Facilitating the everyday steward: Impact of mandatory antimicrobial indication/duration and a 48 hour time out

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Facilitating the Everyday Steward: Impact of Mandatory Antimicrobial Indication/Duration and a 48 Hour Time Out

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Background
- Mandatory antimicrobial indication, duration, and a 48 hour time out are integral parts of antimicrobial stewardship standards put forth by accrediting and professional organizations.
- Limited data are available to demonstrate an effect on antimicrobial utilization and stewardship practice of these practices.
- Children’s Mercy Kansas City (CMH) is a 367-bed academic pediatric medical center located in Kansas City, Missouri, which provides care to a 5-state region.
- The antimicrobial stewardship program (ASP) at CMH was established on March 3, 2008, with the primary focus of optimizing broad spectrum antimicrobial use.
- To align with ASP standards, mandatory antimicrobial indications/durations and a pharmacist-driven 48 hour antimicrobial time out were implemented on February 14, 2017.

Objectives
- Evaluate the impact of mandatory indicated duration along with a pharmacist-driven 48 hour time out on antibiotic utilization and ASP interventions.

Methods
- A retrospective evaluation of ASP interventions and antimicrobial use was performed between February 1, 2016, to January 31, 2018.
- Pre-and post-implementation utilization rates were measured for antibiotic days of therapy (DOT) per 1000 patient days using Poison models and seasonal decomposition analyses to account for seasonal variability.

Results
- Table 1. Antibiotic DOT per 1000 Patient Days Pre-and Post-Implementation

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Pre-Implementation</th>
<th>Post-Implementation</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amoxicillin</td>
<td>40</td>
<td>36</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Cefazolin</td>
<td>40</td>
<td>37</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Cindamycin</td>
<td>38</td>
<td>36</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Vancomycin</td>
<td>43</td>
<td>43</td>
<td>0.696</td>
</tr>
<tr>
<td>Ceftiraxone</td>
<td>47</td>
<td>43</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Meropenem</td>
<td>9</td>
<td>7</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

- Not monitored by the CMH ASP

- Table 2. ASP Interventions Per Indication Pre-and Post-Implementation

<table>
<thead>
<tr>
<th>Infectious Indication</th>
<th>Pre-Implementation (%)</th>
<th>Post-Implementation (%)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 or More</td>
<td>30</td>
<td>18</td>
<td>0.01</td>
</tr>
<tr>
<td>Bacteremia</td>
<td>17</td>
<td>13</td>
<td>0.24</td>
</tr>
<tr>
<td>Bone &amp; Joint</td>
<td>7</td>
<td>0</td>
<td>0.49</td>
</tr>
<tr>
<td>CAP</td>
<td>38</td>
<td>39</td>
<td>0.39</td>
</tr>
<tr>
<td>Cardiovascular</td>
<td>6</td>
<td>8</td>
<td>0.84</td>
</tr>
<tr>
<td>CNS</td>
<td>13</td>
<td>13</td>
<td>1.00</td>
</tr>
<tr>
<td>ENT</td>
<td>25</td>
<td>23</td>
<td>0.73</td>
</tr>
<tr>
<td>Febrile Neutropenia</td>
<td>5</td>
<td>2</td>
<td>0.49</td>
</tr>
<tr>
<td>Gastrointestinal</td>
<td>21</td>
<td>21</td>
<td>1.00</td>
</tr>
<tr>
<td>Gentamicin</td>
<td>29</td>
<td>35</td>
<td>0.25</td>
</tr>
<tr>
<td>Neonatal Fever</td>
<td>7</td>
<td>6</td>
<td>0.54</td>
</tr>
<tr>
<td>Prophylaxis</td>
<td>4</td>
<td>3</td>
<td>1.00</td>
</tr>
<tr>
<td>Respiratory (non-CAP)</td>
<td>18</td>
<td>16</td>
<td>0.64</td>
</tr>
<tr>
<td>Sepsis</td>
<td>8</td>
<td>13</td>
<td>0.02</td>
</tr>
<tr>
<td>SSTI</td>
<td>18</td>
<td>18</td>
<td>0.01</td>
</tr>
<tr>
<td>Surgical</td>
<td>1</td>
<td>2</td>
<td>0.31</td>
</tr>
</tbody>
</table>

Conclusions
- Implementation of additional stewardship practices, including mandatory antimicrobial indication/duration and a 48 hour time out, decreased the use of antibiotics at our institution, including those not monitored by our ASP.
- These efforts augmented, but did not replace existing stewardship efforts as demonstrated by no change in our ASP intervention rate.
- These results support initiatives highlighted by national organizations to minimize antimicrobial use through ASP.

Limitations
- Cefepime and piperacillin/tazobactam, both frequently utilized at our institution, were excluded due to the impact of drug shortages.
- Practice changes (i.e., post-operative antibiotic use) may have impacted antibiotic DOT.
- Cost savings was not assessed.

References