 2 g q6h</td></tr>
<tr><td>Ampicillin/sulbactam[1–3,5]</td><td>1.5 – 3 g q6h</td><td>CrCl < 30: 1.5 – 3 g q12h</td><td>CrCl < 15: 1.5 – 3 g q24h</td><td>1.5 – 3 g q12–24h<br>Dose daily, but after HD on HD days</td><td>3 g q6–8h</td></tr>
<tr><td>Azithromycin (IV/PO)[1,2]</td><td>500 mg q24h</td><td>No change</td><td>No change</td><td>No change</td><td>No change</td></tr>
<tr><td>Aztreonam[1–3,9]<br>Severe: pseudomonas, life-threatening infections</td><td>1 – 2 g q8h<br>Severe/Meningitis: 2 g q6–8h</td><td>CrCl < 30: 1 g q8h<br>Severe/Meningitis: 1 g q6–8h</td><td>500 mg q8h<br>Severe/Meningitis: 1g q12h</td><td>1 g q24h<br>Severe/Meningitis: 1 g q12h</td><td>2 g load, then 1 g q8h<br>– or –<br>2 g q12h</td></tr>
<tr><td>Caspofungin[1,2]</td><td colspan="3">70 mg x 1, then 50 mg q24h<br>Optional: 70 mg x 1, then 35 – 50 mg q24h if severe hepatic dysfunction/ESLD.<br>70 mg q24h if on phenytoin, rifampin, other strong enzyme inducers</td><td>No change</td><td>No change</td></tr>
<tr><td>Cefazolin[1–5,10]</td><td>CrCl ≥ 35:<br>Mild/moderate: 1 g q8h<br>Severe: 2 g q8h</td><td>CrCl 10 – 34:<br>Mild/moderate: 0.5 g q12h<br>Severe: 1 g q12h</td><td>1 g q24h</td><td>1 g q24h<br>Dose daily, but after HD on HD days<br>alt: 2g/2g/3g post-HD only</td><td>2 g q12h</td></tr>
<tr><td>Cefepime[1–3,5,11,12]</td><td colspan="2"><table><tr><th colspan="4">Extended Infusion (4-hour infusion)</th></tr><tr><th></th><th>CrCl > 60</th><th>CrCl 30 – 60</th><th>CrCl < 30</th></tr><tr><td>General</td><td>1 g q8h or 2 g q12h</td><td>1 g q12h or 2 g q24h</td><td>1 g q24h</td></tr><tr><td>CNS/FN</td><td>2 g q8h</td><td>2 g q12h</td><td>1 g q12h</td></tr></table></td><td>General: 0.5 g q24h<br>CNS/FN: 1 g q24h</td><td>0.5 – 1 g q24h<br>Dose daily, but after HD on HD days<br>alt: 2 g post-HD only</td><td>2 g load, then 1 g q8h<br>– or –<br>2 g q12h</td></tr>
<tr><td>Ceftaroline[1,2,13]<br>(SHC Restriction)</td><td colspan="3"><table><tr><th></th><th>CrCl > 50</th><th>CrCl 30 – 50</th><th>CrCl 15 – 30</th><th>CrCl < 15</th></tr><tr><td>General</td><td>600 mg q12h</td><td>400 mg q12h</td><td>300 mg q12h</td><td>200 mg q12h</td></tr><tr><td>Endocarditis/ S.aureus bacteremia</td><td>600 mg q8–12h</td><td>400 mg q8–12h</td><td>300 mg q8–12h</td><td>200 mg q8–12h</td></tr></table></td><td>200 mg q8–12h<br>Endocarditis/S.aureus bacteremia: 200 mg q8–12h</td><td>No data</td></tr>
<tr><td>Ceftazidime (IV)[1–3]</td><td>Usual dose: 1 – 2 g q8h<br>Severe: 2 g q8h</td><td>CrCl 30 – 50: 1 – 2 g q12h<br>CrCl 16 – 30: 1 – 2 g q24h<br>CrCl 6 – 15: 0.5 – 1 g q24h</td><td>CrCl < 5: 0.5 g q24h</td><td>0.5 – 1 g q24h<br>Dose daily, but after HD on HD days<br>alt: 1 – 2 g q48–72h or post-HD only</td><td>2 g load, then 1 g q8h<br>– or –<br>2 g q12h</td></tr>
<tr><td>Ceftazidime/avibactam[1,2,14]<br>(SHC Restriction)</td><td>2.5 g q8h</td><td>CrCl 31 – 50: 1.25 g q8h<br>CrCl 16 – 30: 0.94 g q12h<br>CrCl 6 – 15: 0.94 g q24h</td><td>CrCl < 5: 0.94 g q48h</td><td>0.94 g q24–48h<br>Dose daily, but after HD on HD days</td><td>1.25 g q8h</td></tr>
</table>

<table>
<tr><th>Drug</th><th>CrCl > 50 mL/min</th><th>CrCl 10 – 50 mL/min</th><th>CrCl < 10 mL/min</th><th>Intermittent Hemodialysis (IHD)</th><th>CRRT</th></tr>
<tr><td>Ceftolozane/tazobactam[1,2,15,16]<br>(SHC Restriction)</td><td colspan="3"><table>
<tr><td></td><td><u>CrCl > 50</u></td><td><u>CrCl 30 – 50</u></td><td><u>CrCl 15 – 29</u></td><td><u>CrCl < 15</u></td></tr>
<tr><td>General/<br>CF exacerbation</td><td>1.5 g q8h</td><td>750 mg q8h</td><td>375 mg q8h</td><td rowspan="2">No data</td></tr>
<tr><td>Ventilator-associated pneumonia</td><td>3 g q8h</td><td>1.5 g q8h</td><td>750 mg q8h</td></tr>
</table></td><td>750 mg load, then 150 mg q8h<br>Administer dose immediately after dialysis on dialysis days</td><td>1.5 g IV q8h</td></tr>
<tr><td>Ceftriaxone (IV)[1,2,17]</td><td colspan="2">1 – 2 g q24h<br><u>Endovascular/osteomyelitis/PJI</u>: 2 g q24h<br><u>Meningitis, E. faecalis endocarditis</u>: 2 g q12h</td><td>No change</td><td>No change</td><td>No change</td></tr>
<tr><td>Cephalexin (PO)[1,2,18]</td><td>250 – 1000 mg q6h<br><u>Uncomplicated cystitis</u>:<br>500 mg q12h<br><u>Cellulitis/SSTI</u>: 500 mg q6h</td><td colspan="2"><u>CrCl 15 – 29</u>: 250 mg q8–12h<br><u>CrCl 5 – 14</u>: 250 mg q24h</td><td>500 mg q24h<br>Dose daily, but after HD on HD days</td><td>No data</td></tr>
<tr><td>Cefpodoxime (PO)[1,2]</td><td><u>Uncomplicated cystitis</u>:<br>100 mg q12h<br><u>CAP/bronchitis</u>: 200 mg q12h<br><u>Skin/skin structure</u>:<br>400 mg q12h</td><td colspan="2"><u>CrCl < 30</u>: same dose q24h</td><td>Same dose, post-HD only</td><td>No data</td></tr>
<tr><td>Ciprofloxacin (IV/PO)[1–4,19]</td><td colspan="3"><table>
<tr><td></td><td><u>CrCl > 50</u></td><td><u>CrCl 30 – 50</u></td><td><u>CrCl < 30</u></td></tr>
<tr><td>General infections</td><td>400 mg IV q12h<br>500 mg PO q12h</td><td>Same</td><td>400 mg IV q24h<br>500 mg PO q24h</td></tr>
<tr><td>Pseudomonas, severe</td><td>400 mg IV q8h<br>750 mg PO q12h</td><td>400 mg IV q8–12h<br>500 mg PO q12h</td><td>400 mg IV q24h<br>500 mg PO q24h</td></tr>
</table></td><td>200 – 400 mg IV q24h<br>250 – 500 mg PO q24h<br>Dose daily, but after HD on HD days</td><td>400 mg IV q12–24h<br>500 mg PO q12–24h<br><u>Septic pt > 90 kg on CVVHF/CVVHDF with A.baumannii or P.aeruginosa</u>:<br>400 mg IV q12–8h</td></tr>
<tr><td>Clindamycin[1,2]</td><td>600 – 900 mg IV q8h<br>150 – 450 mg PO q6h</td><td>No change</td><td>No change</td><td>No change</td><td>No change</td></tr>
<tr><td>Colistin (IV)[1–3,20–22]<br>(SHC Restriction)<br>(Dosage expressed in terms of colistin base activity [CBA]; Use ideal BW in obese)</td><td colspan="3">U.S. FDA Package Insert<table>
<tr><td></td><td><u>CrCl > 80</u></td><td><u>CrCl 50 – 79</u></td><td><u>CrCl 30 – 49</u></td><td><u>CrCl < 30</u></td></tr>
<tr><td>Loading Dose</td><td colspan="4">5 mg/kg x 1 (max dose: 300 mg)</td></tr>
<tr><td>Maintenance Dose</td><td>1.25 – 2.5 mg/kg q12h</td><td>1.25 – 1.9 mg/kg q12h</td><td>2.5 mg/kg q24h</td><td>1.5 mg/kg q36h</td></tr>
</table>
Preferred Dosing for Critically Ill Patients (Consult ID Pharmacist)<table>
<tr><td></td><td>CrCl</td><td>Dosing Regimen</td></tr>
<tr><td>Loading Dose</td><td>All CrCl<br>(including HD and CRRT)</td><td>= 4 x IBW (kg)<br>(max dose: 300 mg)</td></tr>
<tr><td rowspan="11">Maintenance Dose</td><td>> 90 mL/min</td><td>180 mg q12h</td></tr>
<tr><td>80 – 89 mL/min</td><td>170 mg q12h</td></tr>
<tr><td>70 – 79 mL/min</td><td>150 mg q12h</td></tr>
<tr><td>60 – 69 mL/min</td><td>138 mg q12h</td></tr>
<tr><td>50 – 59 mL/min</td><td>122 mg q12h</td></tr>
<tr><td>40 – 49 mL/min</td><td>110 mg q12h</td></tr>
<tr><td>30 – 39 mL/min</td><td>98 mg q12h</td></tr>
<tr><td>20 – 29 mL/min</td><td>88 mg q12h</td></tr>
<tr><td>10 – 19 mL/min</td><td>80 mg q12h</td></tr>
<tr><td>5 – 9 mL/min</td><td>72 mg q12h</td></tr>
<tr><td>0 mL/min</td><td>65 mg q12h</td></tr>
</table>
Suggested loading dose and daily doses of colistimethate for desired target colistin Css,avg of 2 mg/L (CID 2017:64. Nation et al)</td><td><u>Loading Dose</u>: 4 x IBW (kg)<br>(max dose: 300 mg)<br><u>Maintenance Dose</u>:<br>65 mg q12h; then supplement an additional 40 mg (for a 3-hr IHD session) or 50 mg (for a 4-hr IHD session) post-dialysis<br><u>alt</u>: 1.5 mg/kg q24h</td><td><u>Loading Dose</u>: 4 x IBW (kg)<br>(max dose: 300 mg)<br><u>Maintenance Dose</u>:<br>220 mg q12h<br><u>alt</u>: 2.5 mg/kg q24h</td></tr>
<tr><td>Daptomycin[1,2,23–29]<br>(SHC Restriction)<br>(Use adjusted BW in obese)</td><td><u>Skin/Soft tissue</u>:<br>6 mg/kg q24h<br><u>Bacteremia/Endovascular</u>:<br>8 mg/kg q24h<br>(If VRE, doses up to 10 – 12 mg/kg q24h; consult ID)</td><td><u>CrCl < 30</u>:<br>Same dose q48h</td><td>Same dose q48h</td><td>Same dose q48h<br>Dose q48h, but after HD on HD days<br><u>alt</u>: ≥ 6 mg/kg post-HD only or 6/6/9 mg/kg post-HD only</td><td>6 – 10 mg/kg q48h<br><u>alt</u>: 4 – 8 mg/kg q24h</td></tr>
<tr><td>Doxycycline (IV/PO)[1,2]</td><td>100 mg q12h</td><td>No change</td><td>No change</td><td>No change</td><td>No change</td></tr>
<tr><td>Ertapenem (IV/IM)[1,2]</td><td>1 g q24h</td><td><u>CrCl <30</u>: 500 mg q24h</td><td>500 mg q24h</td><td>500 mg q24h<br>Dose daily, but after HD on HD days</td><td>1 g q24h</td></tr>
<tr><td>Ethambutol (PO)[1,5,30,31]<br>(Use lean BW if obese)<br>(See footnote for lean BW equation)</td><td><u>Dose range</u>:<br>15 – 25 mg/kg/day<br>(max dose: 1,600 mg/day)<table>
<tr><td>Lean body weight</td><td>Dose</td></tr>
<tr><td>40 – 55 kg</td><td>800 mg</td></tr>
<tr><td>56 – 75 kg</td><td>1,200 mg</td></tr>
<tr><td>76 – 90 kg</td><td>1,600 mg</td></tr>
</table></td><td><u>CrCl 10 – 50</u>:<br>15 – 25 mg/kg q24–36h</td><td><u>CrCl < 10</u>:<br>15 – 25 mg/kg q48h</td><td>15 – 25 mg/kg 3 times per week post-HD<br>Administer after HD only</td><td>15 – 25 mg/kg q24–36h</td></tr>
<tr><td>Fidaxomicin (PO)[1,2]<br>(SHC Restriction)</td><td>200 mg q12h x 10 days</td><td>No change</td><td>No change</td><td>No change</td><td>No change</td></tr>
<tr><td>Fluconazole (IV/PO)[1–4,32]<br>Dose by indication. Load 800 mg for candidemia</td><td>200 – 400 mg q24h<br><u>C.glabrata candidemia</u>:<br>800 mg q24h<br><u>Severe/CNS infections</u>:<br>up to 800 mg q24h</td><td colspan="2">(50% of normal dose) q24h</td><td>Dose by indication;<br>200 – 800 mg post HD only</td><td>400 – 800 mg q24h</td></tr>
</table>

| Drug | CrCl > 50 mL/min | CrCl 10 – 50 mL/min | CrCl < 10 mL/min | Intermittent Hemodialysis (IHD) | CRRT |
|---|---|---|---|---|---|

**Foscarnet (IV)**[1,2,33–35]
**(Consider adjusted BW in obese)**

Adj CrCl (mL/min/kg)

$\left(\frac{140 - \text{age}}{\text{SCr} \times 72}\right) \times (0.85 \text{ if female})$

| CrCl (mL/min/kg) | CMV *induction* | | CMV *maintenance* | | HSV | |
|---|---|---|---|---|---|---|
| **> 1.4** | 60 mg/kg q8h | 90 mg/kg q12h | 90 mg/kg q24h | 120 mg/kg q24h | 40 mg/kg q12h | 40 mg/kg q8h |
| **> 1.0 – 1.4** | 45 mg/kg q8h | 70 mg/kg q12h | 70 mg/kg q24h | 90 mg/kg q24h | 30 mg/kg q12h | 30 mg/kg q8h |
| **> 0.8 – 1.0** | 50 mg/kg q12h | 50 mg/kg q12h | 50 mg/kg q24h | 65 mg/kg q24h | 20 mg/kg q12h | 35 mg/kg q12h |
| **> 0.6 – 0.8** | 40 mg/kg q12h | 80 mg/kg q24h | 80 mg/kg q48h | 105 mg/kg q48h | 35 mg/kg q24h | 25 mg/kg q12h |
| **> 0.5 – 0.6** | 60 mg/kg q24h | 60 mg/kg q24h | 60 mg/kg q48h | 80 mg/kg q48h | 25 mg/kg q24h | 40 mg/kg q24h |
| **≥ 0.4 – 0.5** | 50 mg/kg q24h | 50 mg/kg q24h | 50 mg/kg q48h | 65 mg/kg q48h | 20 mg/kg q24h | 35 mg/kg q24h |
| **< 0.4** | Not recommended | | Not recommended | | Not recommended | |
| **IHD** | 60 – 90 mg/kg loading dose, then 45 – 60 mg/kg/dose post-HD only | | No data | | No data | |
| **CRRT** | No data | | | | | |

**Ganciclovir (IV)**[1,2]
**(Consider adjusted BW in obese)**

| CMV | CrCl >70* | CrCl >50 | CrCl >25 | CrCl >10 | CrCl <10 |
|---|---|---|---|---|---|
| Induction (I) | 5 mg/kg q12h | 2.5 mg/kg q12h | 2.5 mg/kg q24h | 1.25 mg/kg q24h | 1.25 mg/kg 3x/week |
| Maintenance (M) | 5 mg/kg q24h | 2.5 mg/kg q24h | 1.25 mg/kg q24h | 0.625 mg/kg q24h | 0.625 mg/kg 3x/week |

*Manufacturer's CrCl cutoffs. **Please refer to BMT protocols if applicable**

| Intermittent Hemodialysis (IHD) | CRRT |
|---|---|
| I: 1.25 mg/kg post HD only<br>M: 0.625 mg/kg post HD only | I: 2.5 mg/kg q12–24h<br>M: 1.25 – 2.5 mg/kg q24h |

**Gentamicin**[1,3,36]
**(Use adjusted BW in obese)**
**See appendix for complete guidelines**

| | CrCl > 60 | CrCl 40 – 59 | CrCl 20 – 39 | CrCl < 20 | IHD | CRRT |
|---|---|---|---|---|---|---|
| **Gram negative** | 1.7 mg/kg q8h *or* 5 – 7 mg/kg q24h *(high-dose extended-interval)* | 1.7 mg/kg q12h *or* 5 – 7 mg/kg q36h *(high-dose extended-interval)* | 1.7 mg/kg q24h *or* CrCl > 30: 5 – 7 mg/kg q48h CrCl < 30: Not recommended *(high-dose extended-interval)* | 2 mg/kg loading dose, then per level | 2 mg/kg loading dose, then 1.5 mg/kg post HD | 1.5 – 2.5 mg/kg q24–48h |
| **Gram positive synergy** | 1 mg/kg q8h** | 1 mg/kg q12h | 1 mg/kg q24h | 1 mg/kg load, then by level | 1 mg/kg q48–72h; consider redosing when level < 1 mcg/L | 1 mg/kg q24h, then per level |

**Goal levels:** **Gram-negative infections:** Goal peak for traditional dosing 4 – 8 mcg/mL; goal trough < 1 – 2 mcg/mL
**Gram-positive synergy:** Goal peak 3 – 4 mcg/mL; goal trough < 1 mcg/mL

**Timing of levels:** Draw peak 30 minutes after completion of 3rd dose. Draw trough 30 minutes prior to 4th dose (For CrCl < 20 mL/min, may check levels sooner than 3rd/4th dose)
For 7 mg/kg once-daily dosing, draw a single random level 8 – 12 hours after dose administration. Adjust based on **Hartford nomogram**
For HD, draw trough pre-HD (alternative: draw trough level 4-hr post-HD); and peak 30 minutes after end of each infusion

** Streptococci, *Streptococcus gallolyticus (bovis), Streptococcus viridans* endocarditis: optional dosing 3 mg/kg q24h for CrCl > 60 mL/min
** Staphylococci; Enterococcus spp (strains susceptible to PCN and gentamicin) endocarditis: optional dosing 3 mg/kg in 2 or 3 equally divided doses

| Drug | CrCl > 50 mL/min | CrCl 10 – 50 mL/min | CrCl < 10 mL/min | Intermittent Hemodialysis (IHD) | CRRT |
|---|---|---|---|---|---|
| **Isavuconazole (IV/PO)**[1,2] **(SHC Restriction)** | Initial: 372 mg q8h x 6 doses<br>Maintenance: 372 mg q24h | No change | No change | No change | No change |
| **Isoniazid (PO)**[1,2,30,31] | 300 mg q24h (5 mg/kg/day) | No change | No change | No change | No change |

**Levofloxacin (IV/PO)**[1–4]

| | CrCl ≥ 50 | CrCl 20 – 49 | CrCl < 20 |
|---|---|---|---|
| General | 250 – 500 mg q24h | 250 mg q24h - or - 500 mg q48h | 500 mg x1, then 250 mg q48h |
| Severe/PNA/ Pseudomonas/ Stenotrophomonas: | 750 mg q24h | 750 mg q48h | 750 mg x1, then 500 mg q48h |

| Intermittent Hemodialysis (IHD) | CRRT |
|---|---|
| See CrCl < 20 ml/min<br>*Dose q48h, but after HD on HD days* | 750 mg load, then 250 – 750 mg q24h |

| Drug | CrCl > 50 mL/min | CrCl 10 – 50 mL/min | CrCl < 10 mL/min | Intermittent Hemodialysis (IHD) | CRRT |
|---|---|---|---|---|---|
| **Linezolid (IV/PO)**[1,2] **(SHC Restriction)** | 600 mg q12h | No change | No change | No change | No change |

**Meropenem**[1–4,37]
**(SHC Restriction)**
3-hr extended infusion

| | CrCl > 50 | CrCl 26 – 50 | CrCl 10 – 25 | CrCl < 10 |
|---|---|---|---|---|
| Usual dose (FN, PNA, Pseudomonas) | 0.5 – 1 g q8h | 0.5 – 1 g q12h | 0.5 g q12h | 0.5 g q24h |
| CF/Meningitis | 2 g q8h | 2 g q12h | 1 g q12h | 1 g q24h |

| Intermittent Hemodialysis (IHD) | CRRT |
|---|---|
| 500 mg q24h<br>CF/CNS: 1 g q24h<br>*Dose daily, but after HD on HD days* | 1 g q8–12h – or – 500 mg q6–8h<br>CF/CNS: 2 g q12h |

| Drug | CrCl > 50 mL/min | CrCl 10 – 50 mL/min | CrCl < 10 mL/min | Intermittent Hemodialysis (IHD) | CRRT |
|---|---|---|---|---|---|
| **Metronidazole (IV/PO)**[1,2] | 500 mg q6–8h | No change<br>Severe hepatic impairment: can consider 500 mg q12h | | 500 mg q8h | 500 mg q6–8h |
| **Moxifloxacin (IV/PO)**[1,2] | 400 mg IV/PO q24h | No change | No change | No change | No change |
| **Nafcillin**[1,2] | 2 g q4h<br>Mild infections: 1 g q4h | No change for renal impairment.<br>Hepatic Impairment: No specific dose adjustment provided by manufacturer. Dosage adjustment may be necessary in the setting of concomitant renal impairment; nafcillin primarily undergoes hepatic metabolism. | | | |

**Oseltamivir (PO)**[1,2,38]

| | CrCl ≥ 60 | CrCl 30 – 60 | CrCl 10 – 30 |
|---|---|---|---|
| Prophylaxis | 75 mg q24h | 30 mg q24h | 30 mg q48h |
| Treatment | 75 mg q12h | 30 mg q12h | 30 mg q24h |

| Intermittent Hemodialysis (IHD) | CRRT |
|---|---|
| Prophylaxis: 30 mg x 1, then 30 mg after every other HD session<br>Treatment: 30 mg x 1, then 30 mg post-HD only | Prophylaxis: 75 mg q24h<br>Treatment: 75 mg q12h |

| Drug | CrCl > 50 mL/min | CrCl 10 – 50 mL/min | CrCl < 10 mL/min | Intermittent Hemodialysis (IHD) | CRRT |
|---|---|---|---|---|---|
| **Penicillin G (IV)**[1–3,5] | 2 – 4 mu q4h<br>Dose range: 12 – 24 million units/day continuous infusion or in divided doses every 4 to 6 hours | 2 – 3 mu q4h | 1 – 2 mu q6h | Mild: 0.5 – 1 mu q4–6h; or 1 – 2 mu q8–12h<br>Severe: 2 mu q4–6h; or 4 mu q8–12h | 4 mu q4–6h |

<table>
<tr><th>Drug</th><th>CrCl > 50 mL/min</th><th>CrCl 10 – 50 mL/min</th><th>CrCl < 10 mL/min</th><th>Intermittent Hemodialysis (IHD)</th><th>CRRT</th></tr>
<tr><td>Piperacillin/tazobactam[1–4,39,40]</td><td colspan="3"><table>
<tr><td></td><td><u>CrCl > 40</u></td><td><u>CrCl 20 – 40</u></td><td><u>CrCl < 20</u></td></tr>
<tr><td colspan="4">Intermittent Dosing</td></tr>
<tr><td>General</td><td>3.375 g q6h</td><td>2.25 g q6h</td><td>2.25 g q8h</td></tr>
<tr><td>Severe/sepsis/CF/ nosocomial PNA</td><td>4.5 g q6h</td><td>3.375 g q6h</td><td>2.25 g q6h</td></tr>
<tr><td colspan="4">Extended-Infusion Dosing (4-hr infusion)</td></tr>
<tr><td>General, CF Pseudomonas, nosocomial PNA:</td><td colspan="2"><u>Extended infusion for CrCl > 20</u>:<br>3.375 – 4.5 g q8h over 4h*</td><td>3.375 g q12h over 4h</td></tr>
</table>*In select cases, higher piperacillin/tazobactam dosing may be warranted, e.g. sepsis, critically ill patients with severe or deep seated infections, infections with MIC > 16 mg/L, obesity with weight > 120kg or BMI > 40, CrCl > 120 mL/min, or enhanced drug clearance such as those with cystic fibrosis: consider doses of 4.5 g q8h (infused over 4 hours) or q6h.</td><td><u>General</u>: 2.25 g q12h<br><br><u>Severe infections</u>:<br>3.375 g q12h over 4-hr<br><br><u>alt</u>: 2.25 g q8h</td><td>3.375 g q6h<br><br><u>Extended infusion</u>:<br>3.375 – 4.5 g q8h over 4-hr</td></tr>
<tr><td>Polymyxin B[1,2,41]<br>(SHC Restriction)<br>(Use adjusted BW if obese)</td><td colspan="3">7,500 – 12,500 units/kg q12h<br>(maximum: 25,000 units/kg/day)</td><td>No data</td><td>No change</td></tr>
<tr><td>Posaconazole (PO/IV)[1,2]<br>(SHC Restriction [IV])</td><td colspan="3"><table>
<tr><td></td><td>Oral Suspension</td><td>Delayed-release tablet / Intravenous solution</td></tr>
<tr><td>Prophylaxis</td><td>200 mg q8h</td><td rowspan="2">300 mg q12h x 1 day, then 300 mg q24h</td></tr>
<tr><td>Treatment</td><td><u>Usual dose</u>: 200 mg q6–8h or 400 mg q12h</td></tr>
</table>No renal adjustment<ul><li>Delayed-release tablet and oral suspension are not interchangeable</li><li>Posaconazole levels shown to have great degree of interpatient variability. Consider drawing a trough 4 – 7 days after initiating dose</li></ul></td><td>No change</td><td>No change</td></tr>
<tr><td>Pyrazinamide (PO)[1,2,30,31]<br>(Use lean BW if obese)<br>(See footnote for lean BW equation)</td><td><u>Usual Dose</u>: 25 mg/kg q24h<br>(max dose: 2,000 mg/day)<table>
<tr><td>Lean body weight</td><td>Dose</td></tr>
<tr><td>40 – 55 kg</td><td>1,000 mg</td></tr>
<tr><td>56 – 75 kg</td><td>1,500 mg</td></tr>
<tr><td>76 – 90 kg</td><td>2,000 mg</td></tr>
</table></td><td colspan="2"><u>CrCl < 30</u>:<br>25 mg/kg 3 times per week</td><td>25 mg/kg 3 times per week<br>Administer after HD only</td><td>No data</td></tr>
<tr><td>Rifampin (IV/PO)[1,2,30,31,42–44]<br>Capsule size: 150mg, 300mg</td><td colspan="2"><u>TB</u>: 600 mg q24h (≤ 45 kg: 10 mg/kg q24h)<br><u>Endocarditis</u>: 300 mg q8h<br><u>PJI</u>: 300 – 450 mg q12h<br><u>Vertebral Osteomyelitis</u>: 600 mg q24h</td><td>No change</td><td>No change</td><td>No change</td></tr>
<tr><td>Tedizolid (IV/PO)[1,2,45]<br>(SHC Restriction)</td><td>200 mg q24h</td><td>No change</td><td>No change</td><td>No change</td><td>No change</td></tr>
<tr><td>Tobramycin[1,2,36]</td><td colspan="5">Refer to Gentamicin for dosing. See appendix for complete guidelines.</td></tr>
<tr><td>Trimethoprim (TMP)/ Sulfamethoxazole (IV/PO)[1,2,4,46]<br><br>(Dose by adjusted BW in obese)<br>SS = 80 mg TMP = 10 ml po soln<br>DS =160 mg TMP = 20ml po soln</td><td><u>Usual Dose Range</u>:<br>PO: 1 – 2 DS tabs q12–24h<br>IV: 8 – 20 mg/kg/day TMP divided q6–12h<br><br><u>UTI</u>: 1 DS tab PO BID<br><u>SSTI</u>: 1 – 2 DS tab PO BID<br><u>PCP/Stenotrophomonas</u>:<br>15 – 20 mg/kg/day TMP divided q6–8h (approximately 2 DS tab q8h)</td><td><u>CrCl 15 – 30</u>:<br>Administer 50% of recommended dose<br><br><u>PCP/Stenotrophomonas</u>:<br>7.5 – 10 mg/kg/day TMP divided q8–12h</td><td><u>CrCl < 15</u>:<br>Use is not recommended, but if needed for PCP/Stenotrophomonas:<br>5 – 10 mg/kg TMP q24h</td><td>2.5 – 5 mg/kg TMP q24h<br><br><u>PCP/Stenotrophomonas</u>:<br>5 – 10 mg/kg TMP q24h<br>Dose daily, but after HD on HD days<br><br><u>alt</u>: 5 – 20 mg/kg TMP post-HD only</td><td>5 – 10 mg/kg/day TMP divided q12h<br><br><u>PCP/ Stenotrophomonas</u>:<br>15 mg/kg/day TMP divided q8–12h</td></tr>
<tr><td>Valacyclovir (PO)[1,2]<br><br>Please refer to transplant protocols if applicable</td><td colspan="3"><table>
<tr><td></td><td><u>CrCl > 30</u></td><td><u>CrCl 10 – 30</u></td><td><u>< 10</u></td></tr>
<tr><td>VZV</td><td><u>CrCl >50</u>: 1 g q8h<br><br><u>CrCl 30-50</u>: 1 g q12h</td><td>1 g q24h</td><td>500 mg q24h</td></tr>
<tr><td>Genital herpes</td><td><u>Initial episode</u>: 1 g q12h<br><br><u>Recurrent episode</u>:<br>500 mg q12h</td><td><u>Initial episode</u>: 1 g q24h<br><br><u>Recurrent</u>: 500 mg q24h</td><td><u>Initial/recurrent episode</u>:<br>500 mg q24h</td></tr>
<tr><td>Herpes labialis</td><td><u>CrCl >50</u>:<br>2 g q12h x 2 doses<br><br><u>CrCl 30 – 50</u>:<br>1 g q12h x 2 doses</td><td>500 mg q12h x 2 doses</td><td>500 mg x 1 dose</td></tr>
</table></td><td>500 mg q24h<br>Dose daily, but after HD on HD days</td><td>No data</td></tr>
<tr><td>Valganciclovir (PO)[1,2]<br>Please refer to transplant protocols if applicable</td><td colspan="5"><table>
<tr><td></td><td><u>CrCl > 60</u></td><td><u>CrCl 40 – 59</u></td><td><u>CrCl 25 – 39</u></td><td><u>CrCl 10 – 24</u></td><td><u>CrCl < 10; IHD</u></td><td><u>CRRT</u></td></tr>
<tr><td>Induction (14-21 days)</td><td>900 mg q12h</td><td>450 mg q12h</td><td>450 mg q24h</td><td>450 mg q48h</td><td>200 mg 3x/week after HD only</td><td>No data</td></tr>
<tr><td>Maintenance/ prophylaxis</td><td>900 mg q24h</td><td>450 mg q24h</td><td>450 mg q48h</td><td>450 mg twice/week</td><td>100 mg 3x/week after HD only</td><td>No data</td></tr>
</table></td></tr>
<tr><td>Vancomycin (IV)[1,2,47,48]<br><br>(Use actual body weight; refer to Vancomycin Guide Appendix C for obesity dosing)</td><td colspan="3">Consider loading dose of 25 – 30 mg/kg (max 2.5 g) for severe infections and ICU<table>
<tr><td>CrCl (mL/min)</td><td>Dose & Frequency</td><td>Total daily dose range</td></tr>
<tr><td>> 90</td><td>15 mg/kg q8h to 15 – 20 mg/kg q12h</td><td>30 – 45 mg/kg/day</td></tr>
<tr><td>51 – 89</td><td>15 – 20 mg/kg q12h</td><td>30 – 40 mg/kg/day</td></tr>
<tr><td>30 – 50</td><td>15 mg/kg q12h to 20 mg/kg q24h</td><td>20 – 30 mg/kg/day</td></tr>
<tr><td>10 – 29</td><td>10 – 15 mg/kg q24h to 15 mg/kg q48h</td><td>7.5 – 15 mg/kg/day</td></tr>
<tr><td>< 10 or AKI</td><td>15 mg/kg x 1, then dose by level</td><td>N/A</td></tr>
</table>Goal trough 10 – 15 mcg/mL (cellulitis, skin/soft tissue infections)<br>Goal trough 15 – 20 mcg/mL (pneumonia, S. Aureus bacteremia, endocarditis, osteomyelitis)<br>Timing of levels: Draw trough < 30 minutes before 4th dose of new regimen. When SCr acutely rises, hold dose, restart when level < 15 – 20 mcg/mL<br>See appendix for complete guidelines</td><td>15 – 20 mg/kg x 1,<br>then redose per algorithm<br><br>(see Appendix E of Vancomycin per Pharmacy Protocol)</td><td>15 – 20 mg/kg x 1, then 10 – 15 mg/kg q24h<br><br>Draw level prior to 3rd dose. Adjust to levels</td></tr>
<tr><td>Vancomycin PO[1,2,49]</td><td colspan="3">Poor systemic absorption- used for the treatment of Clostridium difficile-associated diarrhea<br><u>Mild/moderate/severe</u>: 125 mg PO q6h<br><u>Severe complicated (CDI-related septic shock, ileus, toxic megacolon)</u>: 500 mg PO q6h</td><td>No change</td><td>No change</td></tr>
</table>

| Drug | CrCl > 50 mL/min | CrCl 10 – 50 mL/min | CrCl < 10 mL/min | Intermittent Hemodialysis (IHD) | CRRT |
|---|---|---|---|---|---|
| **Voriconazole (IV/PO)**[1,2,50,51] **(Dose by adjusted BW in obese)** | IV: 6 mg/kg IV q12h x 2, then 4 mg/kg IV q12h<br>PO: 400 mg PO q12h x 2, then 200 mg PO q12h | **IV→PO conversion 1:1 (round to nearest tablet size- available in 200 mg and 50 mg tablets)**<br>Caution with IV: accumulation of IV vehicle cyclodextran occurs. Consider PO if CrCl < 50 mL/min unless benefits justify risks of IV use.<br>Levels shown to have great degree of interpatient variability. Consider drawing a trough 4 – 7 days after new dose. | | | |

**Abbreviations**: SCr = serum creatinine; LD = loading dose; MU= million units; PNA = pneumonia; HD = hemodialysis; CAP = community acquired pneumonia; CRRT = continuous renal replacement therapy; TMP = trimethoprim; PCP: pneumocystis jiroveci pneumonia; TB = tuberculosis; UF = ultrafiltration

**CRRT dosing**: doses listed are for CVVHDF and CVVHD modalities, which are the most common modes at SHC. Note that these are generally higher than doses used in CVVH.

LBW (men) = (1.10 x Weight(kg)) - 128 x (Weight$^2$/(100 x Height(m))$^2$)

LBW (women) = (1.07 x Weight(kg)) - 148 x (Weight$^2$/(100 x Height(m))$^2$)

LBW online calculator: http://www.empr.com/medical-calculators/lean-body-weight-calculator/article/170219/

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**A. Original Author/Date**

Department of Pharmacy; 07/1998

**B. Gatekeeper**

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**C. Review and Renewal Requirement**

This document will be reviewed every three years and as required by change of law or practice

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Deepak Sisodiya, PharmD; 04/2005
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Katherine Miller, PharmD; 01/2009
Sean Carlton, PharmD; 03/2010
Emily Mui, PharmD; 11/2010, 03/2011, 05/2012, 05/2013, 01/2014, 03/2017
Lina Meng, PharmD; 11/2010, 03/2011, 03/2017
Marisa Holubar, MD; 03/2017
Stan Deresinski, MD; 03/2017

**E. Approvals**

**Antimicrobial Subcommittee** 09/2004, 04/2007, 01/2009, 11/2010, 03/2011, 05/2012, 05/2013, 01/2014, 03/2017
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