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Strain Epidemiology of *Clostridioides difficile* across Three Geographically Distinct Medical Centers in Chicago

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Background

- *Clostridioides difficile* infections (CDI) are caused by a large and diverse group of strains with differences in prevalence and associated morbidity
- The CD molecular epidemiology has changed as the prevalence of the epidemic strain recognized as restriction endonuclease analysis (REA) group BI or PCR-Ribotype group (RT) 027 has decreased
- The changes have corresponded with a decrease in healthcare associated CDI (HA-CDI) and an increase in community onset CDI (CO-CDI)

Objective

- The objective of this study was to determine the current molecular and clinical epidemiology of CD in the city of Chicago

Methods

- Baseline characteristics and symptoms were compared for 81 patients who tested positive for CD by PCR between 9/1/2021 and 10/7/2021 at 3 Chicago hospitals
- Patients were classified as having HA-CDI if symptoms began >72 hours after hospital admission, CO-CDI if symptoms beginning ≤72 hours prior to admission, and community-onset healthcare-associated CDI (COHA-CDI) if they had been hospitalized ≤4 weeks prior to diagnosis
- Determination of HA-CDI, CO-CDI, COHA-CDI, and CD colonization status was determined by review of the medical record
- Available stools were cultured and recovered isolates underwent REA typing

RESULTS

Demographic and Clinical Characteristics

	All (n=81)	Loyola University (n =49)	Rush University (n = 12)	University of Chicago (n = 20)
Male [%]	36 (44%)	22 (45%)	7 (58%)	7 (35%)
Age ≥ 65 [%]	36 (44%)	24 (44%)	6 (50%)	6 (30%)
Hospitalization within 3 months [%]	46 (58%)	29 (59%)	6 (50%)	11 (55%)
History of CDI [%]	34 (42%)	24 (49%)	2 (16%)	8 (40%)
Median No. Previous CDI [IQR]	1 (1-3)	2 (1-3)	3 (2-4)	1 (1-1)
Charlson comorbidity index [IQR]	4 (1 - 6)	5 (2 - 7)	3 (1 - 7)	2 (1 - 3)
Immunocompromised [%]	33 (41%)	23 (47%)	5 (42%)	5 (25%)
Gastric Acid Suppression [%]	31 (38%)	22 (45%)	6 (50%)	3 (15%)
WBC [95% CI]	10.75 (8.75 – 12.65)	11.55 (8.71 – 14.39)	8.78 (3.77 – 13.80)	9.40 (6.54 – 12.25)
Creatinine [95% CI]	1.38 (0.95-1.80)	1.65 (0.97 – 2.32)	0.95 (0.59 – 1.32)	0.91 (0.62 – 1.21)

Diagnostic Classification

	All (n=81)	Loyola University (n =49)	Rush University (n = 12)	University of Chicago (n = 20)
Primary CDI [%]	39 (48%)	20 (41%)	8 (66%)	11 (55%)
CO-CDI	18 (46%)	9 (45%)	3 (3%)	6 (18%)
COHA-CDI	12 (31%)	7 (35%)	3 (3%)	2 (55%)
HA-CDI	9 (23%)	4 (20%)	2 (25%)	3 (27%)
Recurrent CDI	19 (23%)	16 (33%)	1 (8%)	2 (10%)
Suspected Colonization	22 (27%)	13 (27%)	3 (25%)	6 (30%)

Figure 1

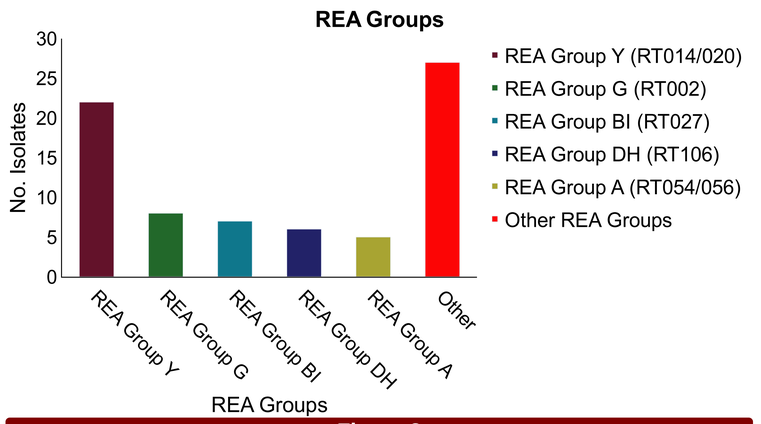
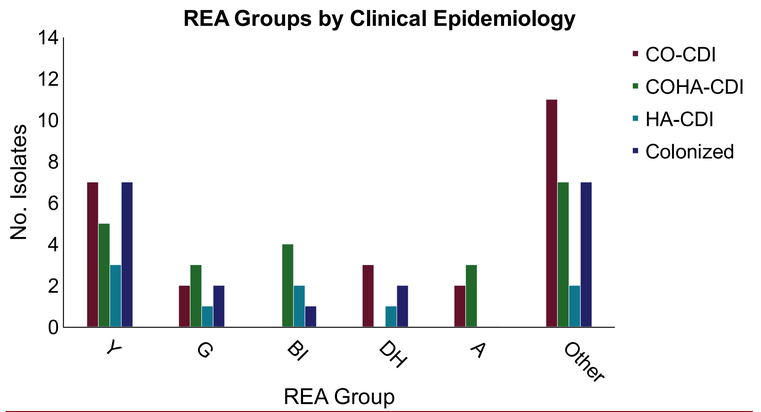


Figure 2



CONCLUSION

- There has been a marked change in the CD epidemiology within the city of Chicago since 2009 when REA group BI accounted for 61% of CDI[1]
- REA group Y (typically identified as RT 014/020) accounted for 29% (22/75) of the CD in Chicago and has supplanted REA group BI as the most common group strain in Chicago
- REA group Y appears to be associated primarily with CA-CDI and CD colonization
- While CO-CDI has increased, HA-CDI (COHA and HA) still account for the majority of CDIs
- A detailed genomic analysis of REA group Y is required to determine potential reservoirs of REA group Y within the city of Chicago

Funding

This project was supported by the National Center for Advancing Translational Sciences (NCATS) of the National Institutes of Health (NIH) through Grant Number 5KL2TR002387-05 that funds the Institute for Translational Medicine (ITM). The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH.

Reference

1. Black, S. R., et. al.,Clostridium difficile Outbreak Strain BI Is Highly Endemic in Chicago Area Hospitals. Infection Control & Hospital Epidemiology, 32(9), 897–902