

E. aerogenes, and 1 carbapenem-resistant *E. aerogenes*. The microbiological data regarding the PMB-resistant enterobacterial species found in this study are shown in Table 1.

Resistance to carbapenems (formerly cephalosporins) among Enterobacteriaceae does matter, which could be interpreted as strong justification to be more liberal with polymyxins (formerly carbapenems) in empirical therapies.⁶ However, the degree to which this can be reflected among MDR organisms other than carbapenem-resistant ones, equally recovered from a setting with a high-level selection pressure, has not been evaluated properly.

Although the resistance rate was lower among MDR Enterobacteriaceae than among KPC producers (16.4% vs 34.8%, respectively) during the same period of evaluation, the outcome reported here is an important matter (and not a myth) because it illustrates a possible influence of PMB use on other bacteria whose infectious processes need not be treated with it.

Additionally, some important observations in this study follow: First, *K. pneumoniae* seems to be a specie with fitness for resistance acquisition. Second, although not as notable as the bloodstream, for example, the urinary site appears to be a reservoir for MDR organisms. Third, PMB resistance does occur without carbapenem resistance: among the 11 PMB-resistant isolates found in this study, only one *E. aerogenes* was a CRE (Table 1).

In conclusion, in this study, an important PMB resistance rate was detected among MDR Enterobacteriaceae isolates with the exception of the carbapenemase-producing ones. This finding emphasizes the need for a constant monitoring program to prevent the emergence of PMB resistance, not only among carbapenemase producers but especially among organisms that have a fitness to develop it.

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Leandro Reus Rodrigues Perez, PhD^{1,2}

Affiliations: 1. Hospital Mãe de Deus, Porto Alegre, Brazil; 2. Universidade Federal do Rio Grande do Sul, Porto Alegre, Brazil.

Address correspondence to Leandro Reus Rodrigues Perez, PhD, Microbiology Unit, Hospital Mãe de Deus, 286, José de Alencar Street, 90610-000, Porto Alegre, RS, Brazil (leandro.reus@gmail.com).

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Fear of Failure: Engaging Patients in Antimicrobial Stewardship after Fecal Transplantation for Recurrent *Clostridium difficile* Infection

To the Editor—Patients and family members are often perceived as part of the problem driving inappropriate use of antibiotics. Patients may request antibiotics due to factors such as the fear of adverse consequences if an infection is not treated or the belief that antibiotics will help them get better faster.¹ In our practices, patients commonly request antibiotics for vague complaints such as fatigue that they believe must be due to a urinary tract infection (UTI) despite the absence of urinary symptoms. Prior experiences in the healthcare system usually underlie such requests: inappropriate prescription of antibiotics for self-limited conditions such as viral upper respiratory infections (URTI) or asymptomatic bacteriuria leads to the belief that antibiotics may be beneficial despite controlled trials demonstrating no benefit.^{2,3}

The request for an antibiotic is further strengthened by a belief that antibiotics are relatively harmless; thus, the possible benefit outweighs any risk.^{3,4} In contrast to most patients, fecal microbiota transplantation (FMT) recipients for recurrent *Clostridium difficile* infection (CDI) have personal knowledge of the adverse consequences of antibiotics and are highly motivated to avoid antibiotics to prevent failure of the transplant. In our FMT practices, FMT recipients are encouraged to contact their FMT providers and/or have their physicians contact the FMT providers for consultation regarding antibiotic prescriptions after the transplant. Here, we report our experience with this antimicrobial stewardship intervention.

TABLE 1. Examples of Cases in which Fecal Microbiota Transplantation (FMT) Recipients Initiated Antimicrobial Stewardship Consultation with their FMT Providers

Case History	Recommendation
1. A 87-year-old nursing home resident had intermittent agitation without other symptoms or signs of infection. Urine culture sent by nursing home staff was positive and treatment was prescribed.	Asymptomatic bacteriuria; no antibiotic therapy indicated
2. A 78-year-old patient with upper respiratory symptoms with no fever was prescribed antibiotics.	Symptomatic therapy only; no antibiotic therapy indicated
3. A 69-year-old patient with chronic obstructive pulmonary disease exacerbation was prescribed moxifloxacin.	Prescribe doxycycline rather than moxifloxacin
4. A 75-year-old patient with leukocytosis and diarrhea 1 week after receiving an antibiotic for surgical prophylaxis and 5 months after FMT was prescribed broad-spectrum antibiotics.	Discontinue antibiotics; test for and treat CDI
5. A 65-year-old patient with history of total hip arthroplasty 2 years prior was prescribed antibiotics for dental cleaning.	No antibiotic prophylaxis indicated
6. A 74-year-old patient with history of malignancy was prescribed antibiotic prophylaxis prior to mediport placement.	No antibiotic prophylaxis indicated
7. A 71-year-old patient with mild paronychia was prescribed oral antibiotics.	Topical antibacterial therapy only

We reviewed medical records for 73 patients who received FMT between April 2013 and March 2016. We determined the frequency of consultation of the FMT physicians by patients and/or non-FMT providers. Antibiotic prescriptions that were recommended for the patients by non-FMT providers were classified as necessary or unnecessary based on practice guidelines and/or standard principles of infectious diseases management as described previously.⁵ We calculated the percentage of antibiotic recommendations that were deemed inappropriate and determined the percentage of recommendations that were accepted.

Of the 73 FMT recipients, 25 (34%) consulted their FMT physicians, either directly or through their non-FMT providers, regarding a total of 43 antibiotic prescriptions. The median time to first consultation was 71 days (range, 1–273 days). Urinary syndromes were the most common indications for antibiotic prescriptions (N = 17). Other syndromes included respiratory (N = 7), gastrointestinal (N = 7), dermatologic (N = 6), and dental prophylaxis (N = 6). Of 43 consultations, 26 (60%) antibiotic courses were deemed unnecessary, 7 (16%) were deemed necessary but an alternative regimen less frequently associated with CDI was recommended, and 10 (23%) were deemed necessary and the regimen was considered appropriate. The recommendations were accepted in 39 of 41 (95%) cases; for 2 cases it was not known whether the recommendation was accepted. Based on chart review, there were no adverse effects attributable to avoidance of antibiotics. Table 1 provides several representative examples of cases and antibiotic recommendations.

Our findings demonstrate that engaging patients in stewardship interventions can be an effective strategy to reduce inappropriate antibiotic use after FMT. FMT patients are an

ideal population for such interventions because they are motivated to avoid antibiotics because they fear failure of the transplant and they are aware that antibiotics pose the most important risk for recurrence. Other CDI patients would also be excellent candidates for such interventions if they are educated that receipt of non-CDI antibiotics is a major risk factor for recurrence of CDI.⁶

Patients with CDI often tell us that they were never informed of the risk of CDI when they received the antibiotics that caused their illness. The belief that there is minimal risk of adverse effects is an important factor that drives patient requests for antibiotics.^{1,4} Thus, there is clearly an opportunity to incorporate more information about the risks of CDI into all stewardship interventions. Patients should be provided with information on the risk of CDI at the time antibiotics are prescribed and the stories of patients who have had severe and/or recurrent episodes of CDI should be more widely disseminated. Patients will only be part of the solution to the problem of inappropriate use of antibiotics if they have a clear understanding that the risk of adverse effects might outweigh potential benefits.

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Michelle T. Hecker, MD;^{1,2}
Edith Ho, MD;^{2,3}
Curtis J. Donskey^{2,4}

Affiliations: 1. MetroHealth Medical Center, Cleveland, Ohio; 2. Case Western Reserve University School of Medicine, Cleveland, Ohio; 3. Gastroenterology Section, Louis Stokes Veterans Affairs Medical Center, Cleveland, Ohio; 4. Geriatric Research Education and Clinical Center, Louis Stokes Veterans Affairs Medical Center, Cleveland, Ohio.

Address correspondence to Curtis J. Donskey, MD, Geriatric Research Education and Clinical Center, Cleveland VA Medical Center, 10701 East Blvd, Cleveland, Ohio 44106 (curtisd123@yahoo.com).

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