Stanford Medication Usage Guide
Polymyxin B & Colistin

What: Polymyxin B is preferred over Colistin (polymyxin E) for non-urinary infections due to multidrug resistant gram-negative bacilli at Stanford Health Care.

SHC formulary restriction criteria – Polymyxin B
1. Infectious Disease Consultation and ID recommendation for use
2. Cystic Fibrosis team

SHC formulary restriction criteria – Colistin
1. Treatment of urinary tract infections
2. Inhalation route

Why: Polymyxin B and Colistin (polymyxin E) have the same spectrum of activity. However, Polymyxin B has favorable clinical pharmacologic properties compared to Colistin
   o Polymyxin B is an active drug that is minimally excreted in urine, whereas Colistin is excreted in the urine as the prodrug colistimethate sodium (CMS). CMS is converted in vivo and has variable and slow (hours) conversion to the active moiety; lower renal clearance allows more time for this conversion to occur, leading to higher levels of active drug.
   o Polymyxin B may be less nephrotoxic

How: Polymyxin B and Colistin dosing is NOT interchangeable
   o Polymyxin B is usually dosed by “unit”, not “mg”
   o Note that with Polymyxin B, each 500,000 units is diluted in 300-500mL: a typical dose may result in 1L of fluid
   o Caution with colistin MIC ≥ 2; CLSI has no established MIC breakpoint for susceptible; MIC breakpoint for intermediate is ≤2 for Enterobacterales, P.aeruginosa, and Acinetobacter spp.
   o For severe infections, colistin and polymyxin B should be used in combination with other ABX. Treatment guidance from IDSA (link 1, link 2)

Monitoring: Neurotoxicity
   o May occur in 1st few days of therapy and may be dose or infusion-rate dependent. May include dizziness, muscle weakness, confusion, headache, visual disturbances, ataxia, paresthesias.
   o Mild ADEs are usually benign and reversible upon discontinuing polymyxin
   o Management: slow the infusion, lower the dose
### Dosing

<table>
<thead>
<tr>
<th>Route</th>
<th>Dosing</th>
<th>IHD CRRT</th>
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</thead>
<tbody>
<tr>
<td><strong>Polymyxin B</strong>&lt;br&gt;Use actual body weight; adjusted body wt for obese</td>
<td>IV&lt;br&gt;20,000 to 25,000 units/kg loading dose, followed by 12,500 units/kg IV Q12H; caution with single doses &gt; 2,000,000 units</td>
<td>No dose adjustment needed</td>
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<tr>
<td><strong>Colistin</strong>&lt;br&gt;Use ideal body weight&lt;br&gt;Doses expressed in colistin base activity (CBA)</td>
<td>IV&lt;br&gt;Preferred Dosing for Critically Ill Patients (<em>Consult ID Pharmacist</em>)&lt;br&gt;Suggested loading dose and daily doses of colistimethate for desired target colistin Css,avg of 2 mg/L</td>
<td>300mg CBA load followed by 180mg CBA on either HD days or 130mg CBA on nondialysis days</td>
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<tr>
<td>Loading Dose</td>
<td>CrCl</td>
<td>Dosing Regimen</td>
</tr>
<tr>
<td>&gt; 90 mL/min</td>
<td>180 mg q12h</td>
<td>&lt;br&gt;300mg CBA load followed by 220mg CBA Q12H</td>
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<tr>
<td>80 – 89 mL/min</td>
<td>170 mg q12h</td>
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<tr>
<td>70 – 79 mL/min</td>
<td>150 mg q12h</td>
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<tr>
<td>60 – 69 mL/min</td>
<td>138 mg q12h</td>
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<tr>
<td>50 – 59 mL/min</td>
<td>122 mg q12h</td>
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<tr>
<td>40 – 49 mL/min</td>
<td>110 mg q12h</td>
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<tr>
<td>30 – 39 mL/min</td>
<td>98 mg q12h</td>
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<td>20 – 29 mL/min</td>
<td>88 mg q12h</td>
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<tr>
<td>10 – 19 mL/min</td>
<td>80 mg q12h</td>
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<tr>
<td>5 – 9 mL/min</td>
<td>72 mg q12h</td>
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<tr>
<td>0 mL/min</td>
<td>65 mg q12h</td>
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<tr>
<td>Inhalation</td>
<td>150 mg inhalation Q12H</td>
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</tbody>
</table>

**Conversions:**
- Colistimethate sodium 1 mg = ~12,500 units of colistimethate sodium
- Colistimethate sodium ~2.67 mg = 1 mg of colistin base activity
- 1 mg colistin base activity (CBA) = 30,000 IU colistin
- 1 mg polymyxin B = 10,000 IU polymyxin B

### Document Information:

**A.** Original Author/Date: Lina Meng, PharmD, BCPS, BCCCP, Emily Mui, PharmD, BCPS, Stan Deresinski, MD, 02/2015

**B.** Gatekeeper: Antimicrobial Stewardship Program

**C.** Review and Renewal Requirement
   This document will be reviewed every three years and as required by change of law or practice

**D.** Revision/Review History: 11/2017, 3/2022

**E.** Approvals
   2. P&T: 12/2017, 4/2022 pending
References:

1. Micromedex online, accessed 2/17/2016, Lexicomp online, accessed 12/20/2021
12. Table 2A. Zone Diameter and MIC Breakpoints for Enterobacterales, Table 2B-1. Zone Diameter and MIC Breakpoints for Pseudomonas aeruginosa, Table 2B-2. Zone Diameter and MIC Breakpoints for Acinetobacter spp. CLSI M100-ED31:2021 Performance Standards for Antimicrobial Susceptibility Testing, 31st Edition

Summary of changes:

3/1/2022:
- Migrated colistin dosing info from ABX Dosing card to SMUG
- Added CLSI info on new breakpoints
- Updated PolyB dosing
- Added explanation of polymyxin B’s vs Colistin’s PK and activity in urine