## ESBL + Treatment Options

<table>
<thead>
<tr>
<th>Non-UTI Diagnoses</th>
<th>Carbapenems: Drugs of choice for ESBL + infections unless sensitivities show resistant or intermediate.</th>
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</thead>
<tbody>
<tr>
<td><em>Antibiotics NOT listed are currently considered inferior options and cannot be routinely recommended even if the culture is “sensitive”.</em></td>
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<td><strong>Carbapenems:</strong> Drugs of choice for ESBL + infections unless sensitivities show resistant or intermediate.</td>
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<td><strong>Meropenem 2 grams IV q8hrs (extended infusion): $46/day</strong></td>
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<td><strong>Ertapenem 1 gram IV daily is a good outpatient option (not for use with pseudomonas). High cost precludes inpatient use: $74/day</strong></td>
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<td><strong>Piperacillin/tazobactam:</strong> High dose (4.5 grams IV q8hrs extended infusion) may be considered as second line behind a carbapenem if the culture is sensitive <em>in vitro</em>. Outcomes are best if MIC ≤ 2: $17/day</td>
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<td><strong>May consider addition of treatment dose amikacin to the piperacillin/tazobactam regimen, especially if MIC &gt; 2 or in severe disease: $20/day</strong></td>
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<td><strong>Cefepime:</strong> Available data is conflicting. High dose (2 grams IV q8hrs) has been shown to be effective by some studies when sensitive <em>in vitro</em>; resistance can emerge during therapy. Consider as a 3rd-4th line option. Treatment failure is more likely with <em>K. pneumonia</em> than other ESBL+ organisms: $20/day</td>
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<td><strong>Addition of treatment dose amikacin is likely to increase therapy response, and is recommended if cefepime is to be used: $20/day</strong></td>
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<td><strong>Tigecycline:</strong> Good <em>in vitro</em> susceptibilities, but data is limited. Dose: 100mg IV x1, then 50mg IV q12hrs (100mg IV q12hrs may be prudent for ESBL+ pneumonia). It carries a black box warning for increased mortality compared to other agents, so not typically considered a 1st line choice: $180/day</td>
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<td><strong>Drug distribution in vivo suggests limited use for UTI and bacteremia (highly distributed to tissues).</strong></td>
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<td><strong>Colistin:</strong> Some case reports with positive results, but limited data. Susceptibility confirmation via E-test is recommended.</td>
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Updated by Justin Jellison, PharmD
Approved by ASP Committee
Last Revision Date November 2014
**UTI Diagnoses**

*Antibiotics NOT listed are currently considered inferior options and cannot be routinely recommended even if the culture is “sensitive”*

- **Carbapenems:** Drugs of choice for ESBL + infections unless sensitivities show resistant or intermediate.
  - Meropenem 500mg IV q6hrs (extended infusion): $19/day
  - Ertapenem 1 gram IV daily is good outpatient option (not for use with pseudomonas). High cost precludes inpatient use: $74/day
- **Piperacillin/tazobactam:** Outcomes similar to carbapenems when MIC ≤ 4. Consider as second line if MIC 4-16. Avoid use if MIC > 16.
  - 3.375 grams IV q8hrs (extended infusion) if MIC ≤ 2: $12/day
  - 4.5 grams IV q8hrs (extended infusion) if MIC 4-16: $17/day
- **Fosfomycin:** Useful for UTI, NOT useful for pyelonephritis due to poor drug distribution. Sensitivities are not readily available at most institutions: most studies report >95% susceptible to ESBL+ *E.coli*, while ESBL+ *K. pneumonia* ranges from 80-93% susceptible. SNF residents should be expected to have lower susceptibilities.
  - Uncomplicated UTI: 3 grams PO x1 dose: $157/dose
  - Complicated UTI: 3 gram PO q48hrs x3 doses: $157/dose
  - Suggested usage:
    - Outpatient treatment of ESBL+ UTI in ambulatory patients (Ertapenem may be a better option for SNF residents)
    - Inpatient treatment of ESBL+ UTI if meropenem and piperacillin/tazobactam are not appropriate (see above)
    - Inpatient treatment of ESBL+ UTI if it allows for early discharge (e.g. patient in hospital only to receive IV antibiotics for a UTI)
- **Nitrofurantoin:** Clinical cure rates are lower for nitrofurantoin than above agents; it should be considered a 2nd-3rd line agent. *Not recommended for patients with CrCl < 60.*
  - Dose: 50mg PO q6hrs (100mg PO BID for MacroBid®): $1.50/day
- **Cefepime:** Available data is conflicting. High dose (2 grams IV q8hrs) has been shown to be effective by some studies when sensitive *in vitro*; resistance can emerge during therapy. Consider as a 3rd-4th line option. Treatment failure is more likely with *K. pneumonia* than other ESBL+ organisms: $20/day
  - Addition of treatment dose amikacin is likely to increase therapy response, and is recommended if cefepime is to be used: $20/day
References