Poster # 682

Benchmarking Antimicrobial Use in Emergency Departments Among Community Hospitals in the Duke Antimicrobial Stewardship Outreach Network (DASON)

travis.m.jones@duke.edu
DUMC Box 103259
Room 260 Hanes House
Durham, NC 27710
Phone: (919) 684-8216

Duke Center for Antimicrobial Stewardship and Infection Prevention

Travis M. Jones[1,2], Elizabeth Dodds Ashley[1,2], Angelina Davis[1,2], April P. Dyer[1,2], Rebekah W. Moehring[1,2], Melissa D. Johnson[1,2]

1 – Duke Center for Antimicrobial Stewardship and Infection Prevention, Duke University Medical Center, Durham, NC, USA
2 – Duke Antimicrobial Stewardship Outreach Network, Duke University Medical Center, Durham, NC, USA

DukeHealth

Abstract

Background: Antimicrobials are frequently administered in the Emergency Department (ED), and there are unique challenges to implementing antimicrobial stewardship in this setting. Benchmarking antimicrobial use (AU) in the ED may assist hospitals in identifying areas to target stewardship interventions. EDs are not currently included in the standardized antibiotic administration ratios calculated by the CDC Module. Therefore, we aimed to establish a method to compare AU among EDs across our network.

Methods: This descriptive cohort included hospitals participating in the Duke Antimicrobial Stewardship Outreach Network (DASON) with available electronic medication administration records from EDs for calendar year 2016. ED encounters were estimated using encounters data collected for LabID event reporting. Overall AU, AU by antimicrobial category, and AU by antimicrobial agent were calculated in days of therapy (DOT) per 1,000 ED encounters and then compared among hospitals using descriptive statistics. Outlying use for individual agents was defined as >95th percentile.

Results: Thirteen community hospitals in the southeastern United States provided AU data for over 724,627 encounters (median 57,199, range 29,063-86,574). Median overall AU was 206 DOT/1000 ED encounters and showed variation among hospitals (interquartile range (IQR) 180-231). The majority of administered agents were antibacterials (96.9%), followed by antifungals (1.18%), antivirals (0.13%), and other (0.12%). Antimicrobial categories showing greatest variation among EDs included antifungals (coefficient of variation (CV) 57.47, median 2.04, IQR 1.39-3.36) and antipseudomonal beta-lactams (CV, 44.8, median 19.3, IQR 14.07-21.76). Outlying use in individual EDs were identified for ertapenem, ceftaroline, daptomycin, and fluconazole.

Conclusion: We observed large variability in AU in EDs among acute care community hospitals and identified several outliers for certain agents among hospital EDs using the metric DOT per 1000 ED encounters. These data will help inform future stewardship interventions at these hospitals.

Background

- Antibiotics are frequently administered in the Emergency Department (ED), and unique challenges for stewardship in this setting exist.
- EDs are not currently included in the standardized antibiotic administration ratios (SAAR) calculated within the CDC Antibiotic Use and Resistance (AUR) module.
- **Objective**: to establish a method for benchmarking antimicrobial use (AU) in EDs in order to assist hospitals in identifying areas to target stewardship interventions.

Methods

- We retrospectively calculated AU in hospitals participating in the Duke Antimicrobial Stewardship Outreach Network (DASON) with available electronic medication administration records from EDs for calendar year 2016.
- Overall AU, AU by antimicrobial category, and AU by agent were estimated in days of therapy (DOT) per 1,000 ED encounters and then compared among hospitals using descriptive statistics.
- ED encounters were estimated using encounters data collected for LabID event reporting within the National Healthcare Safety Network (NHSN).
- Outlying use for individual agents was defined as >95th percentile.

Results

Table 1. Hospital and ED Characteristics and Overall AU in DOT/1,000 ED Encounters (N=13)

	Median	IQR*
Licensed hospital beds	229	142 – 318
ED encounters (calendar year 2016)	57,199	36,120 – 71,374
Overall AU	206	18 – 231

*IQR, interquartile range

Table 2. Median AU by NHSN SAAR Categories[1]

Category	Agents	Median (IQR)	CV*
Anti-MRSA	ceftaroline, dalbavancin, daptomycin, linezolid, oritavancin, quinupristin, tedizolid, vancomycin	16.37 (12.5 – 20.8)	43.84
Broad spectrum, hospital-onset/multi-drug resistant infections	amikacin, aztreonam, cefepime, ceftazidime +/- avibactam, ceftolozane/tazobactam, colistin, doripenem, gentamicin, imipenem, meropenem, piperacillin +/- tazobactam, polymyxin B, tigecycline, tobramycin	20.64 (15.5 – 23.5)	43.71
Broad spectrum, community acquired	cefotaxime, ceftriaxone, ciprofloxacin, ertapenem, levofloxacin, moxifloxacin	77.22 (63.7 – 86.2)	16.8
Surgical prophylaxis	cefazolin, cefotetan, cefoxitin, cefuroxime, cephalexin	9.14 (7.2 – 14)	50.64

*CV, coefficient of variation

Results

Figure 1. Overall ED AU in DOT/1,000 ED Encounters

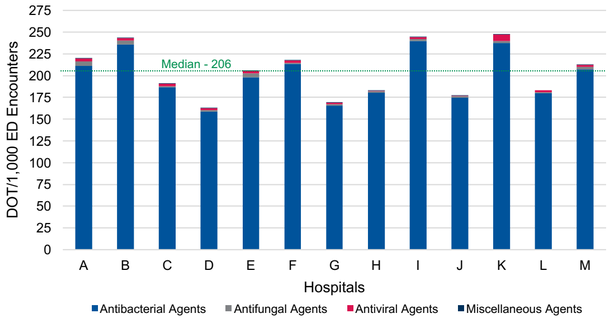


Figure 2. Antipseudomonal Beta-Lactam Use by Hospital

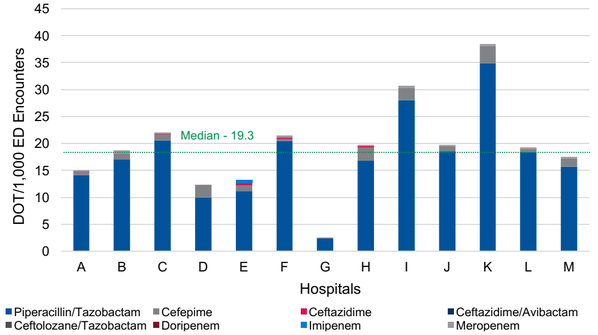


Figure 3. Overall AU by Annual ED Encounters

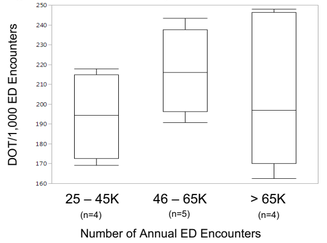


Figure 4. Outlying ED Antibacterial Use

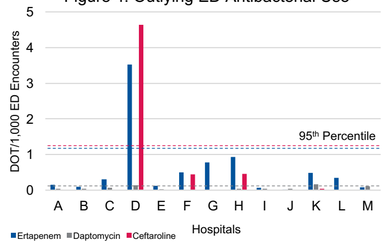
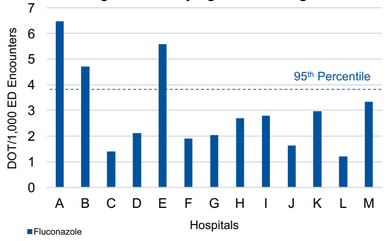


Figure 5. Outlying ED Antifungal Use



Conclusions

- We established a method for benchmarking AU in EDs among 13 acute care community hospitals using the metric DOT per 1,000 ED encounters.
- We observed large variability in overall AU and antipseudomonal beta-lactam use and identified outliers for certain antibacterial and antifungal agents among hospital EDs.
- These data will be used to help inform future stewardship interventions at these hospitals.

1. CDC. NHSN. Protocols: Antimicrobial use and resistance (AUR) module, 2015. Accessed 13 September 2017.