Introduction

An important patient-level risk factor for Healthcare Facility-Onset Clostridium difficile infection is exposure to antimicrobial agents. 1
- High-risk antibiotics for C. difficile include fluoroquinolones2, 3-5, 
  3rd generation cephalosporins, 5 and clindamycin. 6
- The Centers for Disease Control and Prevention (CDC) estimates that 30 to 50% of antibiotic use in the hospital setting is inappropriate. 7
- At the hospital level, a 10% increase in antimicrobial usage has been associated with a 2.1 per 10,000 patient-days increase in C. difficile incidence, though many questions remained unanswered.8
- Environmental hypothesis: Antibiotic Consumption → Clostridium difficile Colonization → Dissemination

Methods

- Single-center, retrospective, ecologic study conducted at Northwestern Memorial Hospital in Chicago, IL
- Data Collection (using CDC National Healthcare Safety Network Antibiotic Use Data): Antibiotic consumption, measured in antibiotic days per 1000 days present, was correlated with HO CDI, standardized to 100,000 days present. Spearman's rank-order correlation was used to describe the temporal associations between antibiotic consumption and the incidence of HO CDI. 7
- Following admission, is a major source of infectious disease-related morbidity and mortality in the U.S. 4
- Temporal associations exist between the intensity of broad antibiotic consumption and HO CDI incidence within hospital units at our center 5. 3
- These lagged findings warrant further exploration of a possible environmental contamination relationship with HO CDI, and exploration of how antibiotic consumption may contribute to HO CDI incidence facility-wide. 6
- **Results:** Facility-Wide Analysis (Matched-Months)

- **Figure:** 2: FacWide Matched Months Ceftriaxone-HO CDI Correlation, January 2013 - April 2015

- **Figure:** 3: FacWide Matched months correlation between ceftriaxone ADs and HO CDI from January 2013 to April 2015 (Spearman ρ=0.44, p=0.0178)

- **Figure:** 5: Stem Cell Transplantation Patients: One Month Lag, Consumption over time: Ceftriaxone and HO CDI Incidence, January 2013 - September 2014

Results: Facility-Wide Analysis (Matched-Months)

- Facility-wide analysis from January 2013 to April 2015 showed a significant correlation with HO CDI incidence (Spearman ρ=0.44, p=0.018). Unit-level analysis among patients in a single unit of predominantly stem cell transplant recipients did not show a significant relationship using matched months and one-month forward time lags.

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Discussion

- Temporal associations exist between the intensity of broad antibiotic consumption and HO CDI incidence within hospital units at our center 5.
- The one-month lag association observed at the unit-level with ceftriaxone and HO CDI incidence contrasts with the matched-month correlation seen with ceftriaxone and HO CDI incidence facility-wide.
- Future directions: Identify if an interaction exists between unit-based antimicrobial consumption and environmental transmission of CDI, assess if there is a consistent association found among different patient populations, identify and compare high-risk and low-risk units for HO CDI.