

Introduction

Clostridioides difficile infection (CDI) is the most common healthcare associated infection worldwide. Patients who develop recurrent *Clostridioides difficile* infection have increased length of stay in the hospital and report lower quality of life due to infection. Per IDSA guidelines, patients with ≥ 3 episodes of CDI are eligible to be considered for fecal microbiota transplant (FMT). The aim of this study is to characterize recurrent CDI in this population and evaluate how fecal microbiota transplantation was being used in the community.

Methods

Study Populations

Georgia Emerging Infections Program CDI Cohort: Active laboratory-based surveillance of all residents in 8 Atlanta Metro Counties

- All patients age > 18 yrs included
- Age, Race, Zip code and dates of positive tests available
- Manual chart review on random 33% sample (Case Report Forms (CRF)) performed included co-morbidity information

Fecal Microbiota Transplant Recipient Cohort:

Database of patients amassed from six area private and academic practices.

Estimated to constitute >85% of FMTs performed in the Atlanta Metropolitan Area during this study period.

Definitions

CDI episodes: each positive CDI test > 14 days after a previous positive test, within 365 days of first episode
Recurrence (rCDI): defined a positive CDI test within 14-365 days of the prior test
FMT Eligible: All patients with ≥ 3 episodes of CDI in 365 days

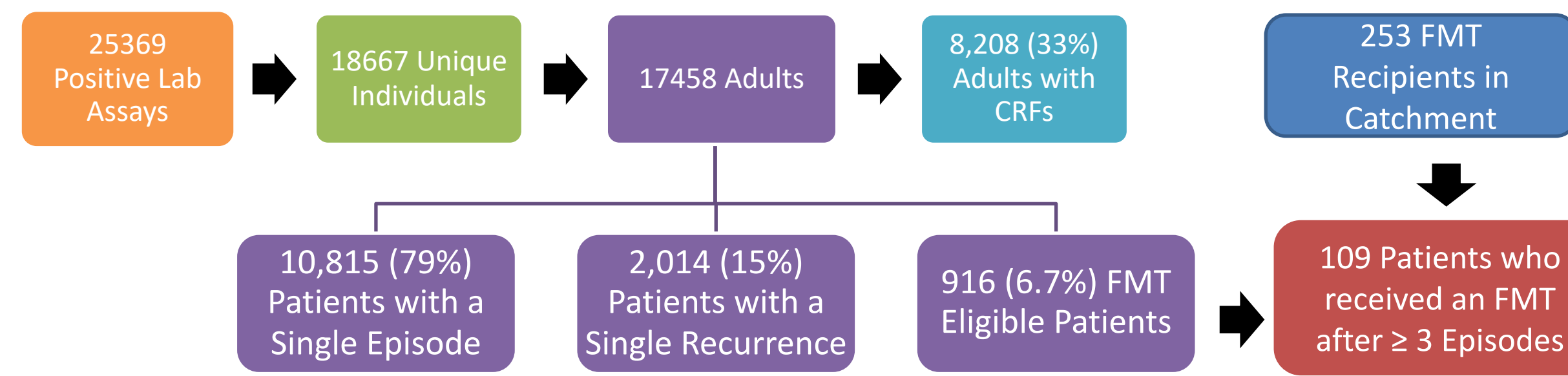
Linkage and Analysis

Patients were linked between databases based on name and DOB using LinkPlus

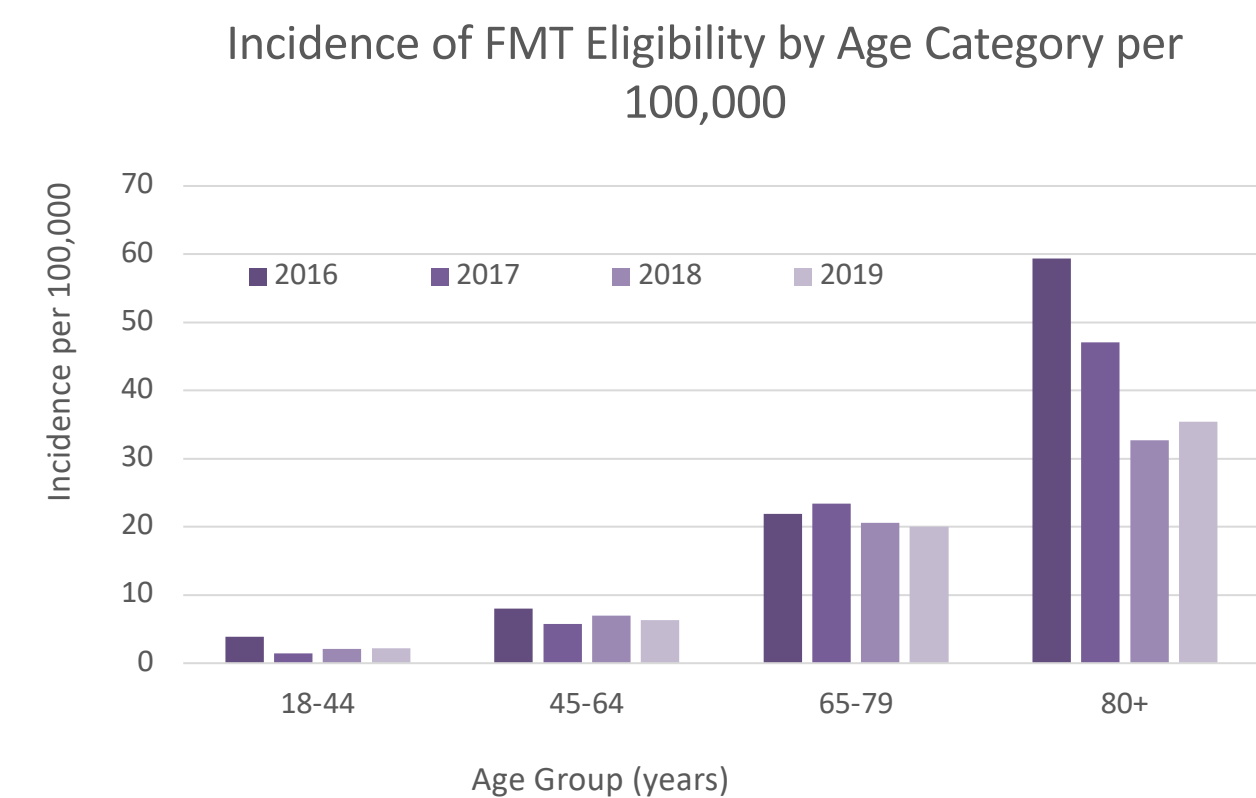
All Analysis was conducted in SAS. Odds ratios were generated by logistic regression.

All patients in EIP database was evaluated for demographic information and time between episodes of CDI. Patients with a CRF were evaluated for comorbid information and patients who had received an FMT were evaluated for demographic information as well as when during course of rCDI they received an FMT and whether they had a recurrence of CDI in 365 days

Overview of Study Populations



Risk Factors for the Development of Multiple Recurrence



Patient Category	Mean days (SD)	P-value
Single recurrence only	82 (81)	<0.0001*
FMT Eligible	65 (60)	

*Two sample T-test

Comorbid Conditions by FMT Eligibility

Comorbid Conditions	Non-FMT Eligible N (%)	FMT Eligible N (%)	Odds Ratio (95% CI):
Renal Disease	695 (12)	172 (22)	1.9 (1.5, 2.4)
Inflammatory Bowel Disease	290 (5)	62 (8)	1.4 (1.0, 2.5)
CCI			
0	3183 (56)	352 (45)	REF
1-2	1314 (23)	214 (27)	1.3 (1.1, 1.7)
3-4	645 (11)	140 (18)	2.0 (1.6, 2.6)
>5	406 (7)	75 (10)	1.5 (1.0, 2.2)

Demographics of FMT Eligible Patients based on FMT Receipt

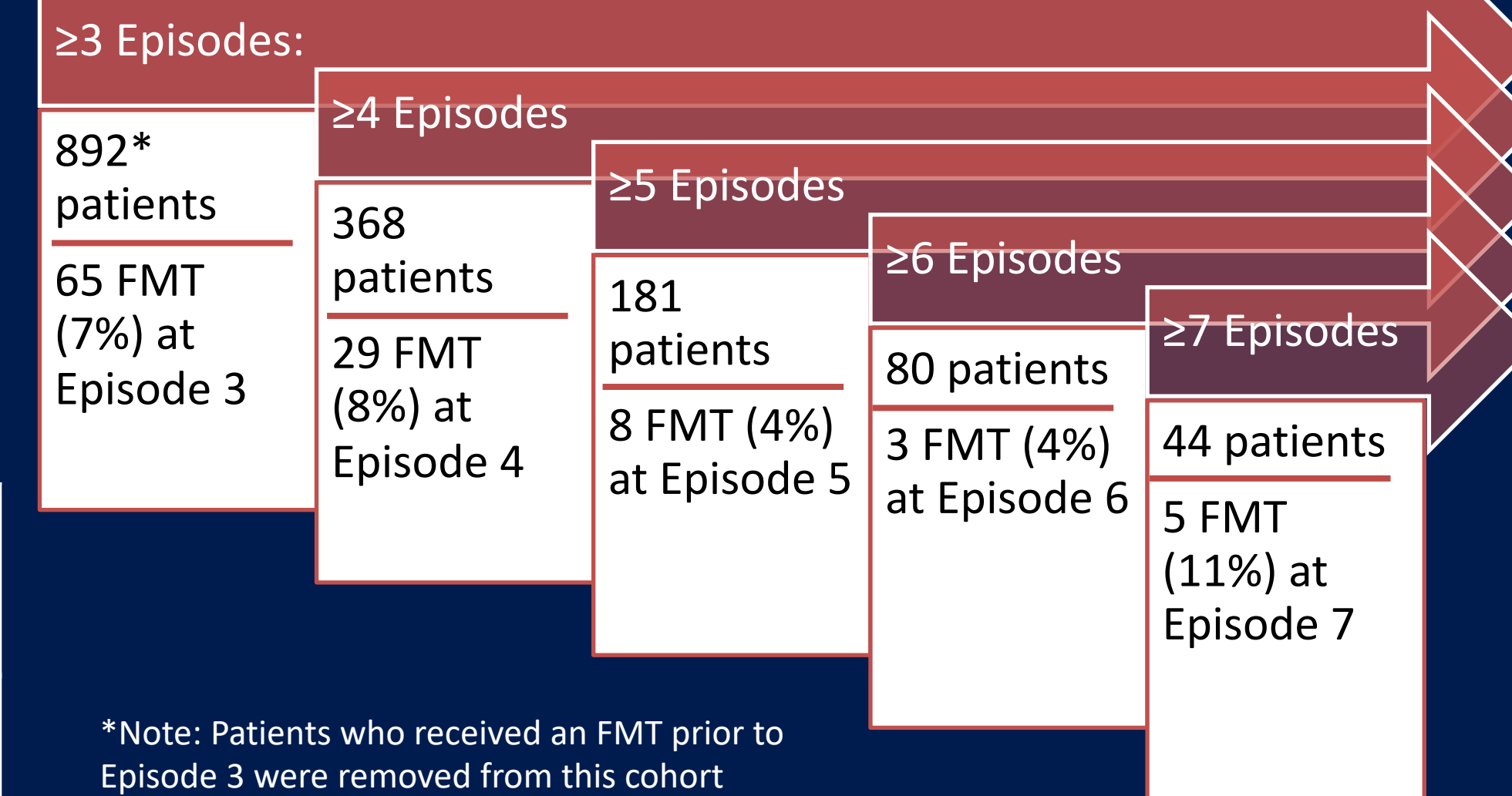
	FMT(-) (N=783)	FMT (+) (N=109)	OR (95% CI)
Sex	N (%)	N (%)	
Female	473 (60.0)	75 (68.8)	REF
Male	310 (40.0)	34 (31.19)	0.7 (0.5-1.0)
Age Group, years			
18-44	118 (15.1)	31 (28.4)	REF
45-64	244 (31.6)	32 (26.5)	0.4 (0.3-0.8)
65-79	285 (36.4)	27 (26.5)	0.4 (0.2-0.8)
80+	136 (17.3)	19 (18.6)	0.6 (0.3-1.1)
Race			
White	314 (50.4)	63 (64.9)	REF
Black	217 (34.8)	27 (24.5)	0.6 (0.3-0.9)
Other	11 (1.77)	0	N/A
Unknown	81 (13)	11 (10.6)	0.7 (0.3-1.3)

Future Directions

- Match patients with hospital discharge database to supplement information about comorbid conditions from CRF as well as and rates of rehospitalization
- Propensity score match FMT recipients to non-recipients to evaluate impact on recurrence and rehospitalization



FMT Administration during Course of Multiple Recurrent CDI



*Note: Patients who received an FMT prior to Episode 3 were removed from this cohort

Recurrence Following FMT at Different Timepoints of rCDI

Episode #	Recurrence	FMT (-)	FMT (+)	OR (95% CI)*
3	+	349 (42%)	19 (29%)	0.54 (0.30-0.97)
	-	478 (58%)	46 (71%)	
4	+	157 (49%)	12 (41%)	0.752 (0.34-1.68)
	-	163 (51%)	17 (59%)	
5	+	73 (45%)	4 (50%)	1.36 (0.29-6.47)
	-	88 (55%)	4 (50%)	

*Age, sex and race adjusted

Conclusions

- rCDI is common and highest among elderly patients around 40/100,000
- Time between the first two episodes is significantly shorter in patients who have multiple recurrences (progress to third episode)
- Patients with renal disease and inflammatory bowel disease were more likely to develop multiple recurrences
- Patients who were black, male and older were less likely to receive an FMT
- Recurrence rates after FMT are lower among patients who receive FMT early in the recurrence course, but benefit appears to diminish after multiple recurrences