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Paper Poster Session

Best practices of hospital antimicrobial stewardship interventions

A pilot study to determine if increasing antibacterial diversity is associated with increased *Clostridium difficile* infection (CDI) incidence?

Philip Howard¹, Jonathan Sandoe², Mark H. Wilcox³

¹*Leeds Teaching Hospitals NHS Trust, Leeds, United Kingdom*

²*Leeds Teaching Hospitals and University of Leeds, Department of Microbiology, Old Medical School, Leeds, United Kingdom*

³*Leeds Teaching Hospitals and University of Leeds, Microbiology, Old Medical School, Leeds, United Kingdom*

Background: Antibiotic diversity is recommended as an approach to decrease antimicrobial resistance. One strategy that contributed to an 80% reduction in CDI in England is to restrict the use of broad spectrum antibiotics such as cephalosporins, fluoroquinolones, and clindamycin from 2009. Amoxicillin-clavulanate replaced them, but may have led to large increases in *E.coli* resistance. This study explored whether antibiotic diversity (using two measures) increases CDI rates in a region of north England. The DU90 is a count of the different antibacterials that make up 90% of the prescribing, and the antibiotic heterogeneity index (AHI) quantifies the degree of antibiotic heterogeneity using a modified version of the Peterson homogeneity index <http://www.le.ac.uk/biology/gat/virtualfc/Stats/peterson.htm>

Material/methods:

Antibiotic benchmarking data were obtained for 14 hospitals in Yorkshire and Humber from Rx-Info Define software and compared with Public Health England CDI rates for hospitals over 4 years. The DU90 and Antibiotic Heterogeneity Index (AHI) were plotted against the CDI rate (cases/100,000 patient bed days per year) using regression analysis.

Results: The two different diversity scoring systems gave very different results. The DU90 scoring system showed no correlation with increase CDI rates as diversity increased for 2011-2 ($R^2 = 0.3361$) and 2012-3 ($r^2 = 0.3109$), but showed a weak correlation for 2013-4 ($r^2 = 0.6478$) and 2014-5 ($R^2 = 0.6322$). The AHI showed no correlation whatsoever, with a non-significant trend for decreasing CDI rates as AHI increased towards 1 (full diversity): 2011-2 ($R^2 = 0.1812$) and 2012-3 ($r^2 = 0.0291$), 2013-4 ($r^2 = 0.1127$) and 2014-5 ($R^2 = 0.1175$). The AHI remained constant each year at 0.82, but the DU90 increased slightly from 15.6 to 15.7 during the study period.

Conclusions: From both diversity scoring methods, it does not appear that there is a strong association between increasing antibiotic prescribing diversity and hospital associated CDI rates. Further work is required to know which is the optimal measure of diversity

