Background: An antimicrobial indication system was implemented in the electronic medical record at a 450-bed community teaching hospital in the Midwest in November of 2019 in order for the healthcare team to more easily assess antimicrobial appropriateness. With this system, providers are required to choose an indication from a pre-populated list for every antimicrobial that is ordered. Methods: This is a retrospective chart review study using data from April 1-April 30, 2020. All antimicrobials administered to patients aged 0-99 during the timeframe were included in the analysis with no other exclusion criteria. The indication selected by the physician using the electronic health record was compared with the antimicrobial selected and assessed for appropriateness based on institution-specific protocols, professional society treatment guidelines, FDA approved indications, patient specific factors, and various other studies. Antimicrobials were considered inappropriate if they were not possibly able to treat the selected indication based on pharmacokinetic or pharmacodynamic principles, or if the dosage form of the antimicrobial in question did not match the selected indication. Antimicrobials were not required to be first line therapy options to be considered appropriate. Results: Chart review for appropriateness was completed on 4178 antimicrobials administered within the timeframe. 8 orders (0.19%) were found to be inappropriate and 4170 orders (99.81%) were deemed appropriate. Orders deemed inappropriate included one order for vancomycin IV for Clostridioides difficile infection, two orders for aztreonam IV for Clostridioides difficile infection, one order for oral vancomycin for intra-abdominal infection, two orders for linezolid IV for oral stepdown therapy, and two orders for micaefugin IV for urinary tract infection. Conclusion: The vast majority of antimicrobials ordered in a one-month time span were appropriate (99.81%) when compared to the indication selected from a pre-populated list upon order entry.

**Methods**

Retrospective chart review study

<table>
<thead>
<tr>
<th>Inclusion Criteria</th>
<th>Exclusion Criteria</th>
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<tbody>
<tr>
<td>Patient age ≥ 18.</td>
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<tr>
<td>Received an antimicrobial medication between April 1, 2020, and April 30, 2020.</td>
<td>Antimicrobial was ordered but never administered.</td>
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In this study, the indication selected by the physician using the electronic health record was compared with the antimicrobial selected and assessed for appropriateness based on institution-specific protocols, professional society treatment guidelines, FDA approved indications, patient specific factors, and various other studies.

**Indications Available for Selection**

- **Community/Acute Care**
  - Infection: Fever/Sepsis, MRSA pneumonia, urinary tract infection, Clostridioides difficile
  - Admission: MRSA, SSI, surgical site infection
  - CAP: Beta-lactam allergy, aztreonam, MRSA, vancomycin, linezolid
  - Clostridioides difficile: Treated, multi-drug resistant organism, Upper Respiratory Tract infection
  - O/R: Infection: Immune suppressed, Other, Urinary tract infection
  - Cytomegalovirus: Intra-abdominal infection, Pneumonia, Community Acquired
  - Endocarditis: Lactam antibiotic prophylaxis, Pneumonia, HAP/VAP
  - Bacterial meningitis: beta-lactam allergy
  - Documented diagnosis: Multi-drug resistant gram negative organism
  - Documented seizure: ALLERGY to penicillin or cephalosporin
  - Documented severe: INFECTION (pneumonia, bacteremia, sepsis, cellulitis)
  - Other: Cerebral abscess, urinary retention, multi-drug resistant organism

**Antimicrobials were considered inappropriate if they were not possibly able to treat the selected indication based on pharmacokinetic or pharmacodynamic principles, or if the dosage form of the antimicrobial in question did not match the selected indication.**

Antimicrobials were not required to be first line therapy options to be considered appropriate.

**Results**

Chart review for appropriateness was completed on 4178 antimicrobials administered within the timeframe.

Of the 4178 orders assessed, 8 orders (0.19%) were found to be inappropriate and 4170 orders (99.81%) were deemed appropriate.

Orders deemed inappropriate included:

- 1 order of vancomycin IV for *Clostridioides difficile* infection
- 2 orders of aztreonam IV for *Clostridioides difficile* infection
- 8.8% of *Clostridioides difficile* infection orders inappropriate (n = 34)
- 1 order of oral vancomycin for intra-abdominal infection
- 0.4% of intra-abdominal infection orders inappropriate (n = 284)
- 1 order of linezolid IV for MRSA pneumonia oral stepdown therapy
- 33.3% of MRSA pneumonia oral stepdown therapy orders inappropriate (n=3)
- 1 order of linezolid IV for MRSA SSTI oral stepdown therapy
- 100% of MRSA SSTI oral stepdown therapy orders inappropriate (n=1)
- 2 orders of micaefugin IV for urinary tract infection
- 0.5% of genitourinary infection orders inappropriate (n=418)

**Conclusions**

The vast majority of antimicrobials ordered in a one-month time span were appropriate (99.81%) when compared to the indication selected from a pre-populated list upon order entry. MRSA oral stepdown therapy indications had the highest percentage of inappropriate orders; however, this may be falsely inflated due to low sample size of these indications.

Targeted education regarding proper treatment of *Clostridioides difficile* infection is most warranted.