



# Successful Gut Decolonization of Extended-Spectrum $\beta$ -Lactamase Producing *Klebsiella pneumoniae* Using Oral Lyophilized Fecal Microbiota Transplant (FMT) in a Woman with Recurrent Urinary Tract Infections

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## Introduction

- Recurrent urinary tract infections can be challenging problems in patients with indwelling catheters or anatomic abnormalities.
- Repeated courses of antibiotics increase the risk of becoming colonized with multidrug-resistant organisms (MDROs).
- The gastrointestinal tract can serve as a reservoir for drug resistant pathogens or resistance determinants, but a healthy fecal microbiome can provide colonization resistance against MDROs<sup>1</sup>.
- Fecal microbiota transplantation has emerged as a therapy for recurrent *Clostridioides difficile* infections, and may be able to restore colonization resistance to MDROs<sup>2</sup>.

## Methods



- FMT was performed using **PRIM-DJ2727**, an oral encapsulated lyophilized stool product under investigation for treatment of *C. difficile* infection.



Expanded Access Investigational New Drug Application protocol and IRB approval



1 week



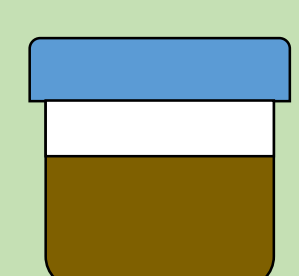
1 week



Three doses were given 1 week apart. Each dose contained 60 g total fecal matter lyophilized to 1g/dose.



Urine and stool samples were collected prior to treatment, 1 week after the final FMT dose, at transplant day +70, and transplant day +180.



Samples underwent nucleic acid extraction using the Qiagen DNeasy PowerSoil Kit and 16S rRNA sequencing on an Illumina MiSeq.

## Results

50 year old woman with an ileal conduit with urostomy and recurrent UTI due to ESBL-producing *K. pneumoniae* (ESBL *Kpn*).

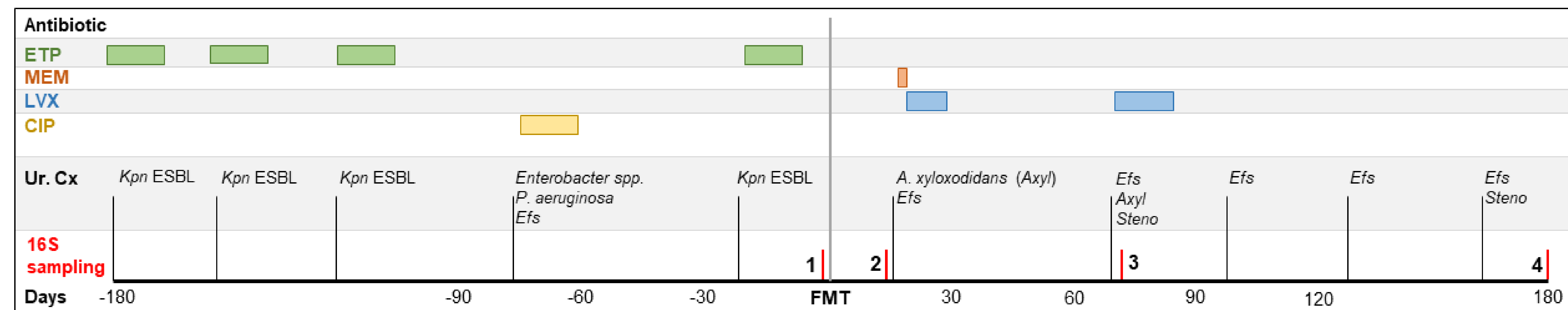


Figure 1. Timeline of clinical course.

ETP, ertapenem; MEM, meropenem; LVX, levofloxacin; CIP, ciprofloxacin; Axyl, *Achromobacter xylosoxidans*; Steno, *Stenotrophomonas maltophilia*; Efs, *Enterococcus faecalis*.

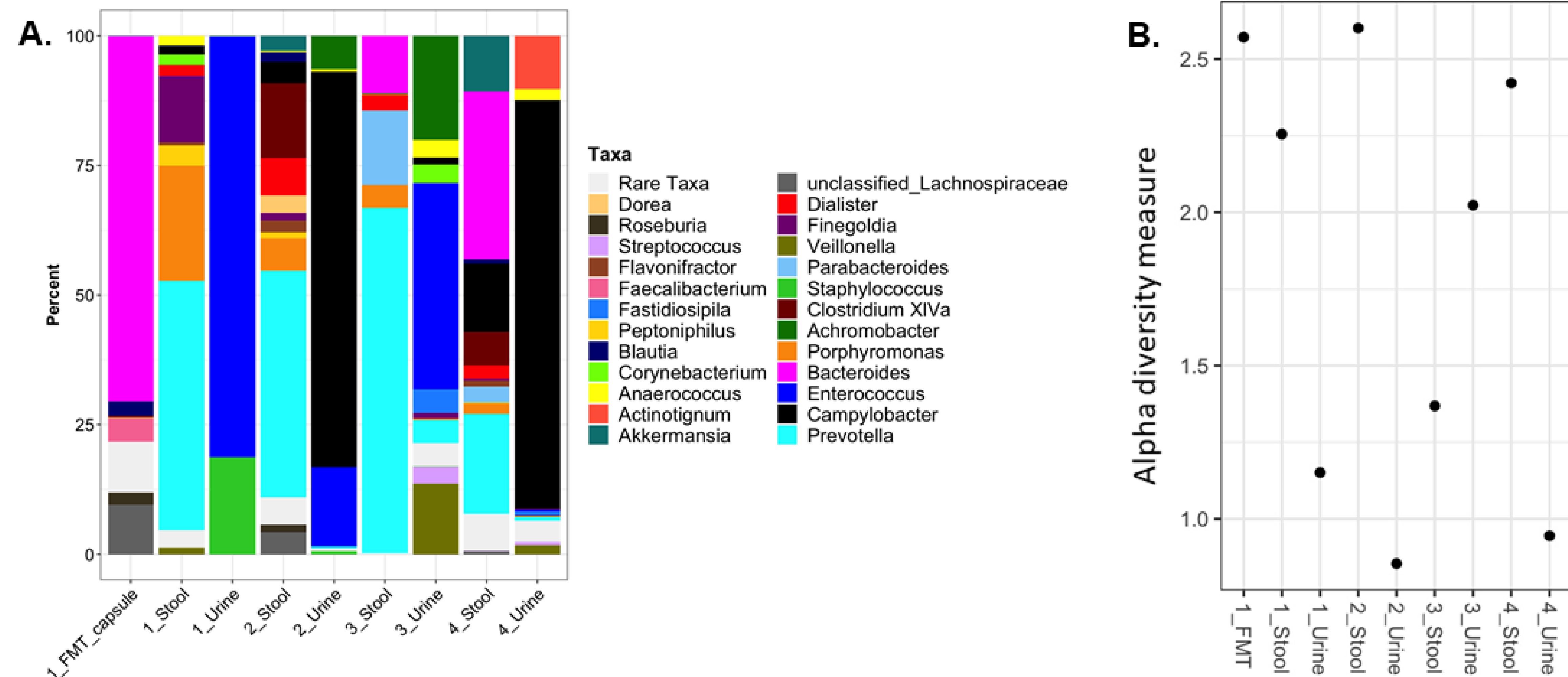


Figure 2. A) Relative abundance of taxa identified in urine and stool samples. Composition of the fecal microbiota transplant (FMT) capsule is shown in the first column. Numbers correspond to the sampling time as indicated in Figure 1. B) Alpha diversity by Shannon index. Numbers correspond to the sampling time as indicated in Figure 1.

## Conclusion

- Oral FMT was used to successfully decolonize a woman with recurrent UTIs due to ESBL *Kpn*.
- Stool  $\alpha$ -diversity increased after the transplant, and recovered by 6 months despite oral fluoroquinolone therapy.

## References

1. Kamada, N., et al., *Control of pathogens and pathobionts by the gut microbiota*. Nat Immunol, 2013. **14**(7): p. 685-90.
2. Saha, S., et al., *Faecal microbiota transplantation for eradicating carriage of multidrug-resistant organisms: a systematic review*. Clin Microbiol Infect, 2019. **25**(8): p. 958-963.