Changes in Broad-Spectrum Antibiotic Use Following Implementation of the Sepsis CMS Core Measure SEP-1 in Select Locations Reporting to NHSN's Antibiotic Use Option

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Abstract

- Background: The goal of this study was to better understand the impact of the CMS SEP-1 measure on antibiotic use in acute care hospitals.
- Methods: Use of select broad-spectrum antibiotics, as reported to the NHSN AU Option, was compared in select VA (exempt from SEP-1) and non-VA ICUs and wards before and after measure implementation.
- Results: On average, a greater percentage of non-VA, versus VA, patient care locations observed increased broad-spectrum AU post-SEP-1.
- Discussion: More detailed analyses are needed to investigate whether the greater percentage of non-VA wards with increased broad-spectrum AU was truly driven by SEP-1 implementation.

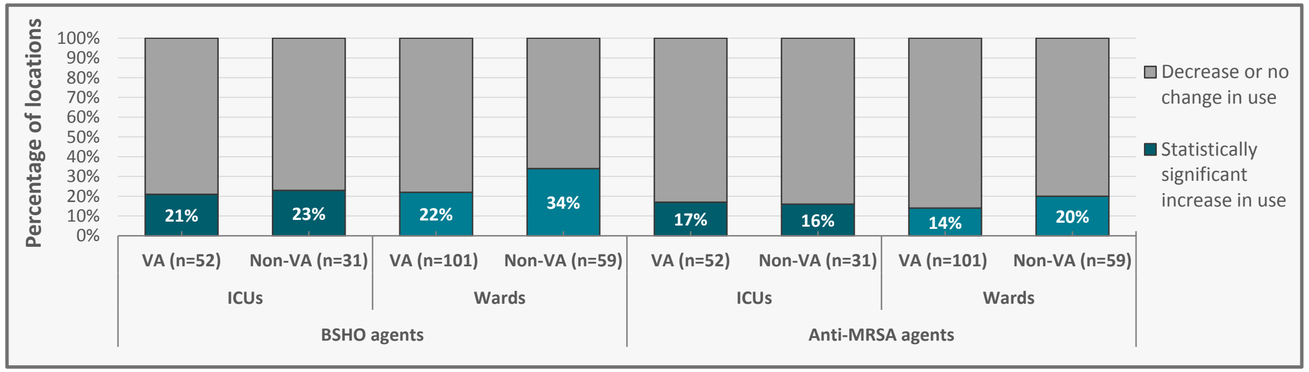
Background

- Beginning in October 2015, Centers for Medicare and Medicaid Services (CMS) began requiring hospitals participating in its Inpatient Quality Reporting program to report their adherence to a sepsis management bundle, including early antibiotic administration, as specified in a clinical quality measure known as SEP-1.
- This study uses data reported by hospitals to the Antimicrobial Use (AU) Option of the CDC's National Healthcare Safety Network (NHSN) to investigate whether an increase in broad-spectrum antibiotic use was observed in select adult inpatient acute care locations following implementation of SEP-1.

Methods

- Rates of AU were compared across two 12-month periods: 1) Pre SEP-1: Oct. 2014 – Sept. 2015, 2) Post SEP-1: Oct. 2015 – Sept. 2016.
- Adult medical, medical/surgical, and surgical wards and intensive care units (ICUs) were included if ≥10 months of data were reported in each period.
- Rates were modeled using Poisson regression for two drug categories, each defined in accordance with CDC's SAAR, or Standardized Antimicrobial Administration Ratio: Broad-spectrum agents used predominantly for hospital onset or multidrug resistant infections (BSHO) and anti-MRSA agents.
- Veteran's Affairs (VA) hospitals, which were not required to implement SEP-1, were used as a control, where the proportion of non-VA patient care locations with a statistically significant increase in rates of antibiotic use were compared to the comparable proportion of VA locations.
- Mid-P exact tests were used to determine if the proportion of VA patient care locations with statistically significant increases in broad-spectrum antibiotic use differed significantly from the proportion of non-VA locations with statistically significant increases in broad-spectrum antibiotic use.

Figure 1: Percentage of adult medical, medical/surgical, and surgical ICUs and wards in VA and non-VA hospitals with statistically significant increases in rates of broad-spectrum antibiotic use following the Oct. 2015 SEP-1 implementation. Observed VA vs. non-VA differences were not statistically significant (21% vs. 23%, 22% vs. 34%, 17% vs. 16%, 14% vs. 20%: all two-tailed p-values >0.05).



BSHO or broad-spectrum agents used predominantly for hospital-onset or multi-drug resistant infections: Amikacin, Aztreonam, Cefepime, Ceftazidime, Ceftazidime/Avibactam, Colistimethate, Ceftolozane/Tazobactam, Doripenem, Gentamicin, Imipenem/Cilastatin, Meropenem, Piperacillin, Piperacillin/Tazobactam, Polymyxin B, Ticarcillin/Clavulanate, Tigecycline, Tobramycin.

Anti-MRSA agents: Ceftaroline, Dalbavancin, Daptomycin, Linezolid, Oritivancin, Quinupristin/Dalfopristin, Tedizolid, Telavancin, IV Vancomycin.

Results

- A greater percentage of non-VA wards than VA wards observed a statistically significant increase in use of select broad-spectrum antibiotics post SEP-1:
  - BSHO: 34% vs. 22%
  - Anti-MRSA: 20% vs. 14%
- These observed differences in VA vs. non-VA ward percentages were not statistically significant (P=0.10, 0.30).
- A similar percentage of VA and non-VA ICUs reported statistically significant increases in AU.

Conclusions

- Comparisons between VA and non-VA locations were not statistically significant; however, these data raise the question of whether the greater percentage of non-VA wards with increased antibiotic use may have been driven by SEP-1 implementation.
- The SEP-1 measure may have a larger impact in non-ICU locations due to the frequent use of broad-spectrum antibiotics in ICUs.
- A more detailed investigation and continued monitoring are needed to further explore this potential association.

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