Stool Bile Acid Profiles in Pediatric Patients who Received FMT for *C. difficile* Infection

M. Elizabeth Tessier, MD

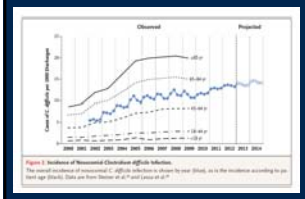
Texas Children's Hospital

Baylor College of Medicine

Disclosures

•Nothing to disclose

Clostridium difficile Infection (CDI)

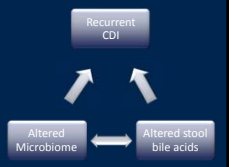


- CDI is linked to over 30,000 deaths per year in the U.S.
- An economic cost of >$3 billion.
- Disease recurrence rates can be as high as 35%

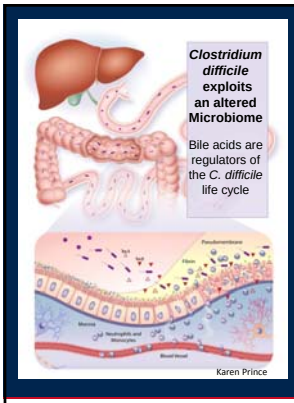
Clostridium difficile Infection. Leffler DA, Lamont JT N Engl J Med. 2015 Apr 16;372(16):1539-1548.
Mergenhagen, K. A., Wojciechowski, A. L. & Paladino, J. A. A review of the economics of treating Clostridium difficile infection. *Pharmacoeconomics* **32**, 639–50 (2014).
O'Brien, J. A., Lahue, B. J., Caro, J. J. & Davidson, D. M. The emerging infectious challenge of clostridium difficile-associated disease in Massachusetts hospitals: clinical and economic consequences. *Infect. Control Hosp. Epidemiol.* **28**, 1219–27 (2007).

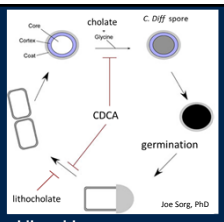
Recurrent *Clostridium difficile* Infection (CDI)

- Fecal microbiota transplant (FMT) is highly effective for the treatment of recurrent *C. difficile* infection (CDI)
- Adult studies suggest that stool bile acid restoration occurs with FMT



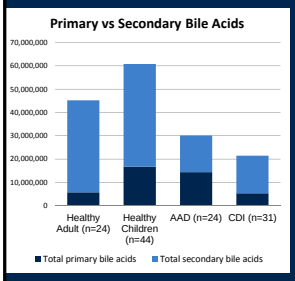
- Pediatric CDI is a different disease
  - Incidence is lower in pediatric patients
  - More difficult to diagnose
  - However, recurrent CDI does occur

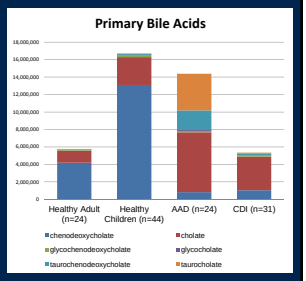




- **Primary bile acids**
  - Cholates are germinants of *C. difficile* spores via interaction with spore germinant receptor CspC.
  - Chenodeoxycholic acid (CDCA) is a known competitive inhibitor at the CspC site as well as is toxic to vegetative cells.
- **Secondary bile acids**
  - Lithocholate and deoxycholate are toxic to *C. difficile* vegetative cells.

Stool Bile Acid Differences in Pediatric and Adult Patients





Study design

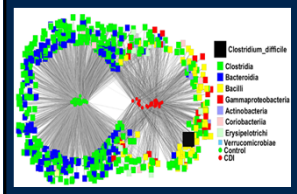
- Stool collected from healthy pediatric patients and patients with primary and recurrent CDI
  - Healthy patients from pediatric human microbiome project

	Number	Average Age (range)
Healthy Control	38	9.5 (7-12)
Primary CDI	21	11.2 (3-19)
Recurrent CDI	13	7.7 (2-16)
FMT	3	12.5 (9-16)

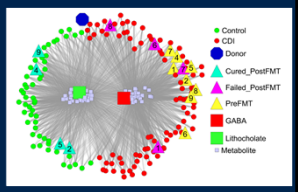
- Stool samples from pediatric patients who received FMT for recurrent CDI
  - Stool taken prior to and 8 weeks after FMT
  - Stool from the universal donor was also collected
- Stool sent for 16s sequencing and global metabolomics

Preliminary Network Analysis

Microbe-patient network



Metabolite-Patient Network



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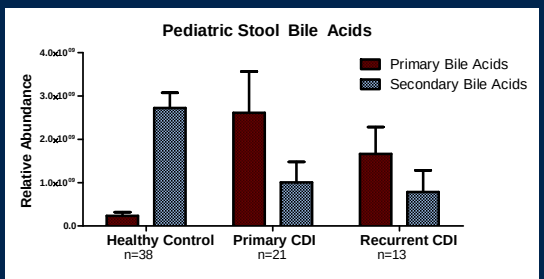
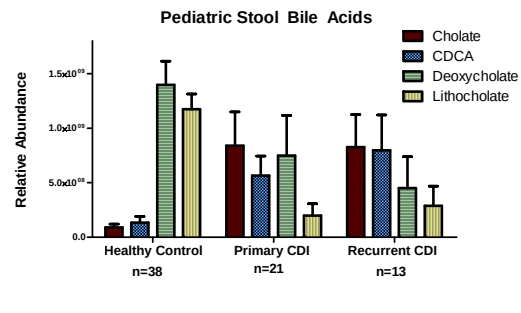
Cana Ross, PhD

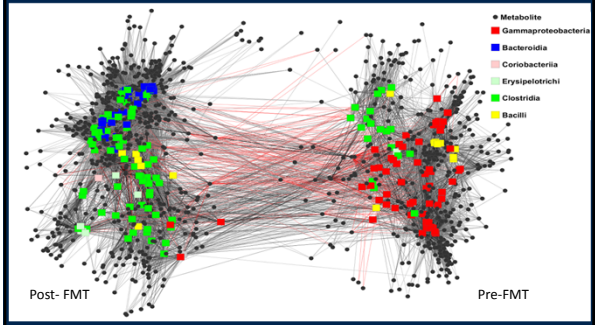
Pediatric Bile Acid Analysis



Pediatric Bile Acid Analysis



Microbe-metabolite Network in FMT



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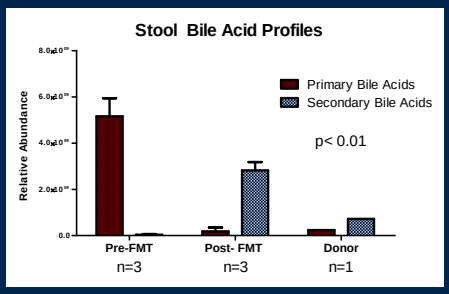
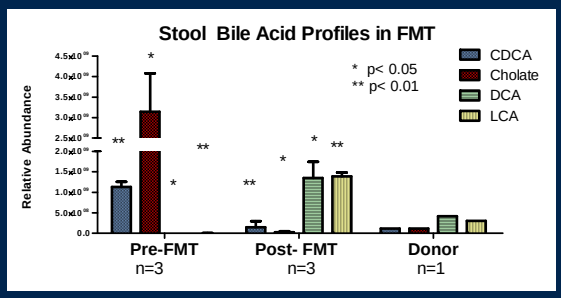
FMT patient stool bile acids

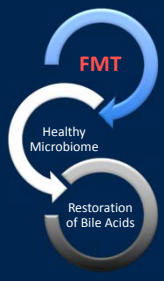


FMT patient stool bile acids



Conclusions

- Stool bile acids profiles in pediatric recurrent CDI patients show similar characteristics to adult patients with CDI: their profiles are ones that are favorable for *C. difficile* germination.
- FMT in these pediatric patients results in restoration of bile acid profiles to those of healthy children
- This suggests FMT functionally restores the microbiome, at least in respect to fecal bile acids.



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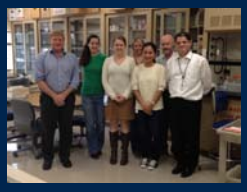

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