Association between Prevalence of Laboratory-Identified *Clostridioides difficile* Infections (CDIs) and CDI Antibiotic Treatment in U.S. Acute Care Hospitals, 2018

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Background

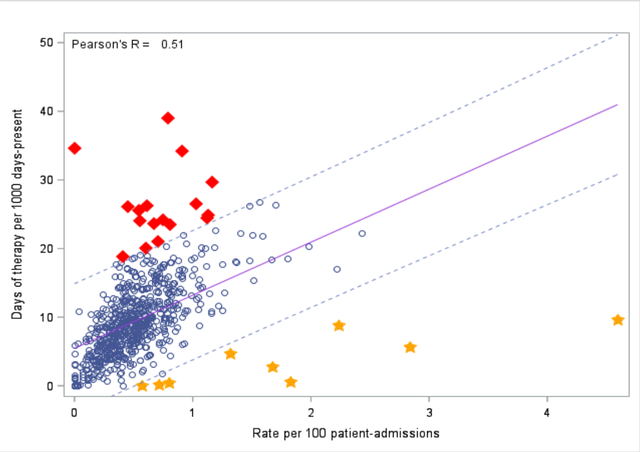
- *Clostridioides difficile* infection (CDI) is an urgent public health threat[1]
- The Centers for Disease Control and Prevention's (CDC's) National Healthcare Safety Network (NHSN) identifies CDI through Laboratory-Identified (LabID) Event reporting[2]
- The Antimicrobial Use (AU) Option of NHSN captures reporting hospitals' AU rate electronically[2]
- The variations of clinical practices on CDI diagnosis and antibiotic treatment across hospitals are unclear
- Oral vancomycin and fidaxomicin are the first-line antibiotics for CDIs recommended by the Infectious Disease Society of America and are almost exclusively used to treat CDIs[3]
- Objectives:
  - To evaluated the association of LabID CDIs and the use of antibiotics mainly prescribed for treating CDIs at facility level
  - To identify hospitals with extreme discordance between CDI prevalence and CDI antibiotic use, as a priority for NHSN team to conduct data validation outreach

Methods

- Hospitals that reported to both the NHSN LabID CDI event Module and AU Option in 2018 are included
  - Facility-wide inpatient locations in acute care hospitals
  - Excluded hospitals submitting <6 months of data and those with 0 or missing patient admissions
- Data metrics:
  - Facility-level CDI prevalence rate = no. inpatient LabID CDI events / no. patient admissions x 100
  - CDI antibiotic use rate = no. days patients on oral vancomycin or fidaxomicin / no. patient days x 1,000
- Data analysis:
  - Association between CDI prevalence and CDI antibiotic use was evaluated using Pearson's linear correlation (r) and Goodman and Kruskal's gamma (G) on ordinal quartiles
  - Discordance defined as hospitals outside of 95% confidence limits in linear correlation plot, or with a discordant pair of Q1 and Q4 in ordinal quartile assessment

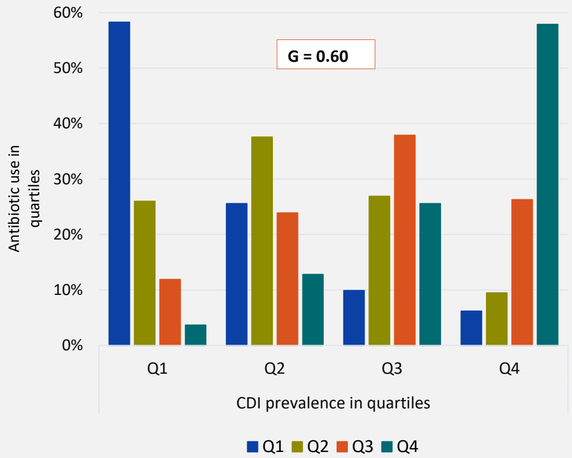
Results

1. Correlation of CDI prevalence and use of oral vancomycin or fidaxomicin (n=710), 2018



*Yellow stars = hospitals with high CDI prevalence and low CDI antibiotic use; red diamonds = hospitals with high CDI antibiotic use and low CDI prevalence

2. CDI prevalence and use of oral vancomycin or fidaxomicin in ordinal quartiles to access rates of discordant pairs, 2018



3. Characteristics of hospitals with extreme discordance between CDI prevalence and use of oral vancomycin and fidaxomicin, 2018

	No. (%)		
Characteristic	**High CDI prevalence + low antibiotic use (n=13)**	**High CDI antibiotic use + low prevalence (n=19)**	**Hospitals without discordance (n=678)**
Hospital bed size, median (IQR)	140 (86–188)	298 (153–434)	215 (108–349)
Average length of stay, median (IQR)	3.8 (3.5–4.5)	3.9 (3.3–4.9)	4.2 (3.5–5.0)
Medical school affiliation			
Major teaching	2 (15)	7 (37)	282 (42)
Graduate teaching	1 (7)	2 (11)	113 (17)
Non-teaching	6 (46)	6 (32)	161 (24)
Undergraduate	4 (31)	4 (21)	122 (18)

Discussion

- The moderate correlation and discordant rates suggest there are variations in CDI clinical treatments and diagnostic practices across participating hospitals
- Oral vancomycin or fidaxomicin might be less frequently used as primary antibiotics in some hospitals; whereas in others, CDI antibiotics might be prescribed for clinical diagnosis of CDI without laboratory confirmation
- Hospitals with high CDI prevalence and low antibiotic use were more likely to be smaller and non-teaching or undergraduate teaching hospitals, and were likely relying on metronidazole for treating CDIs
- For hospitals with high CDI antibiotic use and low prevalence, patients' disease severity could play a role; however, NHSN does not provide information at individual-patient level

Conclusions

- Hospitals with extreme discordance of LabID CDI prevalence and anti-CDI AU should be prioritized for hospital outreach and data validation
- This analysis provides opportunities for antimicrobial stewardship and diagnostic stewardship programs to review the laboratory testing practices and CDI antibiotic treatment for hospitals with extreme discordance between LabID CDIs and antibiotic treatment for CDI
- Additional analyses are needed to evaluate the effect of CDI test type on the association of LabID CDI prevalence and CDI antibiotic use

References

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