Assessing the effect of an electronic health record order entry guideline on duration of outpatient antimicrobial therapy prescribed for uncomplicated urinary tract infections

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Assessing the effect of an electronic health record order entry guideline on duration of outpatient antimicrobial therapy prescribed for uncomplicated urinary tract infections

Kasey Rubin, PharmD; Chelsea Houshour PharmD, BCACP; Christine Doran PharmD, BCACP, MBA

**Background**

- Fifty percent of antibiotics prescribed in the outpatient setting are unnecessary.
- Outside of unnecessary prescribing, the antibiotics chosen can be incorrect with an inappropriate duration of therapy.
- It has been estimated that resistant infections affect nearly 3 million Americans annually and are the cause of 35,000 deaths each year with added costs up to $33.2 billion dollars.
- The Centers for Disease Control (CDC) recommends that outpatient antimicrobial stewardship programs identify "high priority conditions."
- Examples of high priority conditions include acute respiratory infections, urinary tract infections (UTI) and skin and soft tissue infections (SSTI).
- Antibiotics are not associated with a diagnosis code and no specific guidance provided on duration in EHR.
- Providence St. Joseph Health (PSJH) created an outpatient antimicrobial stewardship guideline to assist with prescribing practices of antimicrobials in the outpatient setting. This guideline will be integrated into the electronic health record (EHR) at order entry.
- The PSJH guidelines are based on guideline directed therapy by Infectious Diseases Society of America (IDSA) and American Academy of Family Physicians (AAFP) among others.

**Methods**

- Study design
  - Retrospective/Prospective
  - Pre-intervention: November 2020 – January 2021
  - Post-intervention: To be determined
- Primary Outcome
  - Duration of therapy for uncomplicated UTIs measured in days
- Secondary Outcome
  - Percentage of appropriate prescriptions based on guideline directed therapy
- Inclusion criteria
  - >18 years old
  - Diagnosis code of N.39 within the designated time frame at PMG primary care clinics and urgent/primary care clinics
  - All encounter types: office visit, telephone, virtual, MyChart, orders only
- Exclusion criteria
  - Antibiotics prescribed within 30 days at the time of index date
  - Patients who were/are pregnant at the time antibiotic prescription
  - Patients with complicated UTIs, chronic UTIs or pyelonephritis

**Results**

**Baseline Characteristics (N=100)**

<table>
<thead>
<tr>
<th>Excluded (n=23)</th>
<th>Included (n=77)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excluded (n=23)</td>
<td>Included (n=77)</td>
</tr>
<tr>
<td>Pregnant</td>
<td>1</td>
</tr>
<tr>
<td>Patients &lt;18</td>
<td>2</td>
</tr>
<tr>
<td>Antibiotics within 30 days</td>
<td>20</td>
</tr>
<tr>
<td>GFR &gt;60</td>
<td>57</td>
</tr>
<tr>
<td>GFR 30-44</td>
<td>4</td>
</tr>
<tr>
<td>Sex (F)</td>
<td>66</td>
</tr>
<tr>
<td>Catheter?</td>
<td>2</td>
</tr>
</tbody>
</table>

**Percentage of Patients with Allergies to Antimicrobials in Secondary Outcome Sample**

<table>
<thead>
<tr>
<th>Percentage</th>
<th>NONE</th>
<th>BETA-LACTAMS</th>
<th>SULFA</th>
<th>OTHER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antimicrobial</td>
<td>48.10%</td>
<td>28.60%</td>
<td>11.60%</td>
<td>11.70%</td>
</tr>
</tbody>
</table>

**Percentage of Prescribed Antimicrobials for Uncomplicated UTI in Secondary Outcome Sample**

<table>
<thead>
<tr>
<th>Percentage</th>
<th>BETA-LACTAMS</th>
<th>NITROFURANTION</th>
<th>TMP/SMX</th>
<th>FQN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antimicrobial</td>
<td>24.60%</td>
<td>31.20%</td>
<td>29.90%</td>
<td>3.30%</td>
</tr>
</tbody>
</table>

**Pre-Intervention Average Day Supply for Uncomplicated UTI**

<table>
<thead>
<tr>
<th>Antimicrobials</th>
<th>Beta-Lactams</th>
<th>Nitrofurantoin</th>
<th>TMP/SMX</th>
<th>FQN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Day Supply</td>
<td>5.8</td>
<td>6.4</td>
<td>5</td>
<td>5.3</td>
</tr>
</tbody>
</table>

**Limitations**

- The guideline has not been uploaded due to system delays with pandemic
- The sample selected for evaluating secondary outcomes was not randomized. Instead, patients were selected if they were prescribed an antibiotic that is not first-line or for a longer duration than generally recommended
- Selective sample size to identify trends in prescribing patterns which lead to more TMP/SMX and FQNs prescriptions
  - Ex: FQNs prescribed for 7 days
  - Ex: TMP/SMX prescribed for 5-7 days
- A future limitation of this study is providers choosing to not utilize the guideline resulting in no change in prescribing patterns

**Next Steps**

- Collect data once EHR guideline is implemented to determine post-intervention prescribing patterns
- An opportunity exists for clinic pharmacists to educate providers on UTI prescribing practices
- Analyze results utilizing ANOVA statistical testing
- Associate prescribed antibiotics with appropriate and accurate diagnosis codes

**References**

1. Marcelin JR., Chung Philip., Schooneveld TC., Antimicrobial stewardship in the outpatient setting: a review and proposed framework. Infection Control & Hospital Epidemiology. 2020; 41: 833-840

**Disclosures**

Kasey Rubin - nothing to disclose
Chelsea Houshour - nothing to disclose
Christine Doran - nothing to disclose