Validating a Hospitalist-Specific Antibiotic Prescribing Metric across Four Acute Care Hospitals

EMORY UNIVERSITY SCHOOL OF MEDICINE
Department of Medicine

J Howard-Anderson,[1] C Nys,[2*] J Kubes,[2] WC Dube,[1] B Albrecht,[2] KA Jones,[2] H Shabbir,[3] JT Jacob,[1] Z Wiley,[1] SK Fridkin[1]

1. Division of Infectious Diseases, Emory University School of Medicine 2. Emory Healthcare 3. Division of Hospital Medicine, Emory University School of Medicine * Now at Duke University Hospital

Introduction

- Peer comparison has been shown to reduce unnecessary antibiotic prescribing in the outpatient setting
- No prescribing metric has been validated for inpatient peer comparison
- This study aimed to evaluate if an electronically derived, hospitalist-specific, antibiotic prescribing metric correlated with indicated antibiotic days in hospitalized patients

Methods

- We previously created a hospitalist-specific antibiotic use metric (ratio of NHSN-defined broad-spectrum antibiotic days to billed patient-days) that is risk adjusted based on patient-mix and provides an observed:expected [O:E]) metric for providers
- Data from May-Oct 2019 at four Emory hospitals
- Identified outlier hospitalists prescribing in the top (high O:E) and bottom (low O:E) 15th percentile
- Randomly selected 10 days of antibiotic administration from each outlier provider and chart reviewed days with > 2 consecutive antibiotic DOT
- For pneumonia, COPD, or UTI we determined if each day of antibiotics was indicated, assuming the diagnosis was accurate
- We compared high vs. low O:E providers and used regression modeling to determine if the metric predicted indicated days of antibiotics

Results

- Among 997 days reviewed, **high O:E providers had a greater proportion of days with > 2 prior days of antibiotics** (60%) compared to low O:E providers (54%, p = 0.03)
- In the subset of days with patients receiving > 2 days of antibiotics (n = 569), high O:E providers had more patient-days with longer hospital stays, diabetes and Charlson comorbidity index >3, and fewer days supervising residents/APPs compared with low O:E providers ((Table 1)
- For diagnoses of pneumonia, COPD exacerbation or UTI (n = 260, 25%), 91% of antibiotics were within appropriate duration criteria
- After controlling for days of hospitalization, CCI, immunocompromised status, and supervisory role, **a high O:E was not associated with indicated antibiotic use based on *a priori* determined duration criteria (OR 0.5, 95% CI 0.2 – 1.3)**

Table 1: Description of days with a patient on > 2 days of antibiotics

Characteristics	Days from high O:E providers (n = 308) N (%)	Days from low O:E providers (n = 261) N (%)	P-value
Age, median (IQR)	66 (52 – 76)	63 (47 – 79)	0.54
Female	159 (52)	140 (54)	0.6
Race			0.2
White	156 (51)	145 (56)	
Black	130 (42)	96 (37)	
Asian or Other	22	20	
Charlson comorbidity index >3	**172 (56)**	**123 (47)**	**0.04**
Diabetes	**138 (45)**	**91 (35)**	**0.02**
Immunocompromised	50 (16)	57 (22)	0.09
Days hospitalized prior to review, median (IQR)	**5 (3 – 9)**	**4 (2 – 6)**	**<0.001**
Number of antibiotics received that day			0.1
1	145 (47)	125 (48)	
2	140 (45)	105 (40)	
>2	22 (7)	31 (12)	
Hospitalist supervising a resident or APP	**18 (6)**	**36 (14)**	**< 0.01**
Infectious disease consult	107 (35)	104 (40)	0.2
Primary reason for antibiotics			0.14
CAP	43 (14)	40 (15)	
HAP or VAP	11 (4)	4 (2)	
UTI or pyelonephritis	82 (27)	74 (28)	
Sepsis or fever of unclear origin	10 (3)	9 (3)	
Skin and skin structure infection	70 (23)	50 (19)	
Abdominal infection	44 (14)	24 (9)	
Other	48 (16)	60 (23)	

Conclusions

- A high hospitalist antibiotic prescribing metric (O:E) correlated with patients receiving > 2 consecutive days of antibiotics on any given day
- For common infectious diagnoses (pneumonia, COPD, UTI) the prescribing metric was not associated with an excess duration of antibiotics on any given day
- Evaluating indicated antibiotic use by validating diagnoses and not duration alone may improve metric performance and be important for further stewardship interventions

J.H.A is currently supported by the Antibacterial Resistance Leadership Group fellowship [National Institute of Allergy and Infectious Diseases UM1AI104681]. The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH.

Contact: Jrhowa4@emory.edu
@JessH_A