

Title: Do hospitalists prescribing high (risk-adjusted) rates of antibiotics do so repeatedly?

Authors:

Udodirim Onwubiko, MBBS MPH, Emory University, Atlanta, GA, USA
Christina Mehta, PhD MSPH, Emory University School of Medicine, Atlanta, GA, USA
Zanthia Wiley, MD, Emory University School of Medicine, Atlanta, GA, USA
Jesse Jacob, MD, Emory University School of Medicine, Atlanta, GA, USA
K. Ashley Jones, PharmD, Emory Healthcare, Atlanta, GA, USA
Shabir Hassan, MD, Emory University School of Medicine, Atlanta, GA, USA
Marybeth Sexton, MD, Emory University School of Medicine, Atlanta, GA, USA
Sujit Suchindran, MD, Emory University School of Medicine, Atlanta, GA, USA
Scott Fridkin, MD, Emory University School of Medicine, Atlanta, GA, USA

Background: Provider-specific prescribing metrics can be used for benchmarking and feedback to reduce unnecessary antibiotic use; however, metrics must be credible. To improve credibility of a recently described risk-adjusted antibiotic prescribing metric for Hospital Medicine Service (HMS) providers, we assessed whether providers who initially prescribed excess antibiotics continued to prescribe antibiotics excessively.

Methods: We linked administration and billing data among patients at four acute care hospitals (1,571 beds) to calculate days of therapy (DOT) ordered by individual hospitalists for each of three NHSN antibiotic groupings – broad spectrum-hospital onset (BS-HO), broad spectrum-community onset (BS-CO) or anti-MRSA for each patient-day billed from January 2020 to June 2021. To incorporate repeated measures by provider, mixed models adjusted for patient-mix characteristics (e.g., % encounters with UTI, etc.), were used to calculate serial bimonthly provider-specific observed-to-expected ratios (OERs; OER = 1.25 means prescribing rate observed was 25% higher than predicted adjusting for patient-mix). We then used log binomial generalized estimating equations to assess whether a high prescribing rate (defined as an OER \geq 1.25) for an individual provider in an earlier bimonthly period was associated with a persistent high rate for that provider in the following period.

Results: 975 bimonthly periods were evaluated from 136 hospitalists, the majority (58%) contributing data the entire 18-month study period. Median (Q1, Q3) OERs were similar between hospitals: 0.94 (0.65, 1.28) for BS-HO antibiotic use, 0.99 (0.73, 1.24) for BS-CO antibiotic use, and 0.95 (0.65, 1.28) for anti-MRSA antibiotic use. At the individual prescriber level, roughly one quarter of bimonthly OERs (range varied by group and hospital, 21%-31%) were categorized as high. At three of the four hospitals, a provider with a high OER for either BS-HO or BS-CO antibiotic use in any bimonthly period was more likely to have a high OER in the subsequent period (Figure). These observed risk ratios were statistically significant for BS-HO antibiotic use only at 2 hospitals (Hospital A Risk Ratio RR – 1.54 [1.10-2.16]; Hospital B RR – 1.28 [0.90-1.82]; Hospital C RR – 0.76 [0.39-1.48]; Hospital D RR – 1.71 [1.09-2.68]).

Conclusions: Our findings suggest that hospitalists with a higher than expected 2-month period of antibiotic prescribing are likely to continue to have elevated prescribing rates in the following period, particularly for BS-HO antibiotics. These findings increase the credibility of using a 2-month prescribing metric for BS-HO antibiotic stewardship efforts; further work is needed to evaluate utility for other antibiotic groupings.

Figure: Risk Ratios (circle) and 95% confidence Intervals (line) between high initial antibiotic usage and subsequent high usage among hospitalists in four facilities in an academic healthcare system, Atlanta, Georgia. (Jan.2020-Jun 2021)

