Determinates of CDI testing practices among inpatients with diarrhea at acute care hospitals in Rochester, New York and Atlanta, GA, 2020-2021.

No. 387

Scott K. Fridkin, MD (1,2), Udodirim N. Onwubiko, MBBS MPH (1), William Dube, MPH (2), Chad Robichaux, MSPH (2), Jessica Traenkner, PA-C (2), Dana Goodenough, MPH (3), Frederick J. Angulo, DVM PhD (4), Joann M. Zamparo, MPH (4), Elisa Gonzalez, MS (4), Sahil Khanna, MBBS (5), MS, Christopher Myers, MS (6), Ghinwa Dumyati, MD

1. Emory University Rollins School of Public Health; 2. Division of Infectious Diseases, Emory University School of Medicine; 3. Georgia Emerging Infections Program,;4. Medical Development and Scientific/Clinical Affairs, Pfizer Vaccines, Collegeville, PA; 5. Division of Gastroenterology and Hepatology, Mayo Clinic, Rochester, MN; 6. Center for Community Health and Prevention, University of Rochester Medical Center, Rochester, NY

Contact:
Scott Fridkin;
sfridki@emory.edu

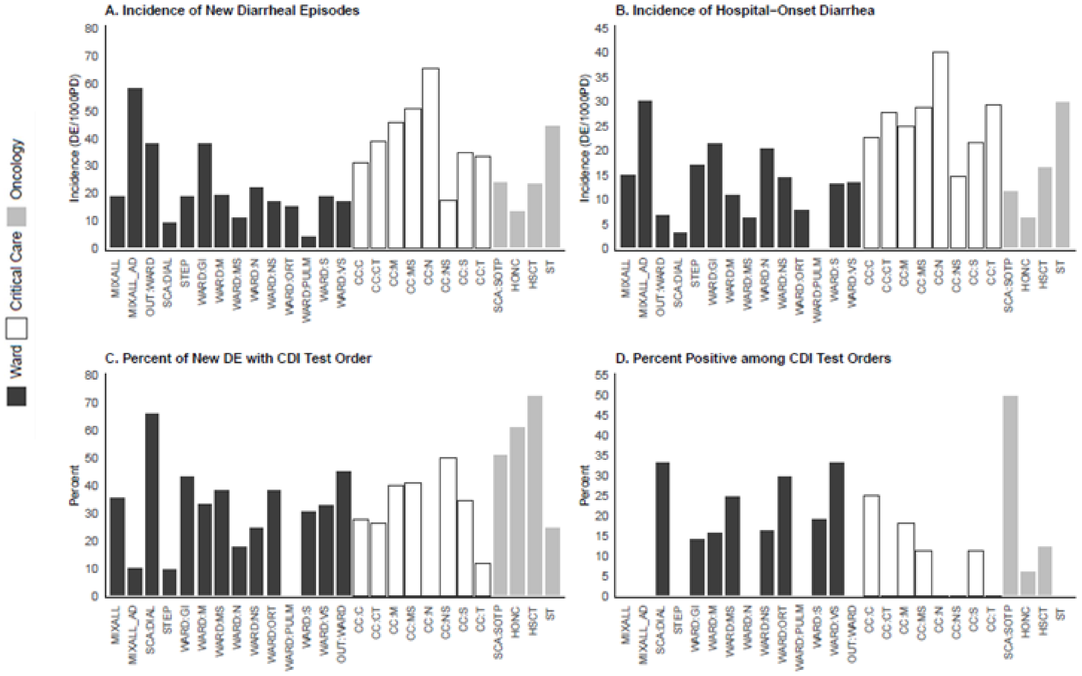
Background

- Valid comparisons of *C. difficile* infection (CDI) incidence estimates for epidemiologic study between sites depends on understanding differences in CDI testing pathways (i.e., case ascertainment, sensitivity)
- CDC's Emerging Infections Program (EIP) makes age/race/gender adjusted population-based estimates with standard case-ascertainment methods
- We aimed to evaluate what patient factors drive differences in test ordering practice among inpatients with new diarrhea, and if such differences are reflected in population-based incidence estimates

Methods

- 3 hospitals in GA EIP site (Site A) and 2 hospitals in NY EIP site (Site B) participated in prospective observational study over 2 distinct 10-day periods 6 months apart
- Study staff identified all new diarrheal episodes (DE) (present on admission or hospital onset, 3 unformed stools/24 hours) during each period, patient data was captured electronically
- NAAT was primary test at Site A and secondary if EIA/GDH was negative at site B (maximum sensitivity).
- Testing and CDI positivity were evaluated by aggregated data among similar NHSN defined Location-types (Figure 1) and compared by Kruskal-Wallis tests (Table).
- Patient, admission, hospital characteristics associated with CDI test ordering were identified through bivariate and Poisson regression analysis (Figure 2)
- Simulation of age/race/gender adjusted population-based estimates using hospital data limited to residents of catchment area compared differences (Site A vs. Site B) (Cochran-Mantel-Haenszel) in CDI incidence to differences in adjusted relative rate of CDI testing

Figure 1: Incidence (per 1000 patient-days) of new diarrheal episodes (N=860) and hospital-onset diarrhea, (N=529), percent of new diarrheal episodes with CDI test order, (N=302) and percent of CDI test orders that tested positive (N=50), by patient-location type

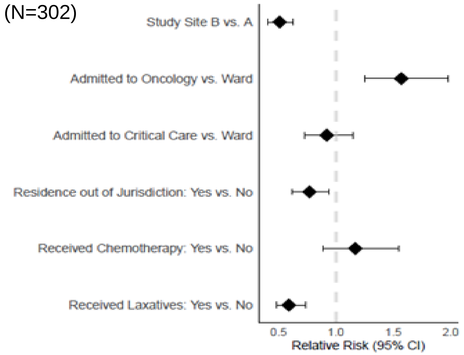


Location	Total PD	No. NHSN locations-Types	No. Units	New DE Cases N	New DE Cases Med. Rate (Q1-Q3)	New DE Cases p value	CDI Test Ordering n (%)	CDI Test Ordering p value	CDI Test Ordering Med. Rate (Q1-Q3)	CDI Test Ordering p value
Overall	38,365	26	107	860	20.6 (12.9-33.1)		302 (35.1%)		6.4 (2.5-12.3)	
Site A	23,643	20	71	435	16.2 (11.3-30.8)	0.001	213 (49.0%)	<0.001	6.5 (2.3-16.3)	0.216
Site B	14,722	19	36	425	25.8 (20.2-44.7)		89 (20.9%)		5.0 (2.6-8.3)	
Wards	26,900	14	63	501	16.0 (10.5-23.8)	0.000	162 (32.3%)	<0.001	4.4 (2.3-8.3)	0.012
Critical Care	6,406	8	32	245	33.1 (22.0-44.9)		78 (31.8%)		8.2 (2.4-17.5)	
Oncology	5,059	4	12	114	20.1 (17.0-25.7)		62 (54.4%)		11.6 (8.0-14.1)	
Site A-Hosp. 1	10,610	14	36	220	20.0 (12.6-32.7)	0.003	105 (47.7%)	<0.001	7.4 (2.3-17.3)	0.625
Site A-Hosp. 2	8,171	11	21	117	13.5 (9.3-17.1)		57 (48.7%)		5.2 (1.7-9.3)	
Site A-Hosp. 3	4,862	11	14	98	16.8 (11.4-27.9)		51 (52.0%)		9.0 (3.1-16.6)	
Site B-Hosp. 1	10,290	16	28	318	29.6 (21.6-45.9)		64 (20.1%)		4.7 (3.0-8.9)	
Site B-Hosp. 2	4,432	6	8	107	21.8 (17.7-24.9)		25 (23.4%)		5.7 (2.6-7.2)	

PD= Patient-days;; DE=diarrheal episodes; CDI = *Clostridiodes difficile* infection
[a]Percent of new DE cases; [1]Kruskal-Wallis test; [2]Fisher's exact test
All rates are per 1000 patient-days.

Results

Figure 2. Multivariable analysis - Relative rate (and 95% confidence intervals) factors for new diarrheal episode (N=860) being CDI Tested (N=302)



At 5 hospitals across 112 care units 860 new diarrheal episodes (DE) (22.4/1000 PD) were captured, 62% were hospital-onset DE, 16% were CDI +.

- Site B had higher DE rates than A; but Site A tested for CDI 2X as often as Site B (Table)
- Laxative use predicted NOT testing; oncology status predicted testing – adjusting for these factors, Site A still tested twice as much as Site B (Figure 2)
- Simulated population-based CDI incidence at Site B was 38% lower (RR 0.62; 95% CI, 0.54-0.71) vs. Site A--similar to adjusted testing rate of 49% lower (adjusted RR -.51; 95% CI 0.4-0.6) as show in Figure 2

Conclusion

- Frequency of CDI testing differs between patient-location types; laxative use and oncology status are most influential in decisions to test
- Differences in testing between sites closely matched difference in estimated CDI incidence
- Comparisons in estimated incidence of CDI between regions may require some insight into differences in test ordering practice to best interpret such data.

*Study activities were supported through a Service Agreement between Pfizer Inc. and Emory University and the University of Rochester.