**The use of faecal microbiota transplant as treatment for recurrent or refractory *Clostridium difficile* infection and other potential indications: joint British Society of Gastroenterology (BSG) and Healthcare Infection Society (HIS) guidelines.**

**Additional Appendices:**

**Appendix A. Scope**

1. **Guideline title**

The use of faecal microbiota transplant as treatment for recurrent or refractory *Clostridium difficile* infection and other potential indications: joint British Society of Gastroenterology (BSG) and Healthcare Infection Society (HIS) guidelines.

* 1. **Short title**

The use of faecal microbiota transplant

1. **The remit**

i. To review the evidence (include randomised trial evidence) for the efficacy of faecal microbiota transplant (FMT) in the treatment of adults (≥18 years), both in *Clostridium difficile* infection (CDI) and in other clinical conditions, and use this to make recommendations about optimal recipient selection and management, donor assessment, material preparation and administration, and other key elements of FMT delivery.

ii. To provide specific guidance about best practice for an FMT service within the context of the regulatory framework for the intervention as it currently exists in the UK and beyond.

Whilst this is not a guideline specifically addressing the management of *Clostridium difficile* infection (CDI), the working group will include consideration of where FMT should be considered within the conventional treatment algorithm of patients with CDI (specifically, in which patients it should be considered, and at which point in their care).

The working group agreed that for the purposes of this guideline, faecal microbiota transplant would be defined as treatment that involves the administration of manipulated whole stool. There is a growing literature of the use of ‘bacteriotherapy’ originally deriving from healthy donor stool as a potential alternative to FMT (including commensal bacteria, spores, bacteriophages and/ or bacterial proteins or metabolites). However, the working group considered this to still be at the research stage, and would not be considered further.

* 1. **Population**
     1. **Groups that will be covered**

Adults (≥18 years) in whom: i. FMT has been used as treatment for CDI.

ii. FMT has been used as treatment for a non-CDI indication.

Given the variability in the means used to diagnose CDI within different studies, the working group agreed to consider the suitability of the definition used on a study-by-study basis.

* + 1. **Groups that will not be covered**

Children and young people (<18 years).

* 1. **Healthcare setting**

All settings in which National Health Service care is received, and/ or clinical trials are undertaken.

* 1. **Clinical management**
     1. **Key clinical issues that will be covered**

1. Appropriate selection of patients with CDI for FMT, and best practice in their management post-FMT.
2. Optimal selection of donors of faecal material, and maintenance of a donor pool.
3. Identification of the preferred means of preparation and administration of FMT to recipients.
4. Evaluation of the safety and efficacy of FMT in treating non-CDI indications.
5. Best practice in the development and delivery of an FMT service.
   * 1. **Clinical issues that will not be covered**
6. General management of CDI.
7. General management of non-CDI conditions in which FMT may have a role in therapy.
   1. **Main outcomes**

Recommendations for practice

1. Patient/ recipient selection, and peri-FMT management
2. Donor selection
3. Preparation and administration of FMT
4. Efficacy and safety of FMT for non-CDI indications
5. Provision of an FMT service
   1. **Economic aspects**

Where FMT is being provided under a MHRA license according to Good Manufacturing Practice (GMP) standards, there are significant costs associated with initial setup and maintenance of the service. These include the cost of obtaining the relevant license, laboratory design and equipment to enable quality assurance, storage facilities for samples, etc. However, there is counterbalance to this, as the expectation of the working group is that the publication of this guideline may encourage provision of FMT as treatment for recurrent or refractory CDI. This has consistently been shown to be cost effective in comparison with anti-*C. difficile* antimicrobial therapy31–34, so overall costs associated with treating the condition may actually decrease. Furthermore, there may be changes to the practice of clinicians already offering the service. For example, encouraging the use of healthy unrelated donors (who can provide multiple stool donations after one screening) reduces the cost of screening when compared to the use of an FMT recipient’s relative as donor, who is likely to provide one donation only.

* 1. **Status**
     1. **Scope**

This is the final scope.

* + 1. **Timing**

The development of the guideline recommendation will begin in July 2017.

1. **Related NICE guidance**

National Institute for Health and Care Excellence. *Faecal microbiota transplant for recurrent Clostridium difficile infection.* NICE Interventional Procedures Guidance IPG485. London: NICE; 2014. Available at:

<https://www.nice.org.uk/guidance/ipg485> [last accessed 19th December 2017].

1. **Further information**

*Guideline development process*

Scottish Intercollegiate Guidelines Network. *SIGN 50: a guideline developer's handbook.* Revised edition.Edinburgh: Healthcare Improvement Scotland; 2014. Available at: <http://www.sign.ac.uk> [last accessed December 2017].

**Appendix B. Declarations of interest**

B.1. *Introduction*

All members of the Working Group were required to make formal declarations of interest at the outset, and these were updated throughout the development process. No interests were declared that required any actions.

B.2. *Tariq Iqbal*

First meeting 19/07/17: no declarations of interest; second meeting 04/10/17: no change.

Third meeting 19/10/17: consultant, advisor or speaker for: Pharmacosmos and Shield Therapeutics.

B.3. *Simon Goldenberg (co-chair)*

First meeting 19/07/17

Advisory board and/ or consultancy and/ or speaker fees: Astellas, MSD, Pfizer.

Second meeting 04/10/17; third meeting 19/10/17: no change.

No action required.

B.4. *Ailsa Hart*

First meeting 19/07/17

Advisory board and/ or consultancy and/ or speaker fees: AbbVie, Atlantic, Bristol-Myers Squibb, Celltrion, Falk, Ferring, Janssen, MSD, Napp Pharmaceuticals, Pfizer, Pharmacosmos, Shire and Takeda. Global steering committee for Genentech.

Second meeting 04/10/17; third meeting 19/10/17: no change.

No action required.

No declared conflict of interests for the other participants.

**Appendix C. Clinical evidence tables**

**C.1. Reviewed case series of FMT for recurrent or refractory CDI**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Paper** | **Study and patient characteristics** | **Donor characteristics** | **FMT characteristics** | **Outcomes** | **Adverse events** | **CRD** |
| Aas *et al, Clinical Infectious Diseases,* 2003 | Case series.  Number of patients: 18.  Female: male 13:5.  Age (mean): 73+/-9 (range 53-88) years.  Comorbidities: x1 patient with Crohn's colitis, x1 with leukaemia.  CDI features: Recurrent (at least 2 x laboratory-confirmed CDI after initial antibiotic treatment).  CDI diagnosis confirmation: Cytotoxin A and B positivity.  Pre-FMT antibiotics: Metronidazole +/- vancomycin (not defined). | Donors were 15 family members, and 3 clinical volunteers.  Working in healthcare: Yes - for 3 donors.  Donor demographics: Not defined.  Donor screening: Questionnaire not explicitly stated.  Travel and antibiotic exclusion period: No antibiotics for 6 months prior; nil stated regarding travel.  Screening blood tests: Hepatitis A, B and C, HIV-1/-2, syphilis.  Screening stool tests: C.*difficile*, enteric pathogens, ova, cysts and parasites. | Amount of stool per transplant / administered to patients: 30g stool in 50-70ml normal saline; only 25ml of total administered to patient.  Diluent used to prepare: Normal saline.  Diluent used to store if frozen: N/A – fresh.  Preparation methods: Homogenised in domestic blender, then coffee filter.  Time from preparation to transplant (fresh): 6 hours.  Time period for storage (frozen): N/A.  Route administered: Upper GI: all nasogatric (18); lower GI: nil; capsules: nil.  Number of infusions: Single infusion for all patients.  Bowel purgative: Not described.  PPI: 20mg omeprazole on day prior to FMT and day of FMT.  Antimotility: Not described.  Prokinetics: Not described.  Time before CDI treatment was stopped before FMT: Continued until day of FMT. | Overall cure within stated follow up period: 83.3% (n=15/18).  Cure with one infusion alone: 83.3% (n=15/18).  Total follow-up period: 90 days. | Minor GI adverse events: Nil stated.  Minor non-GI adverse events: Nil stated.  Serious adverse events: Nil stated.  Deaths: x2 - one related to ESRF, one related to COPD. | Selection/ eligibility reported: Yes.  Consecutively recruited: Yes.  Prospectively recruited: No.  Loss to follow up explained: Yes.  At least 90% followed up: No - 89%. |
| Agrawal *et al, Journal of Clinical Gastroenterology,* 2016 | Case series.  Number of patients: 146.  Female: male: 100: 46.  Age(mean): 78.6 (range 65-97) years.  Comorbidities: Immunosupression in 15 patients (x3 Crohn’s, x2 UC, x1 renal transplant)  CDI features: 89 with recurrent CDI.  CDI diagnosis confirmation: As per ACG guidelines.  Pre-FMT antibiotics: All had prior metronidazole, vancomycin and/ or fidaxomicin. | Donors were identified by the patient or - if not available - provided by the physician.  Working in healthcare: Not stated.  Donor demographics: No antibiotics for last three months. Excluded if significant GI disease, metabolic syndrome, chronic illness, immunocompromise, recent travel, and/ or high risk lifestyle in last three months.  Donor screening: Questionnaire - excluded if significant GI disease, metabolic syndrome, chronic illness, immunocompromise, recent travel, high risk lifestyle in last three months.  Travel and antibiotic exclusion period: Exclusion if travel to an area of high incidence of infectious diarrhoea, and/ or antibiotics within past three months.  Screening blood tests: Hepatitis A, B and C, HIV-1/-2, syphilis.  Screening stool tests: *C difficile*, enteric pathogens, ova, cysts and parasites, *Giardia*, *Cryptosporidium*, *Isospora, H. pylori,* Rotavirus*.* | Amount of stool per transplant / administered to patients: 60-100g of fresh stool.  Diluent used to prepare: Normal saline, upper GI: 75-200ml; lower GI: 250-400ml; enema: 150-200ml.  Diluent used to store if frozen: N/A – fresh.  Preparation methods: Handstirred and blender, sifted through gauze.  Time from preparation to transplant (fresh): Not stated.  Time period for storage (frozen): N/A.  Route administered: upper GI (16); lower GI (130); capsules: nil.  Number of infusions: 1 routinely; 2nd infusion given with vancomycin so data unable to be extracted.  Bowel purgative: PEG on day prior to FMT.  PPI: Not stated.  Antimotility: Loperamide on day of FMT.  Prokinetics: Not stated.  Time before CDI treatment was stopped before FMT: Between 3 days prior to FMT and one day prior to FMT. | Overall cure within stated follow-up period: 83% (n=121/146) .  Cure with one infusion alone: 83% (n=121/146) .  Total follow up period: mean follow up was 12.3 months (range 1-48 months). | Minor GI adverse events: Nil stated.  Minor non-GI adverse events: Nil stated.  Serious adverse events: x2 microscopic colitis, x1 Sjögren’s, x1 scalp follicular lymphoma, x1 contact dermatitis and idiopathic Bence-Jones gammaglobulinaemia. In addition, x1 SCC, x1 ileus (died two weeks after ileus), x1 colonic perforation secondary to CMV colitis and subsequent death after 1 year. Patients developing cancers had underlying risk factors.  Deaths: x10 (x4 decompensated CCF, x3 malignancies, x1 dementia, x1 stroke, x1 pneumonia); deaths between 19 days to 7 months post-FMT. | Selection/ eligibility reported: Yes.  Consecutively recruited: Yes.  Prospectively recruited: No.  Loss to follow up explained: No.  At least 90% followed up: No. |
| Alrabaa *et al, Transplant Infectious Diseases,* 2017 | Case series.  Number of patients: 13.  Female: male: 8:5.  Age (median): 69 (range 59-74) years.  Comorbidities: Yes - x4 OLT, x1 kidney/ liver transplant, x1 lung transplant, x1 HIV+ with CD4 count of 453. x1 immunocompromised patients with IBS, x1 immunocompetent patient with IBS; no IBD patients.  CDI features: Not clear if recurrent or refractory. Mean of 4 previous episodes of CDI prior to FMT.  CDI diagnosis confirmation: PCR.  Pre-FMT antibiotics: All patients had previously had oral vancomycin, x7 prev metronidazole (either with or without vancomycin). x5 received fidaxomicin with or after oral vancomycin. | Donors were unrelated.  Working in healthcare: Nox  Donor demographics: As per OpenBiome protocolx  Donor screening: Questionnaire - as per OpenBiome protocolx  Travel and antibiotic exclusion period: As per OpenBiome protocolx  Screening bloods: FBC, hepatitis A, B and C, LFTs, HIV, HTLV-1/-2, syphilis.  Screening stools: C.*difficile* toxin, MC&S, ova, cysts and parasites, *H.pyl*ori stool antigen. | Amount of stool per transplant / administered to patients: 12.5g of stool in 28.5g of product.  Diluent used to prepare: normal saline - diluted to approx 100-150ml to administer.  Diluent used to store if frozen: Not clear.  Preparation methods: As per OpenBiome protocol.  Time from preparation to transplant (fresh): N/A.  Time period for storage (frozen): As per OpenBiome protocol - not described in paper.  Route administered: Upper GI (nasoduodenal): 13; lower GI: 0; capsules: nil.  Number of infusions: One routinely, but retreated if relapsed after primary outcome. However - one renal transplant patient received 2 doses of FMT on consecutive days (with successful outcome).  Bowel purgative: Bowel preparation used - GoLytely (PEG).  PPI: 40mg pantoprazole night before and morning of procedure.  Antimotility: Loperamide 4mg 1 hour post FMT.  Prokinetics: Not described.  Time before CDI treatment was stopped before FMT: See last box. | Overall cure within stated follow up period: 84.6% (*n*=11/13) at eight weeks post-FMT.  Cure with one infusion alone: 100% (*n*=13/13) at 5 days.  Total follow up period: Follow up up to 8 weeks described. | Minor GI adverse events: Several patients transient cramps and/ or diarrhoea.  Minor non-GI adverse events: Nil noted.  Serious adverse events: x1 patient had episode of CMV reactivation at the time of FMT - thought unrelated. X1 patient had episode of mild transplant rejection two months after FMT - thought unrelated.  Deaths: None. | Selection/ eligibility reported: Yes.  Consecutively recruited: Not clearly described.  Prospectively recruited: No.  Loss to follow up explained: Yes.  At least 90% followed up: Yes. |
| Brandt *et al, American Journal of Gastroenterology,* 2012 | Case series.  Number of patients: 77.  Female: male: 56: 21.  Age (mean): 65+/-17 (range 22-87) years.  Comorbidities: Not stated.  CDI features: All recurrent/ refractory.  CDI diagnosis confirmation: Not clear.  Pre-FMT antibiotics: 62 patients had had prior metronidazole, 76 vancomycin (25 tapered vancomycin), 17 rifaximin. | Donors were 45 spouses/ partners; 21 relatives; 1 unknown person.  Working in healthcare: No.  Donor demographics: No antibiotics within past 3 months.  Donor screening: Questionnaire - not stated.  Travel and antibiotic exclusion period: Excluded if travel to area of high incidence of infectious diarrhoea, or if antibiotics within past three months.  Screening blood tests: HIV-1, HIV-2, hepatitis A, B and C, Syphillis.  Screening stool tests: *Clostridium difficile toxin* (if unavailable then EIA), MC&S, *Giardia, Cryptosporidium*, ova, cysts and parasites, *H.pylori*, Acid Fast stain for *Cyclospora, Isospora.* | Amount of stool per transplant / administered to patients: 6 tablespoons of stool up to entire donation; 300-700ml of transplant administered.  Diluent used to prepare: Normal saline.  Diluent used to store if frozen: N/A – fresh.  Preparation methods: Hand blender used to prep.  Time from preparation to transplant (fresh): Within 8 hours.  Time period for storage (frozen): N/A.  Route administered: Upper GI: 0; lower GI: all 77 colonoscopic.  Number of infusions: 77 patients had one (patients that had second not included because given with concurrent vancomycin).  Bowel purgative: All patients given prep but no details.  PPI: Not described.  Antimotility: Not described.  Prokinetics: Not described.  Time before CDI treatment was stopped before FMT: 3 days. | Overall cure within stated follow up period: N/A.  Cure with one infusion alone: 90.9% (*n*=70/77).  Total follow up period: not clear, but some patients followed-up to 3 years. | Minor GI adverse events: Not stated.  Minor non-GI adverse events: Not stated.  Serious adverse events: Nil.  Deaths: x7 deaths (cause unknown in one case, x1 metastatic colorectal cancer (present from pre-FMT), x1 metastatic ovarian cancer, x1 pneumonia (non-enteric organism), x1 MI, x1 stroke, x1 sepsis five months after FMT. | Selection/ eligibility reported: Yes.  Consecutively recruited: Not clear.  Prospectively recruited: No.  Loss to follow up explained: Reported but not explained.  At least 90% followed up: No - only 77%. |
| Brumbaugh *et al, Journal of Pediatrics,* 2017 | Case series.  Number of patients: 42.  Female: male: 23: 19.  Age (median): 9 (range 1 -18) years.  Comorbidities: 31% had IBD (x4 Crohn's, x9 UC); 29% 'medically complex', including oncological, metabolic, cardiopulmonary or neurological diagnoses.  CDI features: All children had had at least one course of vancomycin. Previously recurrent - at least 2 episodes.  CDI diagnosis: Diarrhoea, haematochezia and/ or crampy abdominal pain in combination with positive *C. difficile* PCR.  Pre-FMT antibiotics: Not stated. | Donor: OpenBiome-supplied FMT.  Working in healthcare: No.  Donor demographics: Not stated.  Donor screening: Questionnaire: As per OpenBiome protocol.  Travel and antibiotic exclusion period: As per OpenBiome protocol.  Screening bloods: As per OpenBiome protocol.  Screening stools: As per OpenBiome protocol. | Amount of stool per transplant / administered to patients: 30ml OpenBiome aliquot/ capsule, although not defined re stool quantity.  Diluent used to prepare: As per OpenBiome protocol  Diluent used to store if frozen: As per OpenBiome protocol  Preparation methods: As per OpenBiome protocol  Time from preparation to transplant (fresh): None given fresh  Time period for storage (frozen): N/A  Route administered: Upper GI: 41, nasogastric administration (some children used pre-existing gastrostomy);  lower GI: 0; capsules: 1 (1 x 30 capsules).  Number of infusions: 1 routinely  Bowel purgative: Not stated  PPI: Rantidine for 24hrs prior to FMT  Antimotility: N/A  Prokinetics: N/A  Time before CDI treatment was stopped before FMT: 48 hours, after minimum of 5 days of vancomycin. | Overall cure within stated follow up period: 71% (*n*=30/42).  Cure with one infusion alone: 71% (*n*=30/42) - remission in 94% (*n* =16/17) otherwise healthy children, 54% (*n* =7/13) (54%) with IBD, 75% (*n*=9/12) medically complex. Success in 71% of children when via NGT, and 67% via gastrostomy (non-significant).  Total follow up period: 5 patients with initial failure opted for 2nd and 2 cured, so total success of 76% (*n*=32/42). | Minor GI adverse events: 6/47 FMT administrations accompanied by vomiting within 24hrs; self-resolved.  Minor non-GI adverse events: Nil reported.  Serious adverse events: Nil reported.  Deaths: Nil reported. | Selection/ eligibility reported: Yes.  Consecutively recruited: Yes.  Prospectively recruited: No.  Loss to follow up explained: Yes.  At least 90% followed up: Yes. |
| Chin et al, *Clinical Gastroenterology & Hepatology,* 2016 | Case series.  Number of patients: 35.  Female: male: 16: 19.  Age (mean): 43 (range 8 -93) years.  Comorbidities: IBD in all, 8 on corticosteroids, 3 on Immunomodulators, 11 on biologics.  CDI features: Recurrent - at least 2 episodes.  CDI diagnosis confirmation: Not stated.  Pre-FMT antibiotics: Not stated. | Donors were age 18 - 50, no medications, BMI 18.5 – 25.  Working in healthcare: Not stated.  Donor demographics: Not stated.  Donor screening: Questionnaire - adapted from US blood bank.  Travel and antibiotic exclusion period: Excluded if antibiotic within past six months.  Screening blood tests: FBC, U&E, LFTs, CRP, ANA, hepatitis A, B and C, HBV, HIV-1/-2, syphilis.  Screening stool tests: Faecal occult blood, rotavirus, bacterial pathogens, ova, cysts and parasites, Acid fast stain for *Giardia* and *Cryptosporidium*, *C difficile*, *H. pylori.* | Amount of stool per transplant / administered to patients: 41g of stool on average.  Diluent used to prepare: Normal saline.  Diluent used to store if frozen: Frozen in 10% glycerol.  Preparation methods: Ambient air.  Time from preparation to transplant (fresh): N/A; given fresh.  Time period for storage (frozen): Up to 156 days.  Route administered: Upper GI: 5 via nasogastric tube; lower GI: 3 via colonoscopy; capsule: 27 patients.  Number of infusions: Not stated.  Bowel purgative: Not routinely - just for colonoscopy (4 litres of PEG).  PPI: 7 on PPI not as premedications.  Antimotility: Not described.  Prokinetics: Not described.  Time before CDI treatment was stopped before FMT: 2 days prior to FMT. | Overall cure within stated follow up period: N/A.  Cure with one infusion alone: Not stated.  Total follow up period: At least 2 months (range 2 to 6 months). | Minor GI adverse events: Not specified.  Minor non-GI adverse events: Not specified.  Serious adverse events: two required surgery (diverting colostomy and total proctectomy), two developed perianal disease with no prior history of it.  Deaths: Ni. | Selection/ eligibility reported: No.  Consecutively recruited: No.  Prospectively recruited: No.  Loss to follow up explained: No.  At least 90% followed up: No. |
| Cohen et al, *Israel Medical Association Journal,* 2016 | Case series.  Number of patients: 22.  Female: male: 9: 13.  Age (median): Median 71.5 (range 16-92) years.  Comorbidities: x1 IBD (colonoscopic group), x2 patients on chemotherapy, unclear why.  CDI features: Recurrent or refractory.  CDI diagnosis confirmation: Diarrhoea and toxin testing.  Pre-FMT antibiotics: 19 patients given previous metronidazole, 9 vancomycin (with 13 both together). | Donors were 13 unrelated, 9 related.  Working in healthcare: Yes - for unrelated.  Donor demographics: No details - just says screening similar to blood donors.  Donor screening: Questionnaire - no details.  Travel and antibiotic exclusion period: Excluded if antibiotics within past six months.  Screening bloods: No details.  Screening stools: No details. | Amount of stool per transplant / administered to patients: 60g stool average (35-75g), 250ml total once mixed with saline (100 - 300ml range).  Diluent used to prepare: Normal saline.  Diluent used to store if frozen: Not stated.  Preparation methods: Some fresh, some frozen.  Time from preparation to transplant (fresh): Not stated.  Time period for storage (frozen): No details.  Route administered: Upper GI: nasoduodenal in 10; lower GI: colonoscopic in 12.  Number of infusions: 1 FMT.  Bowel purgative: 3l of PEG if colonoscopic administration.  PPI: PPI if upper GI administration.  Antimotility: Not described.  Prokinetics: Metoclopramide just prior to upper GI administration.  Time before CDI treatment was stopped before FMT: 12-24hrs. | Overall cure within stated follow up period: 72.7% (*n*=16/22) at 2 months.  Cure with one infusion alone: 72.7% (*n*=16/22) (5/10 upper GI (out of 7 analysed), 91.7% (*n*=11/12) for lower GI (out of 11 analysed)).  Total follow up period: Results reported at two months, but followed up to six months (7 months in the upper GI arm and 5 in the lower GI arm followed up to 6 months). | Minor GI adverse events: x5 transient constipation/ abdominal discomfort.  Minor non-GI adverse events: Not stated.  Serious adverse events: See deaths.  Deaths: x7 (x1 due to CDI, x1 chronic resp disease, x1 related to dialysis, x2 pneumonia, x1 sepsis at ten days post-FMT (aspiration of stool; had been gastroscopic administration), x1 died at home ?cause). | Selection/ eligibility reported: Yes.  Consecutively recruited: Yes.  Prospectively recruited: No.  Loss to follow up explained: Yes.  At least 90% followed up: Yes. |
| Costello *et al, Alimentary Pharmacology and Therapeutics,* 2015 | Case series.  Number of patients: 20.  Female: male: not stated.  Age(median): 69 years.  Comorbidities: Not stated.  CDI features: All recurrent.  CDI diagnosis confirmation: Not stated.  Pre-FMT antibiotics: Conventional therapy with metronidazole, vancomycin and/or fidaxomicin had failed in all. | Donors were 4 healthy volunteers.  Working in healthcare: No.  Donor demographics: No details.  Donor screening: Questionnaire - adapted from US blood bank.  Travel and antibiotic exclusion period: Excluded if travel to diarrhoea-endemic areas witihin 6 months and/ or used antibiotics for 3 months.  Screening blood tests: HIV -1 and -2, hepatitis A, B and C, and syphillis*.*  Screening stool tests: *C difficile* toxin B PCR, routine MC&S, faecal *Giardia* antigen, faecal C*ryptosporidium*, Acid-fast stain for *Cyclospora, Isospora*, ova, cysts and parasites, *H.pylori* fecal antigen. | Amount of stool per transplant / administered to patients: Not stated.  Diluent used to prepare: Normal saline.  Diluent used to store if frozen: 10% glycerol.  Preparation methods: Anaerobically prepared.  Time from preparation to transplant (fresh): all frozen.  Time period for storage (frozen): 16 patients had stool stored for < 2 months. 4 patients had stool stored > 2 months.  Route administered: Upper GI: 1; lower GI: 19; capsule: nil.  Number of infusions: 17 patients had 1, 3 patients had 2.  Bowel purgative: Not reported.  PPI: Not reported.  Antimotility: Not reported.  Prokinetics: Not reported.  Time before CDI treatment was stopped before FMT: Not reported. | Overall cure within stated follow up period: 85% (*n*=17/20).  Cure with one infusion alone: 85% (*n*=17/20).  Total follow up period: Minimum 3 months (but up to 14 months). | Minor GI adverse events: None.  Minor non-GI adverse events: None.  Serious adverse events: None.  Deaths: None. | Selection/ eligibility reported: Yes.  Consecutively recruited: Yes.  Prospectively recruited: No.  Loss to follow up explained: Yes.  At least 90% followed up: Yes. |
| Emanuelsson *et al, Scandanavian Journal of Infectious Diseases,* 2014 | Case series.  Number of patients: 23.  Female: male: 14: 9.  Age (median): 66 years (range 25-99) years (including 8 additional patients treated with ‘bacteriotherapy’).  Comorbidities: 3 with diabetes mellitus, 1 with microscopic colitis.  CDI features: All recurrent.  CDI diagnosis confirmation: Culture and/or toxin EIA.  Pre-FMT antibiotics: Metronidazole and/or vancomycin used in all patients beforehand. | Donors were spouses or close relative.  Donor working in healthcare: No.  Donor demographics: Not stated.  Donor screening:  Questionnaire – asked regarding current and previous GI diagnoses/ symptoms.  Travel and antibiotic exclusion period: Definitely an antibiotic use restriction but not clearly stated.  Screening blood tests: HIV-1 and -2, hepatitis C virus, and hepatitis B surface antigen.  Screening stool tests: *Salmonella, Shigella, Campylobacter,* enterohemolytic *Escherichia coli,* and *Clostridium difficile.* | Amount of stool per transplant / administered to patients: 50g in 500mls.  Diluent used to prepare: Normal saline.  Diluent used to store if frozen: N/A - fresh.  Preparation methods: Anaerobically prepared.  Time from preparation to transplant (fresh): Not stated.  Time period for storage (frozen): N/A.  Route administered: Upper GI: nil; ower GI: 23 (enema/ rectal catheter); capsules: nil.  Number of infusions: 22 patients eceived 1 FMT, 1 patient received 2 FMTs.  Bowel purgative: Not stated.  PPI: Not stated.  Antimotility: Not stated.  Prokinetics: Not stated.  Time before CDI treatment was stopped before FMT: Not stated. | Overall cure within stated follow up period: 65% (*n*=15/23).  Cure with one infusion alone: 65% (*n*=15/23).  Total follow up period: Median follow up of 18 months (range 0-201 months). | Minor GI adverse events: None.  Minor non-GI adverse events: None.  Serious adverse events: None.  Deaths: None. | Selection/eligibility reported: Yes.  Consecutively recruited: Yes.  Prospectively recruited: No.  Loss to follow up explained: Yes.  At least 90% followed up: Yes. |
| Fischer *et al, Inflammatory Bowel Diseases,* 2016 | Case series  Number of patients: 67  Female: male: 39:28  Age (mean/ standard deviation): Mean 45.42 (+/-17.33) years.  Comorbidities: x5 PSC, x4 liver transplant, x3 end stage liver disease, concurrent IBD in all (x35 Crohn’s, x31 UC, x1 indeterminate colitis).  CDI features: recurrent or refractory.  CDI diagnosis confirmation: Return of diarrhoea and positive CDI testing within 12 weeks of FMT.  Pre-FMT antibiotics: metrronidazole in 47 patients, vancomycin in 63, vancomycin taper in 38 patients,, fidaxomicin in 7, rifaxamin in 7. | Donors were patient-directed donor or unrelated healthy volunteers.  Donors working in healthcare: not stated.  Donor demographics: As per Bakken *et al, Clin Gastroenterol Hepatol,* 2011.  Donor screening: Questionnaire - as per Bakken *et al, Clin Gastroenterol Hepatol,* 2011.  Travel and antibiotic exclusion period: Excluded as donor if travel within last 6 months where diarrheal illnesses are endemic or risk of travelers diarrhea is high, and/ or use of antibiotics within 3 months.  Screening blood tests: HIV -1&-2, hepatitis A, B and C, syphilis.  Screening stool tests: As per Bakken *et al, Clin Gastroenterol Hepatol,* 2011. | Amount of stool per transplant / administered to patients: lower GI:-25-50ml; upper GI: 250-500ml.  Diluent used to prepare: Preservative-free normal saline or 4% milk.  Diluent used to store if frozen: N/A – fresh.  Preparation methods: Household blender, homogenized and removal of particle matter with gauze/ urine strainers in a Biohazard Level 2 facility.  Time from preparation to transplant (fresh): Certainly within 24 hours, and preferably within 6 hours.  Time period for storage (frozen): N/A.  Route administered: Upper GI: nil; lower GI: 67 (colonoscopy or sigmoidoscopy); capsule: nil.  Number of infusions: 53 patients received one infusion, 14 received 2 infusions.  Bowel purgative: Standard bowel preparation, but not specified.  PPI: If upper GI administration, PPI on the evening before and morning of the procedure.  Antimotility: Loperamide optional for lower GI administration.  Prokinetics: Not stated.  Time before CDI treatment was stopped before FMT: 24-48 hrs. | Overall cure within stated follow up period: 90% (*n*=60/67) within 3 months.  Cure with one infusion alone: 79% (*n*=53/67).  Total follow up period: average length 10.4 (range 3-36) months. | Minor GI adverse events: x1 IBD flare, managed as outpatient.  Minor non-GI adverse events: x4 pneumonia.  Serious adverse events: x1 colectomy for refractory IBD,x7 hospitalised, x2 CDI recurrence, x2 IBD exacerbation, x1 small bowel obstruction, x1 CMV colitis.  Deaths: none. | Selection/ eligibility reported: Yes.  Consecutively recruited: No.  Prospectively recruited: No.  Loss to follow up explained: N/A.  At least 90% followed up: N/A. |
| Fischer *et al, American Journal of Gastroenterology,* 2016 | Case series.  Number of patients: 328.  Female: male: 241: 87.  Age (mean/ standard deviation): 61.4 (+/-19.3) years.  Comorbidities: 77 immunocompromised (x3 CVID, x3 selective IgA deficiency, x71 immunosupressants (20 for solid organ transplant, 29 for IBD, 6 for rheumatoid arthritis, 2 for SLE, 1 for pemphigoid, 1 for chronic obstructive airway disease, 1 for psoriasis)), x11 chemotherapy for malignancy, x63 IBD (25 UC, 33 Crohn’s), x118 diverticulosis.  CDI features: Recurrent disease in 87.2% and severe or severe-complicated in 12.8%.  CDI diagnosis confirmation: Postive stool *C difficile* toxin or PCR.  Pre-FMT antibiotics: vancomycin. | Donors were 130 (40%) patient-directed donors, and 198 universal (60%).  Donor working in healthcare: Not stated.  Donor demographics: Not stated.  Donor screening: Questionnaire – depended upon individual centre.  Travel and antibiotic exclusion period: Depended upon individual centre.  Screening blood tests: Depended upon individual centre.  Screening stool test: Depended upon individual centre. | Amount of stool per transplant / administered to patients: Not specified.  Diluent used to prepare: Not specified.  Diluent used to store if frozen: Both fresh and frozen, but specific details not given.  Preparation methods: Dependent upon individual centre.  Time from preparation to transplant (fresh): Dependent upon individual centre.  Time period for storage (frozen): Dependent upon individual centre.  Route administered: Not specified (‘predominantly colonoscopy’).  Number of infusions: Dependent upon individual centre.  Bowel purgative: Not specified.  PPI: Not specified.  Antimotility: Not specified.  Prokinetics: Not specified.  Time before CDI treatment was stopped before FMT: Dependent upon each centre. | Overall cure within stated follow up period: 1 month 81.4% (*n=*267/328).  Cure with one infusion alone: Not specified.  Total follow up period: Not specified. | Minor GI adverse events: Not specified.  Minor non-GI adverse events: Not specified.  Serious adverse events: Not specified.  Deaths: Not specified. | Selection/ eligibility reported: Yes.  Consecutively recruited: No.  Prospectively recruited: No.  Loss to follow up explained: N/A.  At least 90% followed up: N/A. |
| Fischer *et al, Gut Microbes,* 2017 | Case series.  Number of patients: 57.  Female: male: 34: 23.  Age (median): Median 72 (range 25-99) years.  Comorbidities: x7 toxic megacolon, x12 acute kidney injury (x3 needing dialysis), x10 with hypovolaemic/ septic shock, x7 mental status changes, x4 on mechanical ventilation. x10 patients had inflammatory bowel disease (x5 with Crohn's and x5 with ulcerative colitis) and x10 patients were on immunosuppressive medications.  CDI features: Severe, recurrent and severe-complicated.  CDI diagnosis confirmation: Positive stool *C.difficle* PCR.  Pre-FMT antibiotics: Included vancomycin, fidaxomicin, rectal vancomycin, intravenous metronidazole. | Donors were screened patient-selected donors for first 29 patients, whilst next 28 from OpenBiome stool bank.  Donors working in healthcare: Not specified.  Donor demographics: Not specified.  Donor screening: Questionnaire – for patient-selected donors, this was as for Bakken *et al, Clin Gastoenterol Hepatol,* 2011; for OpenBiome, as per OpenBiome protocol.  Travel and antibiotic exclusion period: For patient-selected donors, this was as for Bakken *et al, Clin Gastoenterol Hepatol,* 2011; for OpenBiome, as per OpenBiome protocol.   Screening blood tests: For patient-selected donors, this was as for Bakken *et al, Clin Gastoenterol Hepatol,* 2011; for OpenBiome, as per OpenBiome protocol.  Screening stool tests: Ffor patient-selected donors, this was as for Bakken *et al, Clin Gastoenterol Hepatol,* 2011; for OpenBiome, as per OpenBiome protocol. | Amount of stool per transplant / administered to patients: As per Fischer *et al, Alim Pharm Ther,* 2015 or OpenBiome.  Diluent used to prepare: As per Fischer *et al, Alim Pharm Ther,* 2015 or OpenBiome.  Diluent used to store if frozen: As per Fischer *et al, Alim Pharm Ther,* 2015 or OpenBiome .  Preparation methods: As per Fischer *et al, Alim Pharm Ther,* 2015 or OpenBiome.  Time from preparation to transplant (fresh): 6 hours.  Time period for storage (frozen): As per OpenBiome protocols.  Route administered Upper GI: nil; lower GI: 57 via colonoscopy or sigmoidoscopy.  Number of infusions: 32 patients: x1, 20 patients x2, 5 patients x3, 1 patient x4,1 patient x5. Pre-planned protocol for serial FMTs +/- vancomycin, as described in Fischer *et al, Alim Pharm Ther,* 2015.  Bowel purgative: Not stated.  PPI: Not stated.  Antimotility: Not stated.  Prokinetics: Not stated.  Time before CDI treatment was stopped before FMT: Not stated. | Overall cure within stated follow up period: 91% (*n*=52/57), i.e. 100% severe CDI (*n*=19/19), and 87% (*n*=33/38).  Cure with one infusion alone: 52.6% (*n*= 30/57).  Total follow up period: Up to 6 months. | Minor GI adverse events: Not stated.  Minor non-GI adverse events: Not stated.  Serious adverse events: Not stated.  Deaths: x7 unrelated deaths, x4 CDI-related deaths. | Selection/ eligibility reported: Yes.  Consecutively recruited: Yes.  Prospectively recruited: Yes.  Loss to follow up explained: Yes.  At least 90% followed up: Yes. |
| Fischer *et al, Alimentary Pharmacology and Therapeutics,* 2015 | Case series.  Number of patients: 29.  Female: male: 17: 12.  Age (mean/ standard deviation): Overall, mean 65.2 (+/-17.9) years (range 25-92 years); mean 60.8 (range 26-87) years in severe;  67.6 (range 60-78) years in severe-complicated.  Comorbidities: x3 Crohn's, x2 UC, x1 hypogammaglobulinaemia, x1 ESKD, x1 ESLD, x1 renal transplant, x1 liver transplant, x4 on immunosuppressive meds. 12/19 of pts treated in ITU at the time with following complications: x5 patients with toxic megacolon (caecal diam >12cm or rectosigmoid> 6.5cm diameter); x7 AKI and hypovolaemic/ septic shock, x4 of which required vasopressors, x3 with change in mental status, x2 patients ventilated. x22 with pseudomembranes at first FMT.  CDI features: 9 patients with first episode of CDI; all others with previous episodes.  CDI diagnosis confirmation: Diarrhoea (at least 3 loose stools/ day) and positive toxin.  Pre-FMT antibiotics: Not stated. | Donors were either patient selected-donor, or universal donors. If patient-directed, same donor used for subsequent FMTs if required. 44 FMTs in all - patient-selected for 16 FMTs, universal donor for 28 FMTs.  Donors working in healthcare: Not described.  Donor demographics: Not clear.  Donor screening: Questionnaire: As per Bakken *et al, Clin Gastroenterol Hepatol,* 2011.  Travel and antibiotic exclusion  period: As per Bakken *et al, Clin Gastroenterol Hepatol,* 2011.  Screening blood tests: As per Bakken *et al, Clin Gastroenterol Hepatol,* 2011.  Screening stool tests: As per Bakken *et al, Clin Gastroenterol Hepatol,* 2011. | Amount of stool per transplant / administered to patients: 50-200g of stool.  Diluent used to prepare: 300ml of saline.  Diluent used to store if frozen: N/A – all fresh.  Preparation methods: No additional details.  Time from preparation to transplant (fresh): Six hours.  Time period for storage (frozen): N/A.  Route administered: Upper GI: nil; lower GI: flexible sigmoidoscopy or colonoscopy either proximal or distal to the splenic flexure at the discretion of the endoscopist. In practice – proximal to the splenic flexure in 18 FMTs, distal in 26.  Number of infusions: As many as per protocol until end point. 16 x 1 FMT (7 severe, 9 complicated), 11 x 2nd FMT (3 severe, 8 compl), 2 x 3rd FMT (0 severe, 2 complicated).  N.B. Oral vancomycin (125 mg every 6 hours) was resumed 24–48 hours after FMT for a minimum of 5 days if there were pseudomembranes present at colonoscopy. For patients who did not improve by days 6–7, the vancomycin was stopped, and bowel prep was administered if no ileus was present. The next day (day 7–8), a repeat FMT, from the same donor as the first FMT if patient-directed, was performed by sigmoidoscopy or colonoscopy. If pseudomembranes were present, oral vancomycin was resumed for an additional 5 days. If no pseudomembranes were detected, antibiotics were not resumed following the repeat FMT.  Bowel purgative: Split dose 4l Golytely if no ileus/ obstruction.  PPI: Not described.  Antimotility: Not described.  Prokinetics: Not described.  Time before CDI treatment was stopped before FMT: 12-24hr prior to FMT. | Overall cure within stated follow up period: By 3 months, 62% (*n*=18/29) in remission.  Cure with one infusion alone: 70% (*n*=7/10) in severe arm; 47% (*n*=9/19) in severe-complicated arm.  Total follow up period: Up to 3 months. | Minor GI adverse events: Not stated.  Minor non-GI adverse events: Not stated.  Serious adverse events: Nil.  Deaths: x2 deaths by 1 month; x1 death from sepsis within 24 hours of FMT); death following collectomy after 3x failed FMT in patient who was six weeks post-OLT. By 3 months – x2 further deaths from CDI recurrence, x1 death from cirhosis, x1 death from heart failure, x1 death from respiratory failure, x1 death from aspiration. | Selection/ eligibility reported: Yes.  Consecutively recruited: Yes.  Prospectively recruited: Yes.  Loss to follow up explained: Yes.  At least 90% followed up: Yes. |
| Garborg *et al, Scandanavian Journal of Infectious Diseases,* 2010 | Case series.  Number of patients: 40.  Female: male: 21: 19.  Age (mean): Mean age 75 (range 53-94) years.  Comorbidities: x1 Wegener's, x1 AML. Repeated courses of antibiotics, not formally described.  CDI features: Not described.  CDI diagnosis confirmation: Diarrhoea and + *C difficile* toxin (testing for A and B).  Pre-FMT antibiotics: All patients had had at least two courses of oral metronidazole (500mg three times daily) or vancomycin (125mg po four times daily). | Donors were close relatives/ household members.  Donors working in healthcare: No.  Donor demographics: Not stated.  Donor screening: Questionnaire - "Symptoms of GI disease or history of chronic infectious disease".  Travel and antibiotic exclusion period: Not stated.  Screening bloods: Hepatitis A, B and C, HIV.  Screening stools: MC&S, *Yersinia*. No routine paraiste screening ("low prevalence in Norway"). | Amount of stool per transplant / administered to patients: 50-100g.  Diluent used to prepare: 250ml sterile normal saline.  Diluent used to store if frozen: All fresh.  Preparation methods: Stool placed on gauze pad and strained; flushed with saline; drawn up into syringes ready for administration.  Time from preparation to transplant (fresh): Same day.  Time period for storage (frozen): N/A.  Route administered: Upper GI: OGD with delivery in distal duodenum; 38; lower GI: Colonoscopy; 2.  Number of infusions: One at baseline; follow up if 'did not respond' although not specifically defined.  Bowel purgative: Not mentioned, even for colonoscopy.  PPI: Not stated.  Antimotility: Not stated.  Prokinetics: Not stated.  Time before CDI treatment was stopped before FMT: Evening prior to FMT. | Overall cure within stated follow up period: 835 (*n*=33/40).  Cure with one infusion alone: 73% (*n*=29/ 40) (28 in duodenum, 1 in colon).  Total follow up period: Up to 80 days. | Minor GI adverse events: Not stated.  Minor non-GI adverse events: Not stated.  Serious adverse events: Not stated.  Deaths: x5 deaths within 3 weeks - 2 months post-FMT but none attributable to FMT. x2 deaths attributed to ‘frailty’, x1 advanced Wegener's, x1 AML/ antibiotics, one patients with advanced cardiovascular disease who had fulminant colitis, underwent colectomy, but died. | Selection/ eligibility reported: Yes.  Consecutively recruited: Yes.  Prospectively recruited: No.  Loss to follow up explained: Yes.  At least 90% followed up: Yes. |
| Girotra *et al, Digestive Diseases and Sciences,* 2016 | Case series.  Number of patients: 29.  Female: male: 6: 23.  Age (mean/ standard deviation): 80.1 (+/-6.49) years (13 patients 70-79, 14 patients 80-89, 2 patients > 90 years).  Comorbidities: x8 patients with diabetes mellitus.  CDI features: No specific details - purely symptoms > 6 months, failed at least 3 antibiotic regimens.  CDI diagnosis confirmation: At least three unformed stools in 24 hour and positive stool *C difficile* test by toxin (by ELISA) or toxin gene B (by PCR). All patients here defined RCDI by symptoms >6 months and at least x3 failed antibiotics.  Pre-FMT antibiotics: Not indicated. | Donors were patient-selected family or friends.  Donors working in healthcare: No.  Donor demographics: Not stated.  Donor screening: Questionnaire – peptic ulcer disease/GORD, IBS, IBD, polyps, malignancy, antibiotic use/ hospitalisation within past 3 months.  Travel and antibiotic exclusion period: Excluded as donor if antibiotic use within the past three months.  Screening bloods:  HIV, HTLV-I/-II, syphilis enzyme immunoassay, hepatitis A immunoglobulin M, hepatitis B surface antigen, hepatitis C antibody, and *Helicobacter pylori* antibody.  Screening stools: MC&S/ ova, cysts and parasites x3, *Cryptosporidium, Microspora, C difficile* toxin. | Amount of stool per transplant / administered to patients: 450cc - 270cc via colonoscopy AND 180cc into jejunum via enteroscopy.  Diluent used to prepare: Saline - whole stool sample (>30g) mixed with 50-70ml of sterile saline, made up to 5 x 90cc aliquots.  Diluent used to store if frozen: Fresh.  Preparation methods: Stool mixed with saline, homogenised in blender for <4 minutes, filtered x2 with coffee filter paper.  Time from preparation to transplant (fresh): Within 6 hours.  Time period for storage (frozen): N/A.  Route administered: Enteroscopy into jejunum AND colonoscopy in all 29 patients.  Number of infusions: 1 FMT per patient (combined upper and lower GI administration).  Bowel purgative: Not described.  PPI: 20mg omeprazole evening before/ morning of procedure.  Antimotility: Not described.  Prokinetics: Not described.  Time before CDI treatment was stopped before FMT: >12 hours. | Overall cure within stated follow up period: 100% (*n*=29/29).  Cure with one infusion alone: 100% (*n*=29/29).  Total follow-up period: Reported 25.37 +/- 12.8 months follow-up (range 8-50 months).  In addition - researchers report 60% weight gain, 40% stable weight, 75% improved 'failure to thrive' (defined as decrease of weight >10% from baseline, with no improvement despite medical treatment of CDI and nutritional treatment). | Minor GI adverse events: Bloating 10% (*n*=3/29).  Minor non-GI adverse events: Fever 7% (*n*=2/29)  (transient for one day).  Serious adverse events: None.  Deaths: None. | Selection/ eligibility reported: Yes.  Consecutively recruited: Yes.  Prospectively recruited: No.  Loss to follow up explained: N/A.  At least 90% followed up: Yes. |
| Hagel *et al, Deutsches Arzteblatt International,* 2016 | Case series.  Number of patients: 133.  Female: male: 86: 47.  Age (median): Median 75 (IQR 59.5 - 81.5) years.  Comorbidities: x3 chemotherapy, x19 immunosuppressants, x5 solid organ transplant, x1 allogeneic stem cell transplant, x43 GI comorbidities (no details).  CDI features: Median of 3 recurrences (IQR 1-4); no specific details re recurrent vs refractory confirmation.  Pre-FMT antibiotics: x4 metronidazole only, x13 vancomycin only, x2 fidaxomicin only, x61 metronidazole/ vancomycin, x8 vancomycin/ fidaxomicin, x34 metronidazole/ vancomycin/ fidaxomicin, x11 unknown. | Donors working in healthcare: not stated  Donor demographics: Not stated.  Donor screening: Questionnaire - not stated.  Travel and antibiotic exclusion period: Not stated.  Screening blood tests.: Rapid plasma reagin and fluorescent *Treponemal* antibody-absorbed.  Screening stool tests: Not stated. | Amount of stool per transplant / administered to patients: Not stated.  Diluent used to prepare: Not stated.  Diluent used to store if frozen: Yes, in some cases - no details given.  Preparation methods: Not stated.  Time from preparation to transplant (fresh): Not stated.  Time period for storage (frozen): Not stated.  Route administered: Upper GI: 4 OGD, 40 enteroscopy, 19 nasoenteric tube; lower GI: 55 'endoscopic' (no further details); capsule: 13. x2 combination of jejunal and colonoscopic FMT.  Number of infusions: 1 FMT.  Bowel purgative: Yes - 117 (no details given).  PPI: Yes - 31 (no details given).  Antimotility: Yes - 31 (no details given).  Prokinetics: Not stated.  Time before CDI treatment was stopped before FMT: Not stated. | Overall cure within stated follow up period:  Primary cure on day 30 and 90 was achieved in 84.2% (*n*=101/120) and 78.3% (*n*=72/92).  Cure with one infusion alone: No diarrhoea at 30 days in 84.2% (*n*=101/120); no diarrhoea at 90 days in 78.3% (*n*=72/92).  Total follow up period: Median follow up 141 days (IQR 50-353 days). | Minor GI adverse events: x5 nausea, x3 abdominal pain, 2 belching, x2 vomiting, x2 'food intolerance', x1 IBS.  Minor non-GI adverse events: x3 fever, x2 throat discomfort.  Serious adverse events: x1 aspiration pneumonia, x1 haemorrhage (during endoscopy - no details), x1 loss of tooth, x1 polyneuropathy, x1 weight gain > 10kg in 12 months post-FMT.  Deaths: x7 died during follow up, x2 within 90 days of FMT. In x6 cases, definitely not related to CDI (in one patient, recurrence of CDI one week after FMT contributed to her death (but stroke described as primary cause of death). | Selection/eligibility reported: Yes.  Consecutively recruited: Not clear.  Prospectively recruited: No.  Loss to follow up explained: No.  At least 90% followed up: Yes. |
| Hamilton *et al, American Journal of Gastroenterology,* 2012 | Case series.  Number of patients: 43.  Female: male: 31: 12.  Age (mean/ standard deviation): Mean 59 (+/-21) years.  Comorbidities: x14 IBD patients.  CDI features: Recurrent.  CDI diagnosis confirmation: Toxin positive with at least two subsequent recurrences.  Pre-FMT antibiotics: All had vancomycin, 17 patients had addition of vancomycin and 2 weeks of rifaximin (one of these 17 had 4 weeks of rifaximin); 3 patients took 2-4 weeks of nitazoxanide. | Donors were standard donors for 33 FMTs, and individual donors for 10 FMTs.  Donors working in healthcare: Not stated.  Donor demographics: Not stated.  Donor screening: Questionnaire - before recruitment, the donors were required to submit available medical records and have a separate medical history interview away from the recipient patient. The history included assessment of infectious risk, including identification of known risk factors for HIV and hepatitis, current communicable diseases, and recent travel to areas of the world with a higher prevalence of diarrheal illnesses.  Travel and antibiotic exclusion period: Excluded as donors if recent travel to areas where high prevelence of diarrheal illness (not specified), and/ or antibiotic use within the past six months.  Screening blood tests: HIV, hepatitis B/C, RPR, LFTs.  Screening stool tests: *Clostridium difficile* toxin B PCR, MC&S, ova, cysts and parasites, *Giardia*, *Cryptosporidium, H pylori* antigen*.* | Amount of stool per transplant / administered to patients: 50g.  Diluent used to prepare: 250ml sterile, non-bacteriostatic normal saline.  Diluent used to store if frozen: 10% glycerol.  Preparation methods: Stool from individual donors was passed through stainless steel tea strainers; stool from universal donors was transported on ice to the lab, and processed within 2 hours. Material was weighed and homogenised in commercial blender under nitrogen gas. Slurry then passed through 2.0, 1.0, 0.5 and 0.25mm stainless steel lab sieves. The resulting material was then cetrifuged at 6000 x *g* for 15 minutes and resuspended to one-half the original volume in normal saline.  Time from preparation to transplant (fresh): 1-2 hours.  Time period for storage (frozen): 1-8 weeks.  Route administered: Upper GI: nil; lower GI: colonoscopy (with majority into terminal ileum or caecum, with a small proportion into other colonic areas) in all 43; capsules: nil.  Number of infusions: 1x FMT in 37 patients, 2x FMT in 6 patients.  Bowel purgative: Yes - GoLYTELY or Moviprep.  PPI: Not described.  Antimotility: Not described.  Prokinetics: Not described.  Time before CDI treatment was stopped before FMT: 2 days. | Overall cure within stated follow up period: 95% (*n*=41/43) within 2 months follow-up.  Cure with one infusion alone: 86% (*n*=37/43).  Total follow up period: 2 months following FMT. | Minor GI adverse events: ~1/3 of patients reported flatulance and excessive bowel movements within fortnight following procedure.  Minor non-GI adverse events: None.  Serious adverse events: None.  Deaths: None. | Selection/ eligibility reported: Yes.  Consecutively recruited: Yes.  Prospectively recruited: No.  Loss to follow up explained: No.  At least 90% followed up: Yes. |
| Hefazi *et al, Mayo Clinic Proceedings,* 2017 | Case series.  Number of patients: 23.  Female: male: 13: 10.  Age (median): 66 (range 23-88) years.  Comorbidities: x13 patients had haematological malignancy (x4 diffuse large B cell lymphoma, x2 Hodgkin's lymphoma, x1 chronic myeloid leukaemia, x1 follicular lymphoma, x1 stage IV cutaneous T cell lymphoma, x1 B cell acute lymphocytic leukaemia, x1 hairy cell leukaemia, x1 chronic lymphocytic leukaemia, x1 severe aplastic anaemia); x1 with active disease at time of FMT, x2 with recent chemotherapy use, x2 with neutropenia within 12 weeks prior to FMT. x10 patients with solid organ malignancy (x4 breast, x2 anal, x1 colon, x1 pancreatic, x1 tonsillar, x1 non-small cell lung. x5 with metastasis at time of FMT, x3 recent chemotherapy use, x1 with recent neutropenia. Other comorbidities include x1 COPD, x1 ESKD on haemodialysis, x1 graft versus host disease (on immunosuppression), x1 granulomatosis with polyangiitis (Wegener’s) on immunosuppression, x1 hypogammaglobulinaemia on intravenous immunoglobulin, x1 inflammatory arthritis on corticosteroids.  CDI features: All recurrent.  CDI diagnosis confirmation: Not explicitly defined, but definitions of recurrent, severe and complicated CDI as per American College of Gastroenterology.  Pre-FMT antibiotics: All given additional vancomycin until 24hrs prior to FMT. Median of 2.5 standard treatment courses per patient (defined as at least 10 days of metronidazole, vancomycin or fidaxomicin), x1 previous vancomycin taper, and x4 total treatment courses for CDI). | Donors: Fresh stool from family/ friends in 10 patients, frozen stool from standard donors in 13 patients.  Donor working in healthcare: Not stated.  Donor demographics: Not stated.  Donor screening: As per Patel *et al, Mayo Clin Proc,* 2013.  Travel and antibiotic exclusion period: As per Patel *et al, Mayo Clin Proc,* 2013.  Screening blood tests: As per Patel *et al, Mayo Clin Proc,* 2013.  Screening stools: As per Patel *et al, Mayo Clin Proc,* 2013. | Amount of stool per transplant / administered to patients: ~50g.  Diluent used to prepare: 250ml normal saline.  Diluent used to store if frozen: Not stated.  Preparation methods: As per Patel *et al, Mayo Clin Proc,* 2013.  Time from preparation to transplant (fresh): Not stated.  Time period for storage (frozen): Not stated.  Route administered: Upper GI: nil; lower GI: All 23 patients received FMT via colonoscopy into caecum.  Number of infusions: 1 FMT.  Bowel purgative: Not stated.  PPI: Not stated.  Antimotility: Not stated.  Prokinetics: Not stated.  Time before CDI treatment was stopped before FMT: 24 hours. | Overall cure within stated follow up period: 92% (*n=*11/12)  of haematological malignancy patients (other patient died), and 805 (*n*=8/10) solid malignancy patients.  Cure with one infusion alone: 86% (*n*=19/22) by primary outcome criteria.  Total follow up period: x1 CLL patient recurred at 22 months post-FMT in context of ibrutinib and coamoxiclav; successfully treated with 10 days of metronidazole. x1 tonsillar cancer patient had CDI recurrence at 14 months after exposure to cefalexin; successfully treated with 10 days of vancomycin then 10 days of fidaxomicin. N.B. In all - x10 more chemotherapy courses and x8 more antibiotic courses after FMT. | Minor GI adverse events: x3 chronic diarrhoea for at least six months (despite negative *C difficile* laboratory tests), x8 transient diarrhoea, x3 abdominal cramps, x2 faecal urgency, x2 constipation, x1 nausea.  Minor non-GI adverse events: None.  Serious adverse events: None.  Deaths: x1 death after cardiac arrest of Hodgkin’s lymphoma patient at day 5 (multiple medical comorbidities thought likely cause, not FMT); x2 deaths at > 60 days related to the underlying malignancy progressing. | Selection/ eligibility reported: Yes.  Consecutively recruited: Yes.  Prospectively recruited: No.  Loss to follow up explained: Yes.  At least 90% followed up: Yes. |
| Hirsch *et al, BMC Infectious Diseases,* 2015 | Case series.  Number of patients: 19.  Female: male: 13: 6.  Age (mean): 61 (range 26-92) years.  Comorbidities: x3 IBS, x2 diabetes mellitus, x1 diverticulitis, x1 lymphoma, x1 acute myeloid leukaemia, x1 renal cancer, x1 chronic renal failure.  CDI features: Refractory and recurrent (2 or more episodes).  CDI diagnosis confirmation: Not stated.  Pre-FMT antibiotics: metronidazole, vancomycin +/or fidaxomicin. | Donors were 3 unrelated participants.  Donors working in healthcare: Not stated.  Donor demographics: Excluded if BMI>25, diabetes mellitus, psychiatric history, IBD, or IBS.  Donor screening: Questionnaire - standard questionnaire, with details as above.  Travel and antibiotic exclusion period: Excluded if travel outside the USA within 30 days prior to donation, and/ or use of antibiotics within the past 6 months.  Screening blood tests: HIV, hepatitis A, B,C, *Treponema*/ syphilis, and HTLV-1.  Screening stool tests: *Clostridium difficile* toxin B, S*almonella,* *Shigella*, *Campylobacte*r, *E. coli*, *Yersinia*, *Vibrio, Aeromonas, Plesiomonas.* | Amount of stool per transplant / administered to patients: 2.3g.  Diluent used to prepare: 350ml in 0.9% normal saline.  Diluent used to store if frozen: 15% glycerol.  Preparation methods: Strict environmental contol <6 hours after defaecation. All sterile, wet weight of stool was homogenised in 350ml 0.9% normal saline and aliquoted; samples were then centrifudged at 200 x *g* for 10 mins. Supernatent was decanted and centrifuged at 4600 x *g* for 15 minutes. supernatant removed and pellet re-suspended in 0.9% normal saline with glycerol. The typical concentration was 0.5g/ml. The resulting FMT slurry was put in 5-10ml syringes and frozen at -80oC.  Time from preparation to transplant (fresh): N/A.  Time period for storage (frozen): 1-3 weeks at -80oC; prior to use, syringes were transferred to -20oC and used within six weeks.  Route administered: Nil upper or lower GI; all capsules. Aliquots of 0.4 mL of FMT slurry were dispensed into Size 1 acid-resistant hypromellose capsules, subsequently placed within Size 0 acid-resistant hypromellose capsules and then nested within Size 00 gelatin Caps. Capsules were administered immediately upon filling and capping.  Number of infusions: One course was 8-12 capsules (one only took 6).  Bowel purgative: Not described.  PPI: Yes - evening and morning of procedure.  Antimotility: Not described.  Prokinetics: Yes - encouraged to drink 4 ounces of Kefir fermented milk product twice a day, and also given a list of prebiotics to consume for 3 days.  Time before CDI treatment was stopped before FMT: On day prior to FMT. | Overall cure within stated follow up period: 68% (*n*=13/19).  Cure with one infusion alone: 68% (*n*=13/19) at 90 days.  Total follow up period: Primary outcome assessed at 90 days, whilst secondary outcome assessed at 6 weeks after this. | Minor GI adverse events: x5 abdominal pain 5 (x4 self-resolved; x1 required opiates and was hospitalised).  Minor non-GI adverse events: None.  Serious adverse events: None.  Deaths: x1 died from respiratory failure after failing FMT treatment. | Selection/ eligibility reported: Yes.  Consecutively recruited: Not clear.  Prospectively recruited: No.  Loss to follow up explained: No.  At least 90% followed up: Yes. |
| Ianiro *et al, Clinical Microbiology and Infection,* 2017 | Case series.  Number of patients: 64.  Female:male: 39: 25.  Age (mean): Mean 74 years.  Comorbidities: Not reported.  CDI features: Recurrent CDI - all patients had 3 recurrences on average range (range 2-6).  CDI diagnosis confirmation: Defined using ESCMID guidelines.  Pre-FMT antibiotics: All patients had had prior metronidazole, vancomycin and/ or fidaxomicin. | Donors were unrelated for 36 FMTs, and related for 28 FMTs..  Donor working in healthcare: No.  Donor demographics: Not specified.  Donor screening: As per Cammarota *et al, Alim Pharm Ther,* 2015.  Travel and antibiotic exclusion period: As per Cammarota *et al, Alim Pharm Ther,* 2015.  Screening blood tests: As per Cammarota *et al, Alim Pharm Ther,* 2015.  Screening stool tests: As per Cammarota *et al, Alim Pharm Ther,* 2015. | Amount of stool per transplant / administered to patients: not reported.  Diluent used to prepare: 500ml of 0.9% saline.  Diluent used to store if frozen: N/A – fresh.  Preparation methods: After dilution, the solution was blended and supernatant strained and poured into sterile container.  Time from preparation to transplant (fresh): 6 hours.  Time period for storage (frozen): Not specified.  Route administered: Upper GI: nil: lower GI: all 64 given FMT via colonoscopy; capsules: nil.  Number of infusions: 44 patients had x1 FMT, 20 patients had >1 FMT (undefined).  Bowel purgative: 4l macrogol on last 1-2 days of antibiotcs treatment.  PPI: Not specified.  Antimotility: Not specified.  Prokinetics: Not specified.  Time before CDI treatment was stopped before FMT: FMT given on last 1 or two days of CDI treatment. | Overall cure within stated follow up period: 975 (*n*=62/64) at 8 weeks.  Cure with one infusion alone: 69% (*n*=44/64).  Total follow up period: 8 weeks. | Minor GI adverse events: Not specified.  Minor non-GI adverse events: Not specified.  Serious adverse events: Not specified.  Deaths: Not specified. | Selection/ eligibility reported: Yes.  Consecutively recruited: Yes.  Prospectively recruited: No.  Loss to follow up explained: Yes.  At least 90% followed up: Yes. |
| Kassam *et al, Archives of Internal Medicine,* 2012 | Case series.  Number of patients: 27.  Female: male 13: 14.  Age (mean): 69.4 (range 26-87) years.  Comorbidities: Not specified.  CDI features: Recurrent and refractory.  CDI diagnosis confirmation: (1) Laboratory-confirmed *C difficile* toxin using EIA with no other cause for diarrhea; (2) refractory CDI (defined as ongoing diarrhea despite antimicrobial treatment) or recurrent CDI (defined as symptom resolution for at least 2 days after discontinuation of treatment with recurrence of diarrhea).  Pre-FMT antibiotics: All had at least prior metronidazole; 19 had subsequent vancomycin monotherapy. 8 had combination metronidazole and vancomycin therapy. | Donors were two healthy volunteers.  Donors working in healthcare: Not specified.  Donor demographics: Not specified.  Donor screening: Questionnaire - not specified.  Travel and antibiotic exclusion period: Excluded if used antibiotics within last 6 months.  Screening blood tests: Hepatitis B surface antigen, hepatitis C antibody, *Helicobacter pylori* and syphilis serologic markers, HIV types -1 and -2, and HTLV types -I and -II.  Screening stool tests: Stool was processed for enteric bacterial pathogens, *C difficile* toxin, and ova and parasites. | Amount of stool per transplant / administered to patients: 150g of stool.  Diluent used to prepare: 300mls sterile water.  Diluent used to store if frozen: N/A.  Preparation methods: Not specified.  Time from preparation to transplant (fresh): Not specified.  Time period for storage (frozen): N/A – fresh.  Route administered: Upper GI: nil; lower GI: 27 via retention enema.  Number of infusions: 1 enema in 22 patients, 2 enemas in 5 patients.  Bowel purgative: Not specified.  PPI: Not specified.  Antimotility: Not specified.  Prokinetics: Not specified.  Time before CDI treatment was stopped before FMT: At least 24 hours before. | Overall cure within stated follow up period: 81% (*n*=22/27).  Cure with one infusion alone: 81% (*n*=22/27).  Total follow up period: Mean follow-up of 427.3 days after transplant.  . | Minor GI adverse events: Not specified.  Minor non-GI adverse events: Not specified.  Serious adverse events: Not specified.  Deaths: Not specified. | Selection/ eligibility reported: Yes.  Consecutively recruited: Yes.  Prospectively recruited: No.  Loss to follow up explained: Yes.  At least 90% followed up: Yes. |
| Kelly *et al, Journal of Clinical Gastroenterology,* 2012 | Case series.  Number of patients: 26.  Female: male: 24:2.  Age (mean): 59 years.  Comorbidities: Not stated.  CDI features: Recurrent. Mean duration of diagnosis of CDI prior to FMT of 12.6 (range 4 to 84) months.  CDI diagnosis confirmation: Not stated.  Pre-FMT antibiotics: All had previous treatment with metronidazole, and repeated tapering courses of vancomycin. 19 had failed at least one course of rifaximin. Some patients had prior *Saccharomyces boulardii* or *Lactobacillus* GG. Pre-FMT, all had 2 weeks of metronidazole or vancomycin, discontinued 2-3 days before FMT. | Donors were family members in 25 cases, and friend in 1 case.  Donor working in healthcare: No.  Donor demographics: Not specified.  Donor screening: Questionnaire – asked regarding known exposure to HIV within 12 months, high-risk sexual behaviours, use of ilicit drugs, tattoo within 6 months, incarceration within 12 months, risk factors for Creutzfleldt-Jakob disease, GI co-morbidities, recent ingestion of allergen, systemic autoimmunity, chronic pain syndromes.  Travel and antibiotic exclusion period: No antibiotics for preceeding 90 days.  Screening blood tests: blood for hepatitis A, B and C, HIV-1&-2, *Trepenoma pallidum.*  Screening stool tests: Stool for culture for bacteria, stain for ova and parasites, *C difficile* toxin A and B. | Amount of stool per transplant / administered to patients: "6:8 tablespoons of donor stool".  Diluent used to prepare: 1 litre of sterile water passed through gauze. Aliquoted in 60ml syringes.  Diluent used to store if frozen: N/A – fresh.  Preparation methods: As above.  Time from preparation to transplant (fresh): 6 hours prior to transplant.  Time period for storage (frozen): N/A.  Route administered: Upper GI: nil; lower GI: all 26 via colonoscopy; capsules: nil.  Number of infusions: not explicitly stated but imples single infusion for all patients.  Bowel purgative: PEG bowel prep night before transplant.  PPI: Not stated.  Antimotility: Not stated.  Prokinetics: Not stated.  Time before CDI treatment was stopped before FMT: 2-3 days. | Overall cure within stated follow up period: 92.3% (*n*=24/26).  Cure with one infusion alone: 92.3% (*n*=24/26).  Total follow up period: follow up of mean 10.7 months (ranged from 2-30 months). | Minor GI adverse events: Mild diarrhoea post-FMT in x3 patients.  Minor non-GI adverse events: No.  Serious adverse events: No.  Deaths: No. | Selection/ eligibility reported: Yes.  Consecutively recruited: Yes.  Prospectively recruited: No.  Loss to follow up explained: Yes.  At least 90% followed up: Yes |
| Kelly et al, *American Journal of Gastroenterology,* 2014 | Case series.  Number of patients: 80.  Female: male: 42: 38.  Age (mean): N.B. 75 adults, and 5 children. Mean age of adults: 53 (range 20-88) years; mean age of paediatric patients: 10.9 (range 6.5–16) years.  Comorbidities: x36 IBD, x19 solid organ transplant, x3 HIV/AIDS, x7 cancer, x4 rheumatoid arthritis, x1 adrenal insufficiency, x6 cirrhosis, x1 ESKD, x1 panhypopituatarism, x1 end-stage COPD, x1 ESKD with allograft failure, x1 Sjögrens.  CDI features: Both refractory and recurrent patients included as well as severe/ complicated disease.  CDI diagnosis: Not clearly specified.  Pre-FMT antibiotics: Vancomycin 67 (84%), fidaxomicin 23 (29%), rifaximin 13 (16%), metronidazole 55 (69%). | Donors working in healthcare: Not specified.  Donor demographics: Not specified.  Donor screening: Questionnaire: Varied by centre.  Travel and antibiotic exclusion period: Varied by centre.  Screening blood tests: Varied by centre.  Screening stool tests: Varied by centre. | Amount of stool per transplant / administered to patients: Varied by centre.  Diluent used to prepare: Varied by centre.  Diluent used to store if frozen: Varied by centre.  Preparation methods: Varied by centre.  Time from preparation to transplant (fresh): Varied by centre.  Time period for storage (frozen): Varied by centre.  Route administered: Not specified.  Number of infusions: 85% (*n*=68/80) had single FMT, 15% (*n*=12/80) had > 1 FMT.  Bowel purgative: Varied by centre.  PPI: Varied by centre.  Antimotility: Varied by centre.  Prokinetics: Varied by centre.  Time before CDI treatment was stopped before FMT: Varied by centre. | Overall cure within stated follow up period: 89% (*n*=71/80) within a minimum of 12 weeks.  Cure with one infusion alone: 78% (*n*=62/80).  Total follow up period: 12 weeks post-FMT. | Minor GI adverse events: x3 self limiting diarrhoea, x3 bloating and abdominal discomfort, x1 Crohn’s flare, x1 nausea, x1 minor mucosal tear at colonoscopy.  Minor non-GI adverse events: x1 fever, x1 hip pain, x1 pertussis.  Serious adverse events: x10 hospitalization (x1 for fever, encephalopathy and pancytopenia; x1 abdo pain post FMT, x3 IBD flares (x2 Crohn’s, x1 UC), x1 stroke, x1 colectomy, x1 fall and sustained hip fracture, x1 influenza B and diarrhoea, x1 catheter infection.  Deaths: x2 deaths (x1 pneumonia and x1 aspiration after sedation for colonoscopic FMT). | Selection/ eligibility reported: Yes.  Consecutively recruited: No.  Prospectively recruited: No.  Loss to follow up explained: No.  At least 90% followed up: Yes. |
| Khoruts *et al, Clinical Gastroenterology & Hepatology,* 2016 | Case series.  Number of patients: 272.  Female: male: 189: 83.  Age (mean/ median/ standard deviation): Mean 57.2 (+/- 19.2) years; median 59.0 (range 16-100) years.  Comorbidities: x10 dialysis, x22 established Crohn’s, x21 established UC, x15 lymphocytic colitis, x5 diagnosed with Crohn’s during colonoscopy for FMT, x1 diagnosed UC during colonoscopy for FMT, x14 newly-diagnosed lymphocytic colitis. x13 reclassified in terms of IBD. x8 solid organ recipients, x30 patients without IBD were taking biologics (anti-TNF, rituximab), immunomodulators (methotrexate, purine analogues), and/ or corticosteroids.  CDI features: All patients had at least two spontaneous relapses of CDI following initial episode, defined as recurrence within three months of discontinuation of anti-CDI antibiotics treatment in conjunction with diarrheal symptoms.  CDI diagnosis confirmation: Positive stool testing within two months of FMT - not clearly defined.  Pre-FMT antibiotics: x206 patients had had prior metronidazole, x270 vancomycin, x69 fidaxomicin, x71 rifaximin, x104 probiotics. | Donors working in healthcare: As per Hamilton *et al, Am J Gastroenterol,* 2012.  Donor demographics: As per Hamilton *et al, Am J Gastroenterol,* 2012.  Donor screening: Questionnaire - as per Hamilton *et al, Am J Gastroenterol,* 2012.  Travel and antibiotic exclusion period: As per Hamilton *et al, Am J Gastroenterol,* 2012.  Screening blood tests: As per Hamilton *et al, Am J Gastroenterol,* 2012.  Screening stools: As per Hamilton *et al, Am J Gastroenterol,* 2012. | Amount of stool per transplant / administered to patients: As per Hamilton *et al, Am J Gastroenterol,* 2012.  Diluent used to prepare: As per Hamilton *et al, Am J Gastroenterol,* 2012.  Diluent used to store if frozen: As per Hamilton *et al, Am J Gastroenterol,* 2012.  Preparation methods: As per Hamilton *et al, Am J Gastroenterol,* 2012.  Time from preparation to transplant (fresh): As per Hamilton *et al, Am J Gastroenterol,* 2012.  Time period for storage (frozen): As per Hamilton *et al, Am J Gastroenterol,* 2012.  Route administered: Upper GI: nil;  lower GI: colonoscopy (272); capsule: nil.  Number of infusions: One routinely, more than one if required - specific criteria not defined.  Bowel purgative: Yes - all had purgative on day prior to procedure (as per Hamilton *et al, Am J Gastroenterol,* 2012).  PPI: Not described.  Antimotility: Not described.  Prokinetics: Not described.  Time before CDI treatment was stopped before FMT: 2 days. | Overall cure within stated follow up period: 74% (*n=* 32/43) in IBD patients and 92.2% (*n*=211/229) in non-IBD patients.  Cure with one infusion alone: 74% (*n=* 32/43) in IBD patients and 92.2% (*n*=211/229) in non IBD patients.  Total follow up period: Up to 6 years. | Minor GI adverse events: Not specified.  Minor non-GI adverse events: Not specified.  Serious adverse events: 25.6% (*n*=11/43) of IBD patients diagnosed with FMT-related flare. x2 patients hospitalised with IBD flare within two months of FMT. Clearance of CDI by FMT generally associated with improved control of IBD over the long term. x6 patients struggled with IBD despite optimisation of immunosuppressive treatment, x3 of whom underwent colectomies.  Deaths: Nil. | Selection/ eligibility reported: Yes.  Consecutively recruited: Yes.  Prospectively recruited: No.  Loss to follow up explained: Yes.  At least 90% followed up: Yes. |
| Lagier *et al, European Journal of Clinical Microbiology and Infectious Diseases,* 2015 | Case series.  Number of patients: 61.  Female: male: 40:21.  Age (mean): 84 (range 66-101) years.  Comorbidities: Not  Specified.  CDI features: Some patients refractory/ recurrent; some during first CDI.  CDI diagnosis confirmation:PCR that detects toxin and B genes, and toxin C gene deletion that characterises 027.  Pre-FMT antibiotics: Patients divided into 'tardive transplant' (i.e. only after x3 antibiotic failures) or 'early transplant' (during first week of infection during first treatment, accompanied by antibiotics). Antibiotics were for non-severe disease: metronidazole orally three times a day for 14 days, then vancomycin 125mg four times a day for 14 days, then fidaxomicin 200mg twice a day for 10 days; for severe disease (defined as AKI, paralytic ileus, or peritoneal fluid), used vancomycin and metronidazole for primary infection, then fidaxomicin if relapse/ failure. | Donors were preferentially healthy family members, but also used healthy volunteer students and residents.  Donor working in healthcare: Yes - some residents.  Donor demographics: BMI<30, exclude active cancer, diarrhoea, current immunosuppressive drugs, antibiotics within past three months.  Donor screening: Questionnaire: As above.  Travel and antibiotic exclusion period: Excluded as donor if antibiotic use within past three months.  Screening blood tests: HIV, hepatitis A, B,C, E, active CMV, active EBV, *Treponema pallidum,* HTLV.  Screening stool tests: MC&S, parasites, toxigenic *C difficile.'* | Amount of stool per transplant / administered to patients: >30g.  Diluent used to prepare: Whole stool mixed with 400ml normal saline, homogenised for 10 minutes.  Diluent used to store if frozen: N/A – fresh.  Preparation methods: 10 minutes of homogenisation in blender, filtered, put into a syringe at room temperature.  Time from preparation to transplant (fresh): <6 hours.  Time period for storage (frozen): N/A.  Route administered: Upper GI: Via nasogastric tube in 61 patients; nil lower GI or capsules.  Number of infusions: In early FMT arm - one FMT routine; but offered 2nd FMT if relapse.  Bowel purgative: 4l Klean Prep/ two glasses of Fast Prep day before FMT.  PPI: No - but used 200ml 1.4% bicarbonate 15 minutes before FMT.  Antimotility: Not specified.  Prokinetics: Not specified. Time before CDI treatment was stopped before FMT: Not specified. | Overall cure within stated follow up period: Global death rate of 19% (*n*=3/16) in early transplant arm (day 20, day 37, day 166),  67% (*n*=2/3) died in arm of those treated by tardive transplant (day 28, day 54).  None of these patients died with evidence of CDI.  Cure with one infusion alone: 33% (*n*=1/3) treated by tardive FMT dead at day 31; 4.2% (*n*=1/16) treated by early FMT dead at day 31.  Total follow up period: No details on absolute length of follow-up. | Minor GI adverse events: x24 diarrhoea (resolved day 1 after FMT), x1 nausea.  Minor non-GI adverse events: Not specified.  Serious adverse events: x1 acute heart failure - no details.  Deaths: 3/16 in early transplant arm (vs 29/45 treated by abx only or tardive transplant). No sign of CDI at time of death (days 20, 37, 166). | Selection/ eligibility reported: Yes.  Consecutively recruited: No - not stated.  Prospectively recruited: No.  Loss to follow up explained: Yes.  At least 90% followed up: Yes. |
| Lee *et al, European Journal of Clinical Microbiology and Infectious Diseases,* 2014 | Case series.  Number of patients: 94  Female: male: 53: 41.  Age (mean): Mean 71.8 (range 24-95) years.  Comorbidities: x3 IBD, x3 post-renal transplant.  CDI features: Some patients refractory (defined as ongoing diarrhea depsite treatment with at least 5 days of oral vancomycin, 125mg four times daily), or recurrent (symptom resolution for at least two days after the discontinuation of treatment with recurrence of diarrhoea.  CDI diagnosis confirmation: Toxin positive by enzyme immunoassay or polymerase chain reaction.  Pre-FMT antibiotics: Average of 2.1 previous anti-CDI antibiotic courses (range 1-4), specifically: x74 metronidazole courses (79.3%), x71 vancomycin (75%), x14 vancomycin taper (15.2%), x3 probiotic monotreatment (0.03%), x16 concomitant metronidazole/ vancomycin (17.4%). | Donors were volunteers.  Donor working in healthcare: Not specified  Donor demographics: Not specified.  Donor screening: Questionnaire - describes use of questionnaire but no details given - "similar to the Full Length Donor History Questionnaire documents (US Food and Drug administration, DHQ version 1.3, May 2008"  Travel and antibiotic exclusion period: Not specified.  Screening blood testss: HIV-1/-2, HTLV-1 and -2. Hepatitis A IgG/M, hepatitis B surface antigen, hepatitis C antibody, *Treponema pallidum.*  Screening stools: Ova, cysts and parasites, MC&S, *C difficile* toxin, norovirus, adenovirus, rotavirus. | Amount of stool per transplant / administered to patients: Not specified.  Diluent used to prepare: 300ml water.  Diluent used to store if frozen: N/A – fresh.  Preparation methods: Homogenisation of stool in water using a disposable spatula.  Time from preparation to transplant (fresh): Not specified.  Time period for storage (frozen): N/A.  Route administered: Upper GI: nil; lower GI: retention enema in all 94 patients; nil capsules.  Number of infusions: No fixed number - as many as required to achieve remission. No clear definition of non-response.  Bowel purgative: Not specified.  PPI: Not specified.  Antimotility: Not specified.  Prokinetics: Not specified.  Time before CDI treatment was stopped before FMT: Not specified. | Overall cure within stated follow up period: At 6 months – 87% (*n*=81/94) in remission after FMT.  Cure with one infusion alone: 47.9% (*n*=45/94) with single FMT in remission at 6 months.  Total follow up period: 24 months. | Minor GI adverse events: "10% experienced transient constipation and excess flatulence post-FMT".  Minor non-GI adverse events: None described.  Serious adverse events: None described.  Deaths: 75% (*n*=6/8) patients not responding to FMT died (not clear when). All "over 70 years of age", with multiple underlying significant comorbidities and passed away due to critical illnesses; none had deaths attributable to FMT or directly due to CDI. | Selection/ eligibility reported: Yes.  Consecutively recruited: Yes.  Prospectively recruited: No.  Loss to follow up explained: Yes.  At least 90% followed up: Yes. |
| MacConnachie *et al, QJM*, 2009 | Case series.  Number of patients: 15.  Female: male: 14: 1.  Age (median): 81.5 (range 68-95) years.  Comorbidities: no haematological or IBD.  CDI features: Relapsing defined as recurrence of loose stool following successful antibiotic treatment in a patient with previous toxin positive CDI.  CDI diagnosis confirmation: Not specified.  Pre-FMT antibiotics: All had had previous metronidazole and vancomycin; x3 patients tapering vancomycin and intravenous Immunoglobulin. | Donors were healthy related volunteers.  Working in healthcare: Yes – in three cases where relatives could not be identified.  Donor demographics: Not specified.  Donor screening: HIV-1/-2, HTLV- 1 and -2, hepatitis A IgG/M, hepatitis B surface antigen, hepatitis C antibody, *Treponema pallidum.*  Questionnaire: Yes, but not specified.  Travel and antibiotic exclusion period: Not specified.  Screening stools: Ova, cysts and parasites, MC&S, *C difficile* toxin. | Amount of stool per transplant administered to patients: 30g.  Diluent used to prepare: 0.9% normal saline.  Diluent used to store if frozen: N/A – fresh.  Preparation methods: Stool sample prepared in less than 6 hours; add 50-70ml of normal saline, homogenise with handheld stool blender,gradually advance speed, continue for 2-4 mins until smooth, filter suspension in coffee filter paper.  Time from preparation to transplant (fresh): 6 hours.  Time period for storage (frozen): Not applicable.  Route administered: Upper GI: All 15 patients received FMT via nasogastric tube; lower GI and capsules: nil.  Number of infusions: 1 FMT per patient routinely, repeat if required.  Bowel purgative: Not given.  PPI: Omeprazole 20mg eve before and on morning.  Antimotility: Not given.  Prokinetics: Not given.  Time before CDI treatment was stopped before FMT: Stopped on the evening before FMT. | Overall cure within stated follow up period: 84% (*n*=15/18) “resolution”.  Cure with one infusion alone: 884% (*n*=15/18) “resolution”.  Total follow-up period: 90 days. | Minor GI adverse events: x1 diarrhoea.  Minor non-GI adverse events: Nil.  Serious adverse events: Nil.  Deaths: x2 (not felt related to FMT). | Selection/ eligibility reported: Yes.  Consecutively recruited: Yes.  Prospectively recruited: No.  Loss to follow up explained: Yes.  At least 90% followed up: Yes. |
| Mattila *et al, Gastroenterology,* 2012 | Case series.  Number of patients: 70.  Female: male: 42: 28.  Age (mean): Mean 73 (range 22-90) years.  Comorbidities: No IBD, one adenocarcinoma of colon diagnosed during colonoscopy for FMT.  CDI features: Recurrent, mean of 3.5 previous episodes of CDI pre-FMT (range 1-12).  CDI diagnosis confirmation: Positive culture and toxin.  Pre-FMT antibiotics: Mixture of metronidazole, vancomycin, rifaximin - no patient-level data. | Donors: 61 donors were close relatives/ other household members; in 9 cases, healthy volunteers.  Donors working in healthcare: Not specified.  Donor demographics: Not specified.  Donor screening: Questionnaire - "No antibiotics and no intestinal symptoms within 6 months".  Travel and antibiotic exclusion period: Excluded as donor if any antibiotic use within past six months; no details of travel restrictions.  Screening blood tests: Hepatitis B surface antigen, Hepatitis C antibody, HIV-1/-2 , *Treponema pallidum* plasma reagin test; total blood count, C-reactive protein, creatinine, liver enzymes.  Screening stool tests: *C difficile* culture/ tox A/ B; MC&S, ova cysts and parasites. | Amount of stool per transplant / administered to patients: 20-30ml stool.  Diluent used to prepare: 100-200ml water; 100ml of suspension administered to caecum.  Diluent used to store if frozen: N/A – all fresh.  Preparation methods: Not specified.  Time from preparation to transplant (fresh): 6 hours.  Time period for storage (frozen): N/A.  Route administered: Upper GI: nil; lower GI: colonoscopy (70); capsules: nil.  Number of infusions: 1 FMT.  Bowel purgative: 4l PEG (Colonsteril).  PPI: Not specified.  Antimotility: Not specified.  Prokinetics: Not specified.  Time before CDI treatment was stopped before FMT: Average of 36 hours. | Overall cure within stated follow up period: 94% (*n*=66/70) (100% (*n*=34/34) of those with non-027, 89% (*n*=32/36) with 027) within 12 weeks.  Cure with one infusion alone: 94% (*n*=66/70) (100% (*n*=34/34) of those with non-027, 89% (*n*=32/36) with 027) within 12 weeks.  Total follow up period: One year. | Minor GI adverse events: Not specified.  Minor non-GI adverse events: Not specified.  Serious adverse events: Not specified.  Deaths: x4 patients infected with 027 did not respond to FMT and died within 3 months. 10 other patients died of 'unrelated illnesses' during one year of follow-up. | Selection/ eligibility reported: Yes.  Consecutively recruited: Not clear.  Prospectively recruited: No.  Loss to follow up explained: Yes.  At least 90% followed up: Yes. |
| Meighani *et al, European Journal of Gastroenterology and Hepatology,* 2016 | Case series.  Number of patients: 201.  Female: male: 125: 76.  Age (mean/ standard deviation): Mean age 66.6 (+/-18.3) years.  Comorbidities: x37 cancer, x30 immunosuppressed, x26 CKD. Immunosuppressed defined as chemotherapy within 1 year of FMT, HIV with CD4 < 200, or prednisolone use greater than or equal to 20mg for more than 1 month.)  CDI features: 61 with refractory, 140 with recurrent.  CDI diagnosis confirmation: Positive toxin or polymerase chain reaction.  Pre-FMT antibiotics: Not specified. | Donors working in healthcare: not specified.  Donor demographics: not specified.  Donor screening:  Questionnaire - not specified.  Travel and antibiotic exclusion period: Not specified.  Screening blood tests: Not specified.  Screening stool tests: Not specified. | Amount of stool per transplant / administered to patients: Not specified.  Diluent used to prepare: Not specified.  Diluent used to store if frozen: Not specified.  Preparation methods: Not specified.  Time from preparation to transplant (fresh): Not specified.  Time period for storage (frozen): Not specified.  Route administered: Upper GI: nasogastric tube x 76, PEG x5; lower GI: x45 enema, x75 colon; capsules: nil.  Number of infusions: Some people received multiple FMT procedures - repeat FMTs within 90 days of previous FMT were still maintained as a 'single infection unit'.  Bowel purgative: Not specified.  PPI: Not specified.  Antimotility: Not specified.  Prokinetics: Not specified.  Time before CDI treatment was stopped before FMT: 24 hour - not specifically stated as anti-CDI treatment. | Overall cure within stated follow up period: 88% (*n*=176/201) over 90 days.  Cure with one infusion alone: 73.1% (*n*=147/201).  Total follow-up period: Each patient for 90 days. | Minor GI adverse events: Not specified.  Minor non-GI adverse events: Not specified.  Serious adverse events: Not described.  Deaths: 18 deaths in cohort but no clear timeframe, and not clear if any related to FMT. Described as mortality rate of 6.25% in response group, 28% in failure rate. | Selection/ eligibility reported: Yes.  Consecutively recruited: Yes.  Prospectively recruited: No.  Loss to follow up explained: Yes.  At least 90% followed up: Yes. |
| Meighani *et al, Digestive Diseases and Sciences,* 2017 | Case series.  Number of patients: 201.  Female: male: 124: 77.  Age (mean/ standard deviation): Mean 68.79 (+/-16.78) years for x181 non-IBD patients, mean 46.9 (+/-19.97) for the x20 IBD patients.  Comorbidities: 13/20 IBD patients were immunosuppressed (no further details); no further specific details about immunosuppression).  CDI features: Recurrent CDI in 13/20 of IBD patients, primary refractory in 7/20. 1.90 (+/- 1.02) CDI infections in past three months for IBD patients, 1.79 (+/1.17) CDI infections in past three months for non-IBD patients.  CDI diagnosis confirmation: GDH first, then toxin A and B; PCR used if discordance.  Pre-FMT antibiotics: Not defined for non-IBD; for IBD, 15 vancomycin alone, 5 vancomycin and oral metronidazole. | Donors were typically family members, but small number of unrelated universal donors. Amongst IBD cohort - 6 patients had family members as donor, universal donor in other 14.  Donor working in healthcare: Not defined.  Donor demographics: Not defined.  Donor screening: Questionnaire - not defined.  Travel and antibiotic exclusion period: Not defined.  Screening blood tests: Not defined.  Screening stool tests: Not defined. | Amount of stool per transplant / administered to patients: Not defined.  Diluent used to prepare: Not defined.  Diluent used to store if frozen: Not defined.  Preparation methods: Not defined.  Time from preparation to transplant (fresh): Not defined.  Time period for storage (frozen): Not defined.  Route administered: Upper GI: 5 nasogastric (IBD patients only; not described re non-IBD patients) lower GI: 13 colonoscopy (IBD patients only; not described in non-IBD patients); 2 retention enema (IBD patients only; not described re non-IBD patients) (15).  Number of infusions: Any relapse beyond 90 days was defined as 'new infection'. However, not made clear if patients given more than one FMT.  Bowel purgative: Not described.  PPI: Not described.  Antimotility: Not described.  Prokinetics: Not described. Time before CDI treatment was stopped before FMT: No specific deails. | Overall cure within stated follow up period: As per primary outcome - difficult to give more specific information than already given.  Cure with one infusion alone: 87.3% (*n*=158/181) in non-IBD, 75% (15/20) in IBD; but 17.15 (*n*=31/181) non-IBD relapse within 90 days/ 13.9% (*n*=25/180) beyond 90 days, and 25% (*n*=5/20) IBD relapse within 90 days/ 20% (*n*=4/20) beyond 90 days. 3/5 failures in IBD arm had newly-diagnosed IBD, other had severe active disease.  Total follow up period: At least 90 days. | Minor GI adverse events: None.  Minor non-GI adverse events: None.  Serious adverse events: None.  Deaths: None. | Selection/ eligibility reported: Yes.  Consecutively recruited: Yes.  Prospectively recruited: No.  Loss to follow up explained: Yes.  At least 90% followed up: Yes. |
| Patel *et al, Mayo Clinic Proceedings,* 2013 | Case series.  Number of patients: 31.  Female: male: 17: 14.  Age (mean/ standard deviation): Mean 61.26 (+/- 19.34) years.  Comorbidities: x5 diverticulosis, x5 IBS, x3 UC, x1 Crohn's, x1 gastroparesis, x1 coloanal fistula, x3 prev sigmoid surgery for diverticulitis, x2 subtotal colectomy with ileosigmoid anastomosis, x1 left hemicolectomy with colostomy, x3 long term corticosteroids, x2 hypogammaglobulinaemia, x1 OLT, x1 renal transplant, x1 long term methotrexate.  CDI features: Recurrent - mean +/- SD number of confirmed relapses before FMT of 4 +/- 1.4 (range 2-7) episodes.  CDI diagnosis confirmation: At least 3x unformed stools/ day, at least 2 x toxin positive episodes previously to participate.  Pre-FMT antibiotics: All 31 previous methotrexate, all 31 previous vancomycin, 6 previous fidaxomicin, 10 previous rifaximin, 23 prior probiotic. | Donors were healthy family/ contacts of recipients - 14 spouses, 9 children, 5 siblings, 3 parents, 1 niece, 1 friend.  Working in healthcare: Not stated.  Donor demographics: No stated age/ BMI limits.  Donor screening: Questionnaire - exclude if: chronic GI disease, active peptic ulcer disease, GORD requiring daily PPI, IBS, IBD, history of colon polyps/ cancer, antibiotics or hospitalisation in past three months.  Travel and antibiotic exclusion period: No stated travel restrictions; excluded as donor if antibiotic use within past 3 months.  Screening blood tests: hepatitis A IgM, HBsAg, HBc IgG/M, hepatitis C antibody, HIV-1/-2 antibody, HTLV-1/-2 antibody, RPR/ syphilis EIA.  Screening stool tests: MC&S, ova, cysts and parasites, *Cryptosporidium* antigen, *Microsporidia* smear, *C difficile* toxin (PCR or EIA). | Amount of stool per transplant / administered to patients: Whole stool - median transplanted weight of 115g (range 18-397g).  Diluent used to prepare: Normal saline - "added in 100ml increments until mixture suitable for instillation through working channel of colonoscope". Median volume of FMT 360 (range 180-900) ml.  Diluent used to store if frozen: N/A – fresh.  Preparation methods: Blender/ pitcher.  Time from preparation to transplant (fresh): Six hours; kept at room temperature until processing.  Time period for storage (frozen): N/A.  Route administered: Upper GI: nil; lower GI: colonoscopy (31); capsule: nil.  Number of infusions: One initially.  Bowel purgative: Yes - PEG day before FMT.  PPI: Not described.  Antimotility: 4mg loperamide either pre- or immediately after colonoscopy.  Prokinetics: Not described.  Time before CDI treatment was stopped before FMT: Antibiotics continued until 4 hours before prep (i.e. stopped day prior to FMT). | Overall cure within stated follow up period: At 3 months – 91.3% (*n*=21/23) said diarrhoea no longer present; at 1 year, 100% (*n*=6/6) reported maintained improvement or resolution.  Cure with one infusion alone: Of 29 with diarrhoea – 24.1% (*n*=7/29) reported improvement and 75.9% (*n*=22/29) resolution of diarrhoea by median time of three days.  Total follow up period: One year. | Minor GI adverse events: Not described.  Minor non-GI adverse events: Not described.  Serious adverse events: Microperforation - caused by biopsy of an area of presumed ischaemic small bowel injury during the FMT procedure; managed conservatively.  Deaths: x1 death at three months - directly related to recently diagnosed metastatic pancreatic cancer, not related to FMT . | Selection/ eligibility reported: Yes.  Consecutively recruited: Yes, implied that were.  Prospectively recruited: No.  Loss to follow up explained: Yes.  At least 90% followed up: Yes - at least as far as primary outcome. |
| Pathak *et al, Clinical & Experimental Gastroenterology,* 2013 | Case series.  Number of patients: 12.  Female: male: 8: 4.  Age (mean): Mean 71.9 (range 37 – 90) years.  Comorbidities: x1 UC, 1 renal transplant, x1 left colon adenocarcinoma and diverticulitis; x1 ruptured appendix; x2 ventilator-dependent.  CDI features: Recurrent; full details not given. Two of the patients had had recurrent CDI treated with FMT ‘many years ago’.  CDI diagnosis confirmation: Not specifically defined.  Pre-FMT antibiotics: All vancomycin, 8 patients fidaxomicin, 4 patients methotrexate. | Donors were preferrably family/ first degree relatives; family used in all cases here.  Working in healthcare: Not specifically addressed.  Donor demographics: Not given.  Donor screening: Questionnaire - exposure to HIV, hepatitis, STDs; high risk sexual behaviour; drug use, tattoos/ piercings, imprisonment, other high risk behaviour; known current communicable disease; GI morbidities including IBD or GI malignancy; antibiotic use within 90 days.  Travel and antibiotic exclusion period: Excluded as donor if antibiotic use within last 90 days.  Screening blood tests: HIV-1/-2, hepatitis A/B/C, STDs.  Screening stool tests: MC&S, ova, cysts and parasites, *C difficile* toxin A and B. | Amount of stool per transplant / administered to patients: About 6-8 tablespoons.  Diluent used to prepare: 1l of tap water.  Diluent used to store if frozen: N/A - all fresh.  Preparation methods: No specific details.  Time from preparation to transplant (fresh): 6 hours.  Time period for storage (frozen): N/A.  Route administered: Upper GI: nasoduodenal tube (1; as a second FMT); lower GI: colonoscopy (12).  Number of infusions: 1 FMT initially.  Bowel purgative: PEG the night before FMT.  PPI: Not described.  Antimotility: 2 tablets diphenoxylate/ atropine post-FMT.  Prokinetics: Not described.  Time before CDI treatment was stopped before FMT: 24 hours. | Overall cure within stated follow-up period: 91.7% (*n*=11/12).  Cure with one infusion alone: 91.7% (*n*=11/12).  Total follow up period: 2-26 months. | Minor GI adverse events: Not stated.  Minor non-GI adverse events: Not stated.  Serious adverse events: Not stated.  Deaths: x1 death. Patient with perforated appendix developed rCDI; didn't respond to six months of anti-CDI treatment, went to ITU. Donor was husband - no screening, and no response to colonoscopic FMT. For 2nd FMT, used healthy volunteer donor FMT via nasoduodenal tube - responded. Urinary tract infection at nursing home few months later – antibiotic treatment precipitated further CDI. Further sepsis, returned to ITU - declined treatment, then died, four months after initial FMT. | Selection/eligibility reported: Yes.  Consecutively recruited: Yes, implied that were.  Prospectively recruited: No.  Loss to follow up explained: Yes.  At least 90% followed up: Yes. |
| Rohlke *et al, Journal of Clinical Gastroenterology,* 2010 | Case series.  Number of patients: 19.  Female: male: 17: 2.  Age (mean): Mean age 49 years.  Comorbidities: Not described.  CDI features: Recurrent CDI.  CDI diagnosis confirmation: Positive *C difficile* toxin and consistently recurring symptoms over a span of six months.  Pre-FMT antibiotics: Not given in detail - all at least three courses of conventional anti-CDI antibiotics, including pulsed and tapered vancomycin. | Donors were 4 family members, 14 partners, and 1 housemate.  Donors working in healthcare: Excluded.  Donor demographics:  Donor screening:  Questionnaire – included current or recent diarrhoeal illness, sexual behaviour.  Travel and antibiotic exclusion period: Excluded if ‘recent antibiotic use’; not further defined.  Screening blood tests.: HIV, hepatitis A, B and C, and *Trepenoma* serology.  Screening stool tests: *C difficile*, bacterial culture, ova, cysts and parasites, *Giardia, Cryptosporidium.* | Amount of stool per transplant / administered to patients: 350mls.  Diluent used to prepare: Normal saline.  Diluent used to store if frozen: N/A - fresh.  Preparation methods: Fresh preparation, with manual shaking of stool and saline in large suction canister, followed by filtering.  Time from preparation to transplant (fresh): Not stated.  Time period for storage (frozen): N/A.  Route administered: Upper GI: nil; lower GI: all given via colonoscopy.  Number of infusions: One routinely, with one patient having a second FMT.  Bowel purgative: PEG.  PPI: Not described.  Antimotility: Loperamide post-FMT.  Prokinetics: Not described.  Time before CDI treatment was stopped before FMT: 1-3 days. | Overall cure within stated follow up period: 100% (*n*=20/20).  Cure with one infusion alone: 95% (*n*=19/20).  Total follow-up period: 6 months to 5 years. | Minor GI adverse events: Nil reported.  Minor non-GI adverse events: Nil reported.  Serious adverse events: Nil reported.  Deaths: Nil reported. | Selection/ eligibility reported: Yes.  Consecutively recruited: Yes.  Prospectively recruited: No.  Loss to follow up explained: Yes – variable follow-up.  At least 90% followed up: Yes. |
| Rubin *et al, Anaerobe,* 2013 | Case series.  Number of patients: 75.  Female: male: 49: 26.  Age (median): Median 63 (range 6-94) years.  Comorbidities: x10 diabetes mellitus, x8 malignancy, x7 corticosteroids in prior three months.  CDI features: Not stated.  CDI diagnosis confirmation:Not described.  Pre-FMT antibiotics: Oral metronidazole or vancomycin alone or in combination for initial FMT in all cases; not clear exact breakdown/ use for recurrences. | Donors were healthy people from the same household as the patient.  Donors working in healthcare: Not stated.  Donor demographics: Not described.  Donor screening: Questionnaire – as per Aas *et al, Clin Infect Dis,* 2003. Travel and antibiotic exclusion period: As per Aas *et al, Clin Infect Dis,* 2003.  Screening blood tests: As per Aas *et al, Clin Infect Dis,* 2003.  Screening stool tests: As per Aas *et al, Clin Infect Dis,* 2003. | Amount of stool per transplant/ administered to patients: 30g of stool.  Diluent used to prepare: Saline - As per Aas *et al, Clin Infect Dis,* 2003. 25ml of stool/ saline mixture per FMT.  Diluent used to store if frozen: N/A - fresh.  Preparation methods: As per Aas *et al, Clin Infect Dis,* 2003.  Time from preparation to transplant (fresh): As per Aas *et al, Clin Infect Dis,* 2003.  Time period for storage (frozen): N/A – fresh.  Route administered: Upper GI: 64 nasogastric, 4 PEG, 7 OGD (75 administrations to 74 patients); lower GI: nil; capsule: nil.  Number of infusions: One routinely.  Bowel purgative: Not described.  PPI: Evening prior to/ morning of procedure - no further details.  Antimotility: Not described.  Prokinetics: Not described.  Time before CDI treatment was stopped before FMT: Stopped on the day prior to procedure. | Overall cure within stated follow up period: 78.7% (*n*=59/75).  Cure with one infusion alone: 78.7% (*n*=59/75).  Total follow up period: Up to 60 days. | Minor GI adverse events: Nil.  Minor non-GI adverse events: Nil.  Serious adverse events: Nil.  Deaths: No - up to 60 days. | Selection/ eligibility reported: Yes.  Consecutively recruited: Yes.  Prospectively recruited: No.  Loss to follow up explained: Yes.  At least 90% followed up: Yes. |
| Satokari *et al, Alimentary Pharmacology and Therapeutics,* 2015 | Case series.  Number of patients: 49.  Female: male: 34: 15.  Age (mean):  Fresh: 52 (range 22-81) years; frozen: 61 (range 20-88) years.  Comorbidities: Not described in significant details.  CDI features: Recurrent - mean 4.6 (range 2-12) relapses in fresh; mean 4.9 (range 1-6) relapses in frozen.  CDI diagnosis confirmation:"Positive culture and toxin".  Pre-FMT antibiotics: Describes using vancomycin with all, but no specific details. | Donors were: 15 fresh FMTs with individual donors, 11 fresh FMTs with universal donors; and 23 frozen FMTs with universal donor.  Donor working in healthcare: Not stated.  Donor demographics: No clear age or BMI limits.  Donor screening: Questionnaire - "No antibiotics in past six months and no intestinal symptoms".  Travel and antibiotic exclusion period: Excluded as donors if had used antibiotics in past six months.  Screening bloods: Total blood count, CRP, creatinine, LFTs, hepatitis B and C, HIV-1/-1, *Treponema*.  Screening stools: *C difficile* culture and toxin A/B test, MC&S, ova, cysts and parasites. | Amount of stool per transplant / administered to patients: Fresh - approximately 30g of stool.  Diluent used to prepare: Fresh - approximately 150ml of tap water.  Diluent used to store if frozen: Frozen - 30g of stool added to 150ml N/saline and then glycerol  Preparation methods: As described.  Time from preparation to transplant (fresh): Fresh - less than 6 hours between delivery and administration; less than 15 minutes between making FMT and delivery.  Time period for storage (frozen): Up to 16 weeks; thawed over 4-5 hours at room temp or in 37oC water bath.  Route administered: Upper GI: nil; lower GI: colonoscopy (49); capsules: nil.  Number of infusions: One FMT routinely.  Bowel purgative: 4l Colonsteril PEG/ 2l MoviPrep.  PPI: Not described.  Antimotility: Not described.  Prokinetics: not described.  Time before CDI treatment was stopped before FMT: Stopped at an average of 36 hours prior to administration. | Overall cure within stated follow up period:  Fresh: 96% (*n=*25/26); frozen: 96% (*n=*22/23).  Total follow up period: 12 weeks. | Minor GI adverse events: N/A.  Minor non-GI adverse events: Mild transient fever in x2 patients with frozen FMT.  Serious adverse events: N/A.  Deaths: x1 fresh faeces patient died within one year of FMT - not related; x2 frozen patients had relapse within one year, both treated with further antibioitcs – x1 died of recurrent CDI, x1 died of arterial thrombosis. | Selection/ eligibility reported: Yes.  Consecutively recruited: Yes.  Prospectively recruited: No.  Loss to follow up explained: Yes.  At least 90% followed up: Yes. |
| Yoon *et al, Journal of Clinical Gastroenterology,* 2010 | Case series.  Number of patients: 12.  Female: male: 9: 3.  Age (mean)\*: Mean 66 (range 30 - 86) years.  Comorbidities: 9 with diverticulosis (with 2 of these having diverticulitis as index infection).  CDI features: 1 patient with first CDI, 2 with 2nd, 5 with 3rd, 1 with 4th, 1 with 5th, 1 with 6th, 1 with 8th.  CDI diagnosis confirmation: Toxin testing for either toxin A or B, or assessment of both via EIA.  Pre-FMT antibiotics: 12 had oral metronidazole, 3 had intravenous metronidazole, 12 had oral vancomycin, 4 x rifaximin, no mention of fidaxomicin. | Donors were spouses/ partners in 8 patients; for other 4 patients, donors were one son, two daughters, and one granddaughter.  Donors working in healthcare: No.  Donor demographics: No details.  Donor screening: Questionnaire - no details.  Travel and antibiotic exclusion period: No details given  Screening bloods: Hepatitis B and C, HIV.  Screening stools: *C difficile* toxin, enteric pathogens, ova, cysts and parasites - at treating clinician's discretion. | Amount of stool per transplant / administered to patients: Stool (unclear how much) mixed with 1l normal saline; approx 250-450cc of FMT administered in total.  Diluent used to prepare: Normal saline.  Diluent used to store if frozen: N/A.  Preparation methods: Manually shaken then filtered through gauze.  Time from preparation to transplant (fresh): No details.  Time period for storage (frozen): N/A.  Route administered: Upper GI: (N/A)  Lower GI: 10-20cc of FMT administered every 5-10cm of withdrawal distance in all 12 patients.  Number of infusions: Single.  Bowel purgative: All colonoscopic, but no specific details given.  PPI: Not described.  Antimotility: Not described.  Prokinetics: Not described.  Time CDI treatment was stopped before FMT: 3 days. | Overall cure within stated follow up period: 100% (*n=*12/12).  Total follow up period: 3 weeks to 8 years - no details on relation to individual patients. | Minor GI adverse events: Nil described.  Minor non-GI adverse events: Nil described.  Serious adverse events: Nil described.  Deaths: Nil described. | Selection/ eligibility reported: Yes.  Consecutively recruited: Yes.  Prospectively recruited: No.  Loss to follow up explained: No.  At least 90% followed up: Yes. |
| Youngster *et al, JAMA,* 2014 | Prospective case series.  Number of patients: 20.  Female: male: 9: 11.  Age (median): Median 64.5 (range 11-89) years.  Comorbidities: Specific comorbidities not described.  CDI features: Included patients with both recurrent or refractory CDI.  CDI diagnosis confirmation:Toxin and ELISA, PCR if toxin negative but ELISA is positive or indeterminate.  Pre-FMT antibiotics: Failed vancomycin taper and/ or fidaxomicin. | Donors were unrelated adult volunteers.  Donor working in healthcare: Not stated.  Donor demographics: Age range 18-50 years, BMI 18.5 - 25.  Donor screening: Questionnaire - American Association of Blood Banks donor questionnaire.  Travel and antibiotic exclusion period: Excluded as potential donors if used antibiotics within preceeding 6 months.  Screening blood tests: Antibodies to hepatitis A, B, and C; HIV; and *Treponema pallidum* within 2 weeks of donations.  Screening stool tests: " Enteric pathogens". | Amount of stool per transplant / administered to patients: 30 capsules (single treatment) - total 48g of stool.  Diluent used to prepare: saline in 1/10th volume of stool.  Diluent used to store if frozen: 10% glycerol.  Preparation methods: Faecal matter solution was pipetted into size 0 capsules (650 μL), which were closed and then secondarily sealed in size 00 capsules. Capsules were stored frozen at −80°C until use.  Time from preparation to transplant (fresh): N/A.  Time period for storage (frozen): Mean 113 days (30-252 days).  Route administered: All courses were 30 oral capsules.  Number of treatments: 1 course (given as 15 capsules on 2 consecutive days). If failed, retreated at a mean of 7 days.  Bowel purgative: Not described.  PPI: Not described.  Antimotility: Not described.  Prokinetics: Not described.  Time before CDI treatment was stopped before FMT: 48 hours prior to FMT. | Overall cure within stated follow up period: 90% (*n=*18/20).  Cure with one infusion alone: 70% (*n=*14/20).  Total follow up period: 8 weeks. | Minor GI adverse events: Transient abdominal cramping and bloating in 6 patients (30%) that resolved in 72 hours.  Minor non-GI adverse events: Not described.  Serious adverse events: x1 hospitalised with a documented relapse of severe CDI after taking 15 capsules, but had successful treatment after receiving the remaining 15 capsules. No other severe adverse events (grade 2 or above).  Deaths: none. | Selection/ eligibility reported: Yes.  Consecutively recruited: Yes.  Prospectively recruited: Yes.  Loss to follow up explained: Yes.  At least 90% followed up: Yes. |
| Youngster *et al, BMC Medicine,* 2016 | Case series.  Number of patients: 180.  Female: male: Not stated.  Age (median): Median 64 (range 7–95) years.  Comorbidities: Not described.  CDI features: Three or more mild-to-moderate episodes of CDI or two episodes requiring hospitalisation.  CDI diagnosis confirmation: Not specifically described.  Pre-FMT antibiotics: Not described. | Donors were healthy volunteers.  Donors working in healthcare: Not mentioned.  Donor demographics: 18-50 years of age, on no medications, with a ‘normal body mass index’.  Donor screening: Questionnaire - initial screening using the American Association of Blood Banks donor questionaire for exposure to infectious agents.  Travel and antibiotic exclusion period: Excluded as donor if antibiotic use within 6 months.  Screening bloods: Blood was screened for antibodies to hepatitis A, B, and C; HIV; and *Treponema pallidum* within 2 weeks of donations.  Screening stool test: Donor faeces were screened for enteric bacterial pathogens including rotavirus, *Listeria monocytogenes, Vibrio cholerae, Escherichia coli* O157, ova and parasites (including general microscopy, acid-fast staining, and/or antigen testing for *Giardia, Cryptosporidium, Isospora, and Microsporidia*), *C. difficile*, and *Helicobacter pylori* antigen. | Amount of stool per transplant / administered to patients: 30 capsules derived from a mean of 48g of faeces.  Diluent used to prepare: Normal saline.  Diluent used to store if frozen: 10% glycerol.  Preparation methods: Homogenised using a commercial blender then passed through sieves in ambient air.  Time from preparation to transplant (fresh): N/A.  Time period for storage (frozen): Study of capsulised FMT. Faecal slurry was double-encapsulated in hypromellose capsules (Capsugel, Cambridge, MA) and stored at –80 °C for up to 6 months pending use.  Route administered: All received 30 capsules as a ‘dose’.  Number of infusions: 1 course of capsules in 147 patients, 2 courses in 26 patients and 3 course in 4 patients.  Bowel purgative: not mentioned.  PPI: not mentioned.  Antimotility: not mentioned.  Prokinetics: not mentioned.  Time before CDI treatment was stopped before FMT: 24–48 hours prior. | Overall cure within stated follow up period: 91% (*n=*164/180)  Cure with one infusion alone: 82% (*n=*147/180)  Total follow up period: 8 weeks for primary response. | Minor GI adverse events: x5 vomiting, x112 diarrhoea, x45 nausea/ bloating, x40 abdominal pain.  Minor non-GI adverse events: x3 fever, x54 fatigue, malaise, and headache, x12 other complaints.  Serious adverse events: Related serious (x1 fever, x2 new UC, x6 hospitalisations for CDI/ diarrhoea).  Unrelated serious adverse events: x26 hospitalisations, x14 deaths.  Deaths: x14 (unrelated). | Selection/eligibility reported: Yes.  Consecutively recruited: Yes.  Prospectively recruited: No.  Loss to follow up explained: Yes.  At least 90% followed up: Yes. |
| Zainah *et al, Digestive Diseases and Sciences,* 2014 | Case series.  Number of patients: 14.  Female: male: 9:5.  Age (mean +/-range)\*: 73.4 (+/-11.9) years.  Comorbidities: x4 patients with cancer, x1 OLT patient.  CDI features: 8 patients had had prev CDI episodes (2-5 episodes prior).  CDI diagnosis: Diarrhoea (at least 3 unformed stool/d for 2 consecutive days) + positive *C difficile* EIA and/or PCR. All patients here severe by definition - defined here as age >60 years, albumin <2.5mg/dl, temp at least 38.3oC, WBC > 15 within 48 hour of CDI diagnosis; or at least one of the following: pseudomembranes, treatment in intensive care.  Pre-FMT antibiotics: 14 patients prior vancomycin, 12 prior metronidazole too. | Donors: 12 patients received FMT from related donor (7 spouse, 5 children); the other two used unrelated donors.  Donors working in healthcare: Not stated.  Donor demographics: Not stated.  Donor screening: Questionnaire - not described.  Travel and antibiotic exclusion period: No details.  Screening blood tests: HIV-1/-2, hepatitis A IgM, hepatitis B serology, hepatitis C antibody, syphilis (RPR and FTA-ABS).  Screening stools: *C difficile* toxin by PCR, stool ova, cysts and parasites. | Amount of stool per transplant / administered to patients: 30-50g.  Diluent used to prepare: Warm tap water.  Diluent used to store if frozen: N/A.  Preparation methods: Homogenised mixture, then filtered through gauze; 120-180ml of suspension if through nasogastric tube, 300-500ml if through colonoscopy.  Time from preparation to transplant (fresh): "Same day".  Time period for storage (frozen): N/A.  Route administered: Upper GI: Nasogastric administration in all but one patient (13 patients); lower GI: colonoscopic administration in one patient (1 patient).  Number of infusions: One routinely; repeated if no response at 48-72hr.  Bowel purgative: No details.  PPI: Yes, pre nasogastric administration - no details given.  Antimotility: Not described.  Prokinetics: Not described.  Time before CDI treatment was stopped before FMT: 24 hours. | Overall cure within stated follow up period: 79% (*n=*11/14) by seven days.  Cure with one infusion alone: 71% (*n=*10/14).  Total follow up period: Up to 100 days . | Minor GI adverse events: Not described.  Minor non-GI adverse events: Not described.  Serious adverse events: Not described.  Deaths: x1 within 7 days of FMT - but died of their malignancy. | Selection/ eligibility reported: Yes.  Consecutively recruited: Yes.  Prospectively recruited: No.  Loss to follow up explained: Yes.  At least 90% followed up: Yes. |

**C.2. Reviewed randomised studies of FMT for recurrent or refractory CDI**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Paper** | **Study and patient characteristics** | | **Donor characteristics** | | **FMT characteristics** | | **Outcomes** | | **Adverse events** |
| Camacho-Ortiz *et al, PLoS ONE,* 2017 | Intervention: FMT (pooled from three donors). Number of patients: 9. Female: male: 3: 4 (data only presented for 7 patients). Age: Mean of 39.7 (+/- 24.8) years.  Comparator: Vancomycin (250mg every 6 hours for 10-14 days). Number of patients: 10. Female: Male: 3: 6 (data only presented for 9 patients). Age (mean/median): Mean of 46.7 (+/- 15.8) years.  Comorbidities: In FMT arm – x1 abdominal abscess, x1 Child B cirrhotic, x1 pulmonary TB; in vancomycin arm – x2 haemodialysis patients, x1 meningeal TB, x1 ‘abscessed squamous cell carcinoma’.  CDI features: All first episode of CDI, occurring at least 48hrs after admission.  CDI diagnosis confirmation: >3 bowel movements during the previous 24 hours, Bristol scale > 5, positive *C. difficile* EIA or PCR.  Pre-FMT antibiotics: no antibiotics within FMT arm; patients in vancomycin arm received 250mg every 6hrs for 10-14 days.  Total follow up period: up to one year.  Cochrane Collaboration risk of bias assessment: uncertain risk of bias. | | Donors working in healthcare: Not stated.  Donor demographics: >18 years, non-pregnant, BMI 20-25kg/m2  Donor screening: On questionnaire, rejected potential donors who in the past three months had had use of PPI, use of antibiotics, use of immunosuppressives, hospitalisation and/ or diarrhoea. Also excluded if high risk sexual behaviour, first degree relative with diabetes mellitus, abdominal surgery, and any GI disease/ cancer.  Travel and antibiotic exclusion period: Excluded if antibiotics within the past 3 months.  Screening blood tests: Normal full blood count and liver enzymes essential for inclusion. Also screened for HAV, HBV, HCV, HIV, CMV, EBV, *Trypanosoma, Brucella, Treponema pallidum*.  Screening stool tests: Included parasites, enteropathogenic bacteria, rotavirus. | | Amount of stool per transplant: 45ml of pooled donor stool (from three donors), at ~0.19g/ml.  Diluent used to prepare: 0.9% saline.  Diluent used to store if frozen: 15% v/v glycerol.  Preparation methods: Stool from donors pooled, mixed, resuspended in saline, filtered to remove particles > 330m .  Time from preparation to transplant (fresh): N/A.  Time period for storage (frozen): Not stated.  Route administered: Upper GI: 14 by OGD; 1 by nasojejunal tube.  Lower GI: colonic (1; patient with anatomical abnormality due to head and neck neoplasia). Capsule: nil.  Number of infusions: routinely 1; patients not resolving after first FMT received 2nd FMT (as did patients not improving with vancomycin).  Bowel purgative: Not stated.  PPI: Not stated.  Antimotility: Not stated.  Prokinetics: Not stated.  Time before CDI treatment was stopped before FMT: Nil given. | | Treatment arm: FMT Overall cure rate: 71.4% (*n*=5/7) (after 2 x FMT) Cure with one infusion alone: 57.1% (*n*=4/7).  Treatment arm: Vancomycin Overall cure rate: 88.9% (*n=*8/9) (not clear if failed patient received FMT subsequently, as is described in protocol). | | Minor GI adverse events: Nil stated.  Minor non-GI adverse events: Nil stated.  Serious adverse events: Nil stated.  Deaths: Nil. |
| Cammarota *et al, Alimentary Pharmacology and Therapeutics,* 2015 | Intervention: FMT. Number of patients: 20. Female: Male: 12: 8. Age (mean/median): Mean 71 (range 29-89) years.  Comparator: Vancomycin (125mg four times daily for 10 days, follow by a pulse regimen (125-500mg/day every 2-3 days, for at least three weeks).  Number of patients: 19. Female: Male: 11: 8. Age (mean/median): Mean 75 (range 49-93) years.  Comorbidities: No significant difference of Charlson comorbidity index between groups.  CDI features: All recurrent. 7/20 in FMT arm with pseudomembranous colitis.  CDI diagnosis confirmation: Diarrhoea and CDT positive within 10 weeks of previous antibiotic treatment.  Pre-FMT antibiotics: All had had vancomycin or metronidazole. 19/20 of FMT arm and 16/20 of vancomycin arm had had previous vancomycin taper.  Total follow up period: 10 weeks.  Cochrane Collaboration risk of bias assessment: uncertain risk of bias. | | Donors working in healthcare: no.  Donor demographics: Less than 50 years of age, no antibiotics within past 6 months.  Donor screening: Questionnaire - no antibiotics for last 6/12. Excluded if significant GI disease, metabolic syndrome, chronic illness, immunocompromise, recent travel, high risk lifestyle in last three months.  Travel and antibiotic exclusion period: 3 month travel exclusion period, 6 month antibiotic exclusion period.  Screening blood tests: Hepatitis A, B, and C, HIV, EBV, syphilis, *Stongyloides, Entomoeba histolytica,* FBC, LFTs, creatinine, CRP.  Screening stool tests: *C. difficile* cult and toxin, enteric bacteria, ova, cysts and parasites, VRE, MRSA, Gram negative multi-drug resistant bacteria. | | Amount of stool per transplant / administered to patients: Not specified.  Diluent used to prepare: Normal saline 500mls.  Diluent used to store if frozen: N/A – fresh.  Preparation methods: Blended and strained.  Time from preparation to transplant (fresh): 6 hours.  Time period for storage (frozen): N/A.  Route administered: Upper GI: nil; lower GI: colonic (20); capsule: nil.  Number of infusions: 14 had 1 infusion, 4 had 2 infusions, 1 had 3 infusions and 1 had 4 infusions. Initial protocol was that if non-response to first FMT, then second FMT after one week; however, after first two patients, changed to all patients with pseudomembranous colitis receiving repeat FMT every 3 days until resolution of CDI.  Bowel purgative: Macrogol.  PPI: No.  Antimotility: No.  Prokinetics: No.  Time before CDI treatment was stopped before FMT: Between five and two days prior to FMT. | | Treatment arm: FMT Overall cure rate: 90% (*n*=18/20). Cure with one infusion alone: 65% (*n*=13/20); none of these were patients with pseudomembranous colitis. The 7 patients not cured with first FMT all had pseudomembranous colitis; of these, 5/7 cured with protocol of recurrent FMTs.  Treatment arm: Vancomycin: Overall cure rate:  Cure with one infusion alone: 26% (*n*=5/19). | | Minor GI adverse events: x19 diarrhoea, x12 bloating ( all resolved at 12 hours).  Minor non-GI adverse events: None.  Serious adverse events: None.  Deaths: x2 from *C difficile-*related complications. |
| Allegretti *et al, Gastroenterology (abstract),* 2016 | Intervention: Low dose FMT capsules (30 pills once). Number of patients: 10. Female: male: Not stated. Age (mean/median): Not stated.  Comparator: High dose FMT. capsules (30 pills daily on two consecutive days). Number of patients: 9. Female: male: Not stated. Age (mean/median): Not stated.  Comorbidities: Not stated.  CDI features:Not stated.  CDI diagnosis confirmation: Not stated.  Pre-FMT antibiotics: Not stated.  Total follow up period: 8 weeks.  Cochrane Collaboration risk of bias assessment: uncertain risk of bias. | | Donors were unrelated donors from universal stool bank (OpenBiome).  Donors working in healthcare: No.  Donor demographics: mean age 26, mean BMI 22.2.  Donor screening: Questionnaire - as per OpenBiome protocol.  Travel and antibiotic exclusion period: As per OpenBiome protocol.  Screening bloods: As per OpenBiome protocol.  Screening stools: As per OpenBiome protocol. | | Amount of stool per transplant / administered to patients: 30 pills a day for one day.  Diluent used to prepare: Not stated.  Diluent used to store if frozen: Stored at -80oC prior to use.  Preparation methods: Capsules physically stable for 30 days at 25oC using an emulsion-based production protocol.  Time from preparation to transplant (fresh): Not stated.  Time period for storage (frozen): Not stated.  Route administered: All capsule – as described above.  Number of infusions: 30 tablets (over one day).  Bowel purgative: Not stated.  PPI: Not stated.  Antimotility: Not stated.  Prokinetics: Not stated.  Time before CDI treatment was stopped before FMT: Not stated. | | Treatment arm: Low dose FMT capsules (30 pills once). Overall cure rate: 70% (*n*=7/10).   Treatment arm: High dose FMT capsules (30 pills daily on two consecutive days). Overall cure rate: 77.8% (*n*=7/9). | | Minor GI adverse events: None.  Minor non-GI adverse events: None.  Serious adverse events: None.  Deaths: None. |
| Hota *et al, Clinical Infectious Diseases,* 2016 | Intervention: FMT. Number of patients: 16. Female: male: 11: 5. Age (mean/ standard deviation): Mean 75.7 +/- 14.5 years.  Comparator: 6 week vancomycin taper. Number of patients: 12. Female: male: 8: 4. Age (mean/ standard deviation): Mean 69.6 +/- 14.2 years.  Comorbidities: Not stated, but similar Charlson comorbidity index score between groups.  CDI features: All recurrent.  CDI diagnosis confirmation: Symptoms and toxin or PCR detection.  Pre-FMT antibiotics: At least 1 course of vancomycin for a minimum of 10 days. The majority of patients in both arms had had prior vancomycin tapers.  Total follow up period: 120 days.  Cochrane Collaboration risk of bias assessment: uncertain risk of bias. | | Donors working in healthcare: Not stated.  Donor demographics: ≥18yrs.  Donor screening: Questionnaire - self-screening questionnaire of behaviours associated with risk for blood-borne pathogens.  Travel and antibiotic exclusion period: Antibiotic use for at least two days in the preceding three months.  Screening blood tests: Extensive screening comparable with previous studies.  Screening stool tests: Extensive screening comparable with previous studies. | | Amount of stool per transplant / administered to patients: 50g.  Diluent used to prepare: 500mls normal saline.  Diluent used to store if frozen: N/A – fresh.  Preparation methods: Stomacher laboratory blender.  Time from preparation to transplant (fresh): 48 hours.  Time period for storage (frozen): N/A.  Route administered: Upper GI: nil; lower GI: 16; capsule: nil.  Number of infusions: All had 1 infusion.  Bowel purgative: None.  PPI: None.  Antimotility: None.  Prokinetics: None.  Time before CDI treatment was stopped before FMT: Day prior to FMT. | | Treatment arm: FMT: Overall cure rate: 43.8% (*n*=7/16). Cure with one infusion alone: 43.8% (*n*=7/16).  Treatment arm: 6 week vancomycin taper. Overall cure rate: 58.3% (*n*=7/12). | | Minor GI adverse events: abdominal pain, tenderness and bloating, equal in both groups.  Minor non-GI adverse events: Nil.    Serious adverse events: x1 developed anasarca from liver disease, x1 had perforated bowel from diverticulitis at 35 days post-FMT.  Deaths: None. |
| Jiang *et al, Alimentary Pharmacology and Therapeutics,* 2017 | Intervention: Fresh FMT. Number of patients: 25. Female: male: 21:4. Age (mean): Mean 75 (range 19-97) years.   Comparator: Lyophilised FMT. Number of patients: 23. Female: Male: 13: 10. Age (mean): Mean 63 (range 20-87) years.  Comparator: Frozen FMT. Number of patients: 24 Female: Male: 18: 6. Age (mean): Mean 62.5 (range 33-88) years.  CDI features: All recurrent.  CDI diagnosis confirmation:Not explicitly stated, but includes CDI toxin.  Pre-FMT antibiotics: Not stated.  Total follow up period: 2 months.  Cochrane Collaboration risk of bias assessment: high risk of bias. | | Donors working in healthcare: Not stated.  Donor demographics: "Normal BMI".  Donor screening: Questionnaire -as per van Nood *et al, NEJM,* 2013.  Travel and antibiotic exclusion period: As per van Nood *et al, NEJM,* 2013.  Screening blood tests: As per van Nood *et al, NEJM,* 2013.  Screening stool tests: As per van Nood *et al, NEJM,* 2013. | | Amount of stool per transplant / administered to patients: 50g.  Diluent used to prepare: Normal saline.  Diluent used to store if frozen: Implied use of glycerol for frozen product but not clearly stated.  Preparation methods: mix stool with normal saline (1:10), aerobic conditions, use Stomacher to homogenise.  Time from preparation to transplant (fresh): Within 2 hours of preparation.  Time period for storage (frozen): Not specified.  Route administered: All colonoscopic.  Number of infusions: 1  Bowel purgative: PEG on night before FMT.  PPI: No.  Antimotility: 4mg loperamide 3 hours before.  Prokinetics: No.  Time before CDI treatment was stopped before FMT: Not specified. | | Treatment arm: Fresh: Overall cure rate: 100% (*n*=25/25).  Cure with one infusion alone: 100% (*n*=25/25).  Treatment arm: Frozen: Overall cure rate: 83% (*n*=20/24).  Cure with one infusion alone: 83% (*n*=20/24).  Treatment arm: Lyophilised: Overall cure rate: 78% (*n*=20/23). Cure with one infusion alone: 78% (*n*=20/23). | | Minor GI adverse events: no differences in the three groups. Mild transient abdominal pain and diarrhoea in 86% of patients. x6 experienced fatigue and x4 had a headache. x2 gained weight.  Minor non-GI adverse events: None stated.  Serious adverse events: None.  Deaths: None. |
| Kao *et al, JAMA,* 2017 | Comparitor: Oral FMT capsules.  Number of patients: 57.  Female: male: 43: 14.  Age (median/standard deviation): 58.7 (+/-18.5) years.  Comparitor: Colonoscopic FMT.  Number of patients: 59.  Female: male: 36: 13.  Age (median/standard deviation): 57.4 (+/-19.1) years.  CDI features: All recurrent.  CDI diagnosis: Recurrence of diarrhea (>3 unformed bowel movements every 24 hours) within 8 weeks of completing a prior course of treatment, with either a positive *C difficile* toxin by glutamate dehydrogenase and *C difficile* toxins A/B (*C diff* QuikChek Complete; Techlab) or by detection of glutamate dehydrogenase and *C difficile* cytotoxin B gene (Cepheid), plus resolution of diarrhea for the current episode.  Pre-FMT antibiotics: Oral vancomycin (125mg twice daily) up to 24hrs before FMT.  Total follow-up period: 12 weeks. | | Donors were unrelated volunteers.  Working in healthcare: Not stated.  Donor demographics: Not stated. Donor screening: Questionnaire: As per Kelly *et al, Gastroenterology,* 2015.  Travel and antibiotic exclusion period: As per Kelly *et al, Gastroenterology,* 2015.  Screening blood tests: As per Kelly *et al, Gastroenterology,* 2015.  Screening stool tests: As per Kelly *et al, Gastroenterology,* 2015. | | Amount of stool per transplant / administered to patients: 80-100g.  Diluent used to prepare: Normal saline.  Diluent used to store if frozen: 100% glycerol.  Preparation methods: Mix stool with 200ml of normal saline, and filtered using a Stomacher to homogenise 180ml of faecal slurry.  Time from preparation to transplant (fresh): up to 2 months frozen, collected fresh within 12 hours.  Time period for storage (frozen): up to 2 months.  Route administered: lower GI: 59 (colonoscopy); capsule: 57.  Number of infusions: x1 of colonoscopy, or x40 capsules as one-off.  Bowel purgative: PEG on the night before.  PPI: No.  Antimotility: Not stated.  Prokinetics: Not stated.  Time before CDI treatment was stopped before FMT: 24 hours. | | Treatment arm: Oral FMT capsules: 96.2% (*n*=51/53) absence of CDI at 12 weeks.  Cure with one treatment alone: 96.2% (*n*=51/53).  Treatment arm: FMT via colonoscopy: 96.2% (*n*=50/52).  Cure with one infusion alone: 96.2% (*n*=50/52). | | Minor GI adverse events: Capsule group: x3 nausea, x2 vomiting, x1 abdominal pain. Colonoscopy group: x1 nausea, x1 vomiting, x1 fever, x5 abdominal pain.  Minor non-GI adverse events: .1 developed confusion in the colonoscopy group between time of screening and delivery of FMT. This was not communicated to team, and despite an uneventful FMT she died three days later from heart failure.  Serious adverse events: None.  Deaths: x1 in each group from cardiopulmonary disease (see above for colonoscopy). The other patient developed *Staphylococcus epidermis* bacteraemia 10 weeks after capsule treatment and died from sepsis. |
| Kelly *et al, Annals of Internal Medicine,* 2016 | Intervention: Donor FMT. Number of patients: 22. Female: male: 18: 4. Age (mean/ standard deviation): Mean age 48 (+/-16) years.  Comparator: Autologous FMT. Number of patients: 24. Female: male: 19: 5. Age (mean/ standard deviation): Mean age 55 (+/-14) years.  Comorbidities: Similar median Charlson comorbidity scores between groups.  CDI features: Recurrent.  CDI diagnosis confirmation: ≥3 unformed stools over 24 hours for 2 consecutive days, and either a positive stool test result for *C difficile* or pseudomembranes on colonoscopy.  Pre-FMT antibiotics: All patients had had prolonged prior courses of vancomycin.  Total follow up period: 8 week outcome follow up, 6 month safety follow-up.  Cochrane Collaboration risk of bias assessment: low risk of bias. | | Donors working in healthcare: Not stated.  Donor demographics: Not stated.  Donor screening: Questionnaire - potential donors also completed a modified AABB full-length donor history questionnaire, and those with risk factors for infectious agents were excluded.  Travel and antibiotic exclusion period: Excluded as donor if antibiotics within preceeding 90 days. Screening bloods: Testing for HIV-1 and HIV-2 was performed within 2 weeks before donation for FMT. Other serologic testing was performed within 1 month before FMT and included testing for hepatitis A, B, and C viruses; also, testing for *Treponema pallidum*.  Screening stool tests: polymerase chain reaction (PCR) testing for detection of *C difficile* toxin; culture for enteric pathogens (*Escherichia coli, Salmonella, Shigella, Yersinia, Campylobac- ter, Listeria monocytogenes, Vibrio parahaemolyticus,* and *V cholerae*); testing for fecal *Giardia* and *Cryptosporidium* antigens; acid-fast stain for detection of *Cyclospora* and *Isospora*; ova and parasite testing; and enzyme immunoassay for detection of Rotavirus. | | Amount of stool per transplant / administered to patients: Mean stool dose of 64 g (standard deviation of 25 g; range, 20 to 100g).  Diluent used to prepare: 100g of stool in 500mls of normal saline.  Diluent used to store if frozen: N/A.  Preparation methods: Not reported.  Time from preparation to transplant (fresh): 6 hours.  Time period for storage (frozen): N/A.  Route administered: Upper GI: nil; lower GI: all patients in both groups (colonoscopy); capsule: nil.  Number of infusions: 1 infusion only.  Bowel purgative: polyethylene glycol (PEG).  PPI: No.  Antimotility: Not described.  Prokinetics: No.  Time before CDI treatment was stopped before FMT: continued therapy until 2 to 3 days before the procedure. | | Treatment arm: Donor FMT: Overall cure rate: 90.9% (*n*=20/22). Cure with one infusion alone: 90.9% (*n*=20/22).  Treatment arm: Autologous FMT Overall cure rate: 62.5% (*n*=15/24). Cure with one infusion alone: 62.5% (*n*=15/24). | | Minor GI adverse events: Low rates of abdominal pain, bloating, nausea, vomiting, diarrhea, flatulence, anorexia, and constipation; these did not differ significantly between groups.  Minor non-GI adverse events: None described.  Serious adverse events: None described.  Deaths: None. |
| Lee *et al, JAMA,* 2016 | Intervention: Frozen FMT. Number of patients: 108. Female: male: 72: 36. Age (mean/ standard deviation): Mean age 73.0 (+/- 16.4) years.  Comparator: Fresh FMT. Number of patients: 111. Female: Male: 74: 37. Age (mean/ standard deviation): Mean age 72.5 (+/- 16.2) years.  Comorbidities: Not described.  CDI features: All recurrent disease.  CDI diagnosis confirmation: Toxin and PCR.  Pre-FMT antibiotics: All had had prior metronidazole, vancomycin, or both in combination. Almost all patients had had prior vancomycin taper.  Total follow up period: 13 weeks.  Cochrane Collaboration risk of bias assessment: low risk of bias. | Donors were unrelated volunteers.  Donors working in healthcare: Not specifically described.  Donor demographics: Not defined.  Donor screening: questionnaire – comparable to blood donor screening questionnaire.  Travel and antibiotic exclusion period: Excluded as donor if travel (within the last 6 months) to areas of the world where diarrheal illnesses are endemic or risk of traveler's diarrhea is high; also excluded if antibiotics within the preceeding 3 months.  Screening blood tests: HIV-1 and -2, hepatitis A IgM, HBsAg, anti-HBc (both IgG and IgM), and anti-HBs, hepatitis C antibody, RPR and FTA-ABS*.*  Screening stool tests: *Clostridium difficile* toxin B by PCR; if unavailable, then evaluation for toxins A and B by EIA; routine bacterial culture for enteric pathogens; faecal *Giardia* antigen; faecal *Cryptosporidium* antigen; Acid-fast stain for *Cyclospora, Isospora* and, if antigen testing unavailable, *Cryptosporidium;* ova, cysts and parasites. | | Amount of stool per transplant / administered to patients: 100g of stool.  Diluent used to prepare: 300mls of water.  Diluent used to store if frozen: no solvents used for storage.  Preparation methods: 100g of stool homogensied and mixed in 300mls of water.  Time from preparation to transplant (fresh): If fresh, administered within 24hrs.  Time period for storage (frozen): If frozen, kept for 30 days at -20oC.  Route administered: Upper GI: nil; lower GI: enema FMT for all patients in both groups; capsule: nil.  Number of infusions in frozen arm: 57 patients had 1 infusion; 24 patients had 2 infusions; rest had >2 infusions; in fresh arm: 56 patients had 1 infusion; 22 patients had 2 infusion; rest had >2 infusions.  Bowel purgative: Not described.  PPI: Nil.  Antimotility: Not described.  Prokinetics: Not described.  Time before CDI treatment was stopped before FMT: Discontinued 24 - 48 hours prior to FMT. | | Treatment arm: Frozen: Overall cure rate: 90.7% (*n*=98/109). Cure with one infusion alone: 52.8% (*n=*57/108).  Treatment arm: Fresh: Overall cure rate: 85.6% (*n*=95/111). Cure with one infusion alone: 50.5% (*n*=56/111). | | Minor GI adverse events: Transient diarrhoea (70%), abdominal cramps (10%), nausea (5%) in 24 hours post-FMT; constipation (20%) and flatulence (25%) in follow-up period. No difference between the two groups.  Minor non-GI adverse events: None described.  Serious adverse events: x12 patients required hospitalization because of ilnesses unrelated to FMT.  Deaths: x6 deaths in frozen and x13 deaths in fresh arm (all unrelated to FMT). | |
| van Nood *et al, New England Journal of Medicine,* 2013 | Intervention: FMT + bowel lavage. Number of patients: 16. Female: male: 8: 8. Age (mean/ standard deviation): 73 (+/- 13) years.  Comparator: Vancomycin (500mg orally four times daily for 14 days). Number of patients: 13. Female: male: 7: 6. Age (mean/ standard deviation): 66 (+/-14) years.  Comparator: Vancomycin (500mg orally four times daily for 14 days) + bowel lavage. Number of patients: 13. Female: Male: 3: 10. Age (mean/ standard deviation): 69 (+/-16) years.  Comorbidities: No significant difference in median Charlson comorbidity index between groups.  CDI features: All recurrent.  CDI diagnosis confirmation: Toxin and PCR.  Pre-FMT antibiotics: At least one course of adequate antibiotic therapy (≥10 days of vancomycin at a dose of ≥125mg four times a day or ≥10 days of metronidazole at a dose of 500mg three times per day).  Total follow up period: After first infusion at 10 weeks; follow-up was extended to 10 weeks after the second infusion.  Cochrane Collaboration risk of bias assessment: low risk of bias. | | Donors were healthy volunteers.  Donors working in healthcare: No.  Donor demographics: <60 years of age.  Donor screening: questionnaire: questionnaire addressed risk factors for potentially transmissible diseases.  Travel and antibiotic exclusion period: Excluded as donor if travel to tropical area within past 3 months, or antibiotic use within the past two months.  Screening blood tests: Blood was screened for HIV; human T-cell lymphotropic virus types 1 and 2; hepatitis A,B, and C; cytomegalovirus; Epstein-Barr virus; *Treponema pallidum; Strongyloides stercoralis;* and *Entamoeba histolytica.*  Screening stool tests: Donor feces were screened for parasites, including *Blastocystis hominis* and *Dientamoeba fragilis*; *C difficile*, and enteropathogenic bacteria. | Amount of stool per transplant / administered to patients: A mean (+/-standard deviation) of 141+/-71g of faeces was infused.  Diluent used to prepare: Faeces were diluted with 500mls of sterile saline, 0.9%.  Diluent used to store if frozen: N/A.  Preparation methods: The solution was stirred, and the supernatant strained and poured in a sterile bottle.  Time from preparation to transplant (fresh): Mean time from defecation to infusion was 3.1+/-1.9 hours.  Time period for storage (frozen): N/A.  Route administered: Upper GI: 16 (via nasoduodenal tube); lower GI: nil; capsule: nil.  Number of infusions: 16 patients had 1 infusion; 3 who did not respond in this group had 2nd infusion.  Bowel purgative: 4 litres of macrogol solution (Klean-Prep) on the last day of antibiotic treatment.  PPI: Not stated.  Antimotility: Not stated.  Prokinetics: Not stated.  Time before CDI treatment was stopped before FMT: 24 hours. | | Treatment arm: FMT + bowel lavage Overall cure rate: 94% (*n*=15/16). Cure with one infusion alone: 81% (*n*=13/16).  Treatment arm: Vancomycin: Overall cure rate: 315 (*n*=4/13) patients at 10 weeks.  Treatment arm: Vancomycin + bowel lavage: Overall cure rate: 23% (*n*=3/13) patients at 10 weeks. | | Minor GI adverse events: 94% immediate diarrhoea, 31% abdominal pain with cramping, 19% belching - resolved within 3 hours. During follow-up, x3 patients had constipation (19%).  Minor non-GI adverse events: Nil.  Serious adverse events: Nil described.  Deaths: None. | |
| Youngster *et al, Clinical infectious diseases,* 2014 | Intervention: Colonoscopic FMT. Number of patients: 10. Female: male: 6:4. Age (mean/ standard deviation): Mean 50.4 (+/- 28.8) years.  Intervention: Nasogastric FMT. Number of patients: 10. Female: male: 5: 5. Age (mean/ standard deviatoin): Mean 58.6(+/-19.6) years.  Comorbidities: Not defined.  CDI features: Relapsing or recurring (having at least 3 episodes of mild-to-moderate *CDI* *or* at least 2 episodes of severe CDI resulting in hospitalization and associated with significant morbidity.  CDI diagnosis confirmation: Toxin; initial GDH enzyme-linked immunosorbent assay, followed by PCR only if the GDH test is positive or indeterminate.  Pre-FMT antibiotics: Treatment failures of a 6- to 8-week taper with vancomycin (95% of patients) with or without an alternative antibiotic, including fidaxomicin (70% of participants).  Total follow up period: 8 weeks follow-up for primary response.  Cochrane Collaboration risk of bias assessment: uncertain risk of bias. | | Donors were healthy volunteer non-pregnant adults.  Donors working in healthcare: No.  Donor demographics: 18-50 years of age, on no medications, with a normal body mass index.  Donor screening: questionnaire - initial screening using the American Association of Blood Banks donor questionnaire for exposure to infectious agents.  Travel and antibiotic exclusion period: Excluded if antibiotic use within 6 months.  Screening blood tests: Blood was screened for antibodies to hepatitis A, B, and C; HIV; and *Treponema pallidum* within 2 weeks of donations.  Screening stool tests: Donor faeces were screened for enteric bacterial pathogens including rotavirus*, Listeria monocytogenes, Vibrio cholerae, Escherichia coli* O157, ova and parasites (including general microscopy, acid-fast staining, and/or antigen testing for *Giardia, Cryptosporidium, Isospora,* and *Microsporidia*), *C difficile,* and *Helicobacter pylori* antigen. | Amount of stool per transplant / administered to patients: 90mls of thawed FMT (41g).  Diluent used to prepare: Normal saline.  Diluent used to store if frozen: 10% glycerol.  Preparation methods: Homogenised using a commercial blender then passed through sieves.  Time from preparation to transplant (fresh): N/A.  Time period for storage (frozen): Inocula were stored frozen for up to 156 days, range, 29-156 days.  Route administered: Upper GI (nasogastric) 10; lower GI (colonoscopy): 10; capsule: nil.  Number of infusions: Colonoscopy: 8 patients - 1 infusion, 2 patients – 2 infusions; NG: 7 patients - 1 infusion; 3 patients – 2 infusions.  Bowel purgative: For colonic route - 4 liters of PEG solution.  PPI: 20mg of omeprazole orally for 48 hours prior to FMT.  Antimotility: single dose of oral loperamide prior to procedure.  Prokinetics: Nil.  Time before CDI treatment was stopped before FMT: Patients were required to discontinue all antibiotics at least 48 hours prior to the procedure. | | Treatment arm: Overall Overall cure rate: 90% (*n*=18/20). Cure with one infusion alone: 70% (*n*=14/20).  Treatment arm: Colonoscopy: Overall cure rate: 100% (*n*=10/10). Cure with one infusion alone: 80% (*n*=8/10).  Treatment arm: Nasogastric:  Overall cure rate: 80% (*n*=8/10). Cure with one infusion alone: 60% (*n*=6/10). | | Minor GI adverse events: Mild abdominal discomfort and bloating in x4 patients (20%). X1 child treated colonoscopically had a transient fever of 38.8oC on day 2 that resolved spontaneously.  Minor non-GI adverse events: Nil described.  Serious adverse events: x1 new diagnosis of malignancy, x1 hospitalisation for Fournier gangrene (unrelated to FMT).  Deaths: x2 deaths (unrelated to FMT). | |

**C.3. Reviewed randomised studies of FMT for non-CDI indications**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Paper** | **Study and patient characteristics** | **Donor characteristics** | **FMT characteristics** | **Outcomes** | **Adverse events** | |
| Moayyedi *et al, Gastroenterology,* 2015 | Intervention: FMT. Number of patients: 38. Female: male 20: 18. Age (mean +/-range)\*: 42.2+/-15.0 years.  Comparator: Water enema. Number of patients: 37. Female: male: 11: 26. Age (mean +/-range)\*: 35.8 +/- 12.1 years.  Primary outcome: Remission at week 7, defined as full Mayo score < 3 and complete healing of mucosa at flexible sigmoidoscopy (endoscopic Mayo score: 0).  Secondary outcome: Clinical response (at least 3 point reduction in Mayo score), change in Mayo, IBD Questionnaire scores, EQ-5D scores.  Inclusion criteria: >18 years with UC - Mayo at least 4 with endoscopic subscore at least 1 (included patients with severe disease).  Exclusions - antibiotics/ probiotics in past 30 days, concomitant *C difficile*/ other enteric pathogens, disease severity requiring hospitalisation, pregnancy, unable to give informed consent.  Concomitant medications: Stable dose thiopurines, mesalamine, corticosteroids, and anti-TNF allowed as long as stable dose for at least 12 weeks (4 weeks for steroids).  Total follow-up period: Up to 12 months.  Cochrane Collaboration risk of bias assessment: low risk of bias. | Donors were unrelated volunteers - six donors used. Plus - one patient in active treatment arm had spouse as donor (treatment failure).  Working in healthcare: Not specifically stated.  Donor demographics: 18-60 years.  Donor screening: Questionnaire – yes.  Travel and antibiotic exclusion period: Retesting of stool whenever donor travelled outside North America. Excluded as donor if antibiotics within past 3 months. Screening repeated regardless every 6 months.  Screening blood tests: HIV, hepatitis A IgM, HBsAg, hepatitis C antibody, syphilis, HTLV-1/-2.  Screening stool tests: MC&S, ova, cysts and parasites, *C difficile* toxin, VRE, MRSA. | Amount of stool per transplant / administered to patients: 8.3g of stool per enema  Diluent used to prepare: 50g of stool mixed with 300ml of commercial bottled drinking water, then 50ml of mixture administered as enema.  Diluent used to store if frozen: No glycerol. FMT administered either fresh, or stored at -20 degrees. 21 received frozen, 15 received fresh, 1 mixture of fresh and frozen.  Preparation methods: Not anaerobic. Single donor per FMT.  Time from preparation to transplant (fresh): Processing within 5hr of collection.  Time period for storage (frozen): Not stated.  Route administered and frequency:  Upper GI: nil; lower GI: enema - weekly for 6 weeks. Aimed to retain for at least 20 mins (38); capsule: nil.  Bowel purgative: No PEG.  PPI: Not described.  Antimotility: Not described.  Prokinetics: Not described. | FMT arm: Remission rates: 24% (*n*=9/38). Clincial response rates: 40% (*n*=15/38) had reduction in full Mayo score of at least 3 points. Quality of Life Assessment: Yes - IBDQ and EQ-5D not significantly different between groups.  Water enema arm: Remission rates: 5% (*n*=2/37) (*p*=0.03) Clincial response rates: 24% (*n*=9/37) had reduction in full Mayo score of at least 3 points (*p*=0.16). | FMT arm: Minor GI adverse events: Two patients developed patchy inflam in the colon and also rectal abscess formation - resolved with antibiotics.  Minor non-GI adverse events: None.  Serious adverse events: x2 patients had diagnosis changed to Crohn's colitis, one was *C difficile* toxin positive at end of therapy.  Deaths: None.  Water enema arm: Minor GI adverse events: x1 patient developed patchy inflammation in the colon and also rectal abscess formation - resolved with antibiotics.  Minor non-GI adverse events: None.  Serious adverse events: x1 patient changed diagnosis from UC to Crohn's colitis; x1 admitted with hospital with active severe colitis and required colectomy.  Deaths: None. |
| Rossen *et al, Gastroenterology,* 2015 | Intervention: Donor faeces. Number of patients: 23. Female: male: 12: 11. Age (median, (range)): 40 (33-56) years.  Comparator: Autologous faeces. Number of patients: 25. Female: male: 14:11. Age (median, (range)): 41 (30 – 48) years.  Primary outcome: Clinical remission (defined as a SCCAI score ≤2) in combination with 1-point improvement on the combined Mayo endoscopic score of the sigmoid and rectum, as compared with baseline sigmoidoscopy, 12 weeks after the first treatment.  Secondary outcome: Endpoints at 6 and 12 weeks were clinical response (defined as a reduction of 1.5 points on the Simple Clinical Colitis Activity Index (SCCAI), a validated disease activity index tool in ulcerative colitis ), clinical remission (defined as a SCCAI of ≤2), endoscopic response, change in median (Inflammatory Bowel Disease Questionnaire [IBDQ]) score from baseline to shortly after treatment (week 6), and adverse events.  Inclusion criteria: enteric infection, use of biologics within 8 weeks or methotrexate within 4 weeks  Concomitant medications: stable doses of thiopurines, mesalamine, or corticosteroids 10 mg/day for the 8 weeks before inclusion.  Total follow-up period: 12 weeks.  Cochrane Collaboration risk of bias assessment: low risk of bias. | Donors were healthy partners, relatives, or volunteers.  Working in healthcare: Not stated  Donor demographics: >18 yrs  Donor screening: Questionnaire - Dutch Red Cross Questionnaire addressing risk factors for potential transmissible diseases used for screening of blood donors in The Netherlands.  Travel and antibiotic exclusion period: Excluded as donor if antibiotics within 8 weeks.  Screening blood tests: CMV (IgG + IgM), EBV (IgG + IgM), hepatitis A (total antibody), hepatitis B (HBsAg), hepatitis C (hepatitis C virus antibody), HIV (1+2 antibodies/antigen), HTLV (I + II antibodies), *Entamoeba* (antibodies against *Entamoeba* *histolytica*), *Strongyloides* (*Strongyloides* ELISA).  Screening stools: Multiplex PCR containing probes against enteral viruses (*rotavirus, norovirus, enterovirus parechovirus, sapovirus, adenovirus 40/41/52, astrovirus*), FT + TFT II: PCR op *Giardia, SSYC, Clostridium* toxin | Amount of stool per transplant / administered to patients: 120g  Diluent used to prepare: Normal saline  Diluent used to store if frozen: not stated  Preparation methods: Not anaerobic  Time from preparation to transplant (fresh): not stated  Time period for storage (frozen): not stated  Route administered and frequency:  Upper GI: Nasoduodenal route. 2 infusions three weeks apart. Nil lower GI or capsule  Bowel purgative: Macrogol before both infusions  PPI: Not described  Antimotility: Not described  Prokinetics: Not described | Donor faeces arm: Remission rates: 30% (*n*=7/23) Clincial response rates: 47.8% (*n*=11/23) at 12 weeks. Quality of Life Assessment: IBDQ only calculated based on responders vs nonresponders.  Autologous faeces arm: Remission rates: 20% (*n*=5/25), (*p*=0.51). Clincial response rates: 52% (*n*=13/25) at 12 weeks. | Minor GI adverse events: 78.3% (*n*=18/23) of donor stool and 64% (*n*=16/25) of autologous stool experienced side effects post FMT: transient borborygmus, diarrhoea, vomiting, fever.  Minor non-GI adverse events: None.  Serious adverse events: x4 overall (small bowel perforation – secondary to Crohn’s), CMV infection, abdominal pain, cervical carcinoma.  Deaths: Nil. |
| Paramsothy *et al, Lancet,* 2017 | Intervention: FMT. Number of patients: 41. Female: male 19: 22. Age (median, (range)): 35.6 (27.8-48.9) years.  Comparator: Placebo-isotonic saline with added colourant odourant and glycerol cryoprotectant (concentration 10%). Number of patients: 40. Female: male: 15: 25. Age (median, (range)): 35.4 (27.7-45.6) years.  Primary outcome: Composite of steroid-free clinical remission and endoscopic remission or response at week 8, defined as a total Mayo score of 2 or less, with all Mayo subscores of 1 or less, and at least a 1 point reduction from baseline in the endoscopy subscore.  Secondary outcome: Secondary outcomes were: steroid-free clinical remission (defined as combined Mayo subscores of 1 or less for rectal bleeding plus stool frequency); steroid-free clinical response (defined as either a decrease of 3 points or more on the Mayo score, a 50% or greater reduction from baseline in combined rectal bleeding plus stool frequency Mayo subscores, or both); steroid-free endoscopic response (defined as a Mayo endoscopy subscore of 1 or less, with a reduction of at least 1 point from baseline); steroid-free endoscopic remission (defined as a Mayo endoscopy subscore of 0); quality of life (assessed with the IBDQ); and safety (assessed by adverse events).  Inclusion criteria: 1. 18-75 years; 2. UC for >3 months; 3. UC of any extent except isolated proctitis <5cm; 4. currently active mild-moderate UC as mesured by a Mayo score of 4-10, endoscopy score must be greater or equal to 1 and a physician global assessment score of less than or equal to 2; 5. Written consent.  Concomitant medications: Drugs permitted as long as the dose was stable preceding enrolment: oral 5-aminosalicylates (stable dose for 4 weeks); thiopurines and methotrexate (on medication for ≥90 days and dose stable for 4 weeks); and oral prednisolone (dose ≤20mg daily and stable for 2 weeks). During the study, patients remained on the same dose of 5-aminosalicylate, thiopurine, and methotrexate. For oral prednisolone, patients received a mandatory taper of up to 2·5 mg per week so that patients would be steroid-free by week 8.  Cochrane Collaboration risk of bias assessment: low risk of bias. | Donors were between 3-7 unrelated donors.  Working in healthcare: No.  Donor demographics: Not described.  Donor screening: Questionnaire asked regarding:  · Known HIV, hepatitis B or hepatitis C infection · Known exposure to HIV or viral hepatitis within the previous 12 months · High risk sexual behavior (e.g. sexual contact with anyone with HIV/AIDS or viral hepatitis, men who have sex with men, sex for drugs or money) · Use of illicit drugs · Tattoo or body piercing within the preceding 6 months · Incarceration or history of incarceration · Known current communicable disease (e.g. upper respiratory tract infection) · Risk factors for variant Creutzfeldt-Jakob disease · Travel within last 2 weeks to areas of the world where diarrhoeal illnesses are endemic or risk of traveler’s diarrhea is high · History of or current inflammatory bowel disease (IBD) · History of or current irritable bowel syndrome (IBS), chronic constipation, chronic diarrhea or other intrinsic gastrointestinal illness / condition · History of or current gastrointestinal malignancy or known polyposis or strong family history of colorectal cancer · History of major gastrointestinal surgery (e.g. gastric bypass, partial colectomy)h Antimicrobials (antibiotics, antivirals, antifungals), probiotics or proton pump inhibitors (PPIs) within the preceding 3 months · Major immunosuppressive medications (e.g. calcineurin inhibitors, biological agents, exogenous glucocorticoids) · Systemic anti-neoplastic agents · Household members with active GI infection Systemic autoimmunity (e.g. multiple sclerosis, connective tissue disease) · Atopic disease (e.g. moderate - severe asthma, eosinophilic disorders of the gastrointestinal tract) · Metabolic syndrome, obesity (BMI >30) or moderate to severe under-nutrition / malnutrition · Chronic pain syndromes (e.g. chronic fatigue syndrome, fibromyalgia) or neurologic / neurodevelopmental disorders · History of malignant illness or ongoing oncologic therapy  Travel and antibiotic exclusion period: Excluded if travel within last 2 weeks to areas where diarrheal illnesses are endemic or risk of travelers diarrhea is high.  Screening blood tests: Complete blood count, electrolytes, urea and creatinine, LFTS, ESR, CRP, HIV-1 and -2, hepatitis A IgM, hepatitis B SAg, hepatitis B core antibody (IgM and IgG) and surface antibody, hepatitis c antibody, rapid plasma reagin and/or fluorescent treponemal antibody-absorbed, HTLV-1 and HTLV-2.  Screening stools: *C difficile* PCR, faecal MC&S with routine bacterial culture for enteric pathiogens, *Giardia* antigen, *Cryptosporidium* antigen, faecal ova/cysts/parasites including *Blastocystitis hominis* and *Dientamoeba fragilis,* and Norovirus. | Amount of stool per transplant / administered to patients: 37.5g of blended stool to isotonic saline; volume of each infusion was 150ml.  Diluent used to prepare: isotonic saline with 10% glycerol cryoprecipitant.  Diluent used to store if frozen: -80oC with glycerol cryoprotectant (concentration 10%).  Preparation methods: Donors had to provide faeces within 4 hours of a bowel movement, which was inspected visually for suitability (formed stool, no blood or mucous). Donor stool homogenised for a given batch on each day in a biosafety cabinet in isotonic saline then filtered. Placebo infusions comprised isotonic saline; brown food colourant, odourant, and glycerol cryoprotectant (concentration 10%) was added to all study infusions (investigational and placebo). The volume of each infusion was 150 mL. Infusions were stored at −80°C until dispensation to patients at fortnightly study visits for home freezer storage at −20°C before daily administration.  Time from preparation to transplant (fresh): Not described.  Time period for storage (frozen): Not described.  Route administered and frequency:  Upper GI: 0; lower GI: 5 enemas per week following colonosopic delivery -5 days on, two days off for 8 weeks (40 enemas per patient); capsule: 0.  Bowel purgative: Yes, but no details  PPI: Not described  Antimotility: Not described  Prokinetics: Not described | Donor FMT arm: Remission rates: 275 (*n*=11/41). Clincial response rates: 54% (*n=*22/41). Quality of Life Assessment: Not described.  Placebo arm: Remission rates: 8% (*n*=3/40) (*p*=0.021). Clincial response rates: 23% (*n*=9/40) (*p*=0.04). Quality of Life Assessment: Not described. | FMT arm: Minor GI adverse events: abdominal pain x12 (29%), colitis x10 (24%), flatulance x10 (24%), bloating x8 (20%), nausea x2 (5%), elevated ALT x2 (5%), vomiting x2 (5%), enterocolitis x1 (2%), diarrhoea x1 (2%), reflux x1 (2%), haemorrhoids x1 (2%), elective surgical procedure x1 (2%).  Minor non-GI adverse events: None.  Serious adverse events: x2 (5%) - x1 clinical deterioration and colectomy, x1 needed intravenous intravenous steroids.  Deaths: Nil.  Placebo arm: Minor GI adverse events: abdominal pain x11 (28%), colitis x9 (23%), flatulance x8 (20%), bloating x11 (28%), nausea x5 (13%), vomiting x1 (3%), enterocolitis x3 (8%), anal fissure x1 (3%), faecal incontinence x1 (3%), elevated ALT x2 (5%).  Minor non-GI adverse events: None.  Serious adverse events: x1 (3%) - admitted to hospital (no details why).  Deaths: Nil. |
| Costello *et al, Journal of Crohn's and Colitis (abstract),* 2017 | Intervention: Donor FMT. Number of patients: 38. Female: male: Not stated. Age (mean/median): Not stated.  Comparator: Control - autologous FMT in saline. Number of patients: 35. Female: male: Not stated. Age (mean/median): Not stated.  Primary outcome: Steroid-free remission of UC, as defined by total Mayo of 2 or less with an endoscopic Mayo score of 1 or less at week 8.  Secondary outcome: Clinical response (at least 3 point reduction in Mayo score), clinical remission (i.e. SCCAI of 2 or less), endoscopic remission (Mayo 1 or less), and safety.  Inclusion criteria: UC - Mayo 3-10 with endoscopic subscore at least 2.  Concomitant medications: Stable dose of immunomodulator, 5-ASA, biological, tapering prednisolone.  Cochrane Collaboration risk of bias assessment: uncertain risk of bias. | Donors were healthy volunteers.  Working in healthcare: Not clear.  Donor demographics: Not described.  Donor screening: Questionnaire – yes but no details described.  Travel and antibiotic exclusion period: Not described.  Screening blood tests: Yes but not described .  Screening stool tests: Yes but not described. | Amount of stool per transplant / administered to patients: 50g of stool for first FMT, 25g of stool in subsequent enemas.  Diluent used to prepare: 65% saline.  Diluent used to store if frozen: Yes - frozen with 10% glycerol.  Preparation methods: Anaerobic prep, donor stool pooled from 3-4 donors.  Time from preparation to transplant (fresh): N/A.  Time period for storage (frozen): Not stated.  Route administered and frequency:  Upper GI: nil; lower GI: FMT via colonoscopy on day 0, followed by 2 enemas on day 7 (38); capsule: nil  Bowel purgative: PEG before colonoscopy but not enema  PPI: Not described  Antimotility: Not described  Prokinetics: Not described | Donor FMT arm: Remission rates: 32% (*n*=12/38) in steroid-free remission at week 8. Clincial response rates: 55% (*n*=21/38). Quality of Life Assessment: Not described.  Autologous FMT arm: Remission rates: 9%. (*n*=3/35) in steroid-free remission at week 8 (*p*<0.01). Clincial response rates: 20% (*n*=7/35) (*p*<0.01). Quality of Life Assessment: Not described. | Donor FMT arm: Minor GI adverse events: Nil.  Minor non-GI adverse events: Nil.  Serious adverse events:  Worsening colitis in x2 patients  Deaths: Nil.  Control - autologous FMT in saline arm. Minor GI adverse events: Nil.  Minor non-GI adverse events: None.  Serious adverse events: Worsening colitis in x2 placebo patients. x1 patient requiring colectomy, x1 pneumonia.  Deaths: Nil. |
| Johnsen et al,  *Lancet Gastroenterology and Hepatology,*  2017 | Intervention: Donor FMT. Number of patients: 55. Female: male: 36: 19. Age (median, (range)): 44 (33-54) years.  Comparator: Control - autologous FMT . Number of patients: 28. Female: male: 19: 9. Age (median (range)): 45 (34-57) years.  Primary outcome: Symptom relief of more than 75 points assessed by IBS-SSS at 3 months after FMT.  Inclusion criteria: 18-75 yrs of age, IBS with diarrhoea or mixed IBS according to Rome III criteria.  Exclusion criteria: participants with severe cardiac disease, pulmonary  disease, or kidney failure, non-IBS type abdominal pain, immunodeficiency or on immunomodulating agents.  Cochrane Collaboration risk of bias assessment: low risk of bias | Donors were two volunteers screened at start and at 7 months post donation.  Working in healthcare: Not stated.  Donor demographics: Not described.  Donor screening: Questionnaire - new tattoos or piercings in the past 3 months; high-risk sexual behaviour; former imprisonment; or history of any of the following conditions: chronic diarrhoea, constipation,  inflammatory bowel disease, IBS, colorectal polyps or  cancer, immunosuppression, obesity, metabolic syndrome,  atopic skin disease, or chronic fatigue.  Travel and antibiotic exclusion period: Excluded if antibiotics within past three months.  Screening blood tests: Glycated  haemoglobin; and serology for HIV, *Treponema pallidum*,  and hepatitis A, B, and C.  Screening stool tests: *Salmonella* spp, *Shigella* spp,  *Campylobacter* spp, *Yersinia* spp, and toxin-producing  *C difficile*; faecal tests for *Helicobacter pylori* antigen,  viruses (norovirus, rotavirus, Sapovirus, adenovirus),  and faecal calprotectin. | Amount of stool per transplant / administered to patients: 50 to 80g of stool in 50mls.  Diluent used to prepare: 200ml isotonic saline and 50mls of 85% glycerol.  Diluent used to store if frozen: glycerol, only for autologous transplants.  Preparation methods: Aerobic, stool from both donors was mixed together.  Time from preparation to transplant (fresh): 7 hours.  Time period for storage (frozen): 2-4 weeks.  Route administered and frequency:  upper GI: none; lower GI: single infusion of FMT via colonscopy; nil capsule.  Bowel purgative: Picoprep.  PPI: Not described.  Antimotility: Loperamide 8mg 2 hours before.  Prokinetics: Not described. | Donor FMT arm:  Remission rates: 66% (*n*=36/55) .  Quality of Life Assessment: Not described.  Autologous FMT arm:  Remission rates: 43% (*n*=12/28) (*p*=0.49).  Quality of Life Assessment: Not described. | FMT arm:  Minor GI adverse events: Self limiting intermittent abdominal pain x1, self limiting nausea and vertigo x1.  Minor non-GI adverse events: Nil.  Serious adverse events: Nil.  Deaths: Nil.  Placebo arm:  Minor GI adverse events: Self limiting intermittent abdominal pain x2.  Minor non-GI adverse events: Nil.  Serious adverse events: Nil.  Deaths: Nil. |
| Bajaj *et al,*  *Hepatology,*  2017 | Intervention: Donor FMT.  Number of patients: 10.  Female: male: 0: 10.  Age (mean+/-standard deviation): 64.5 +/- 5.1 years.  Aetiology (HCV / alcohol / HCV+alcohol / NAFLD / others): 2/4/2/2/0.  Comparator: Standard of care (lactulose/ rifaximin).  Number of patients: 10.  Female: male: 0: 10.  Age (mean+/-standard deviation): 62.9 +/- 9.8 years.  Aetiology (HCV / alcohol / HCV+alcohol / NAFLD / others): 1/5/2/1/1.  Primary outcome: Proportion of participants with FMT-related serious adverse events (SAEs) at day 150, a composite endpoint of death, hospitalisations, emergency room visits or transmissible infections, as defined by the FDA.  Secondary outcomes: Changes in cognitive function at day 20, cirrhosis severity (MELD score, albumin), changes in liver function and white blood cell (WBC) count, development of all adverse events (AEs), and changes in microbiota composition and function in the FMT arm compared to standard of care arm.  Inclusion criteria: >/:18 yrs outpatients with cirrhosis and recurrent hepatic encephalopathy (HE) defined as at last two documented overt HE episodes requiring therapy.  Exclusion criteria: MELD score >17, on oral or intravenous antimicrobial agents besides nonabsorbable  rifaximin, allergies to pretreatment antibiotics, immunosuppressive medications, positive C. difficile test, pregnancy, active infection, those with active alcohol abuse, and unable to provide informed consent  Cochrane Collaboration risk of bias assessment: low risk of bias | Single donor only - identified based on highest relative abundances of *Lachnospiraceae* and *Ruminococcaceae* (16S rRNA gene sequencing analysis) among a universal stool donor bank (OpenBiome).  Working in healthcare: Not stated.  Donor demographics: Not described  Donor screening: Based on OpenBiome screening. 178-point clinical assessment for infectious and microbiome-mediated diseases and 30 stool pathogen and serological tests before and after the stool is collected.  Screening blood tests: HIV-1/-2 status, hepatitis A/B/C, *Treponema pallidum*,  LFT, Complete Blood Count (CBC) (Includes differentials and platelets), HTLV-I/II antibody, with Reflex to Confirmatory Assay.  Screening stool tests: *Clostridium difficile* Toxin B and PCR, *Cyclospora* and *Isospora* Examination, ova, cysts and parasites with *Giardia* Antigen EIA, *Salmonella/ Shigella/ Campylobacter* Culture, Shiga Toxin EIA with Reflex to *E. coli* O157 Culture and *Vibrio* Culture, *Cryptosporidium* Antigen EIA, *Helicobacter pylori* Antigen EIA, Stool Norovirus EIA, Stool Rotavirus Antigen Detection, Adenovirus Antigen Detection, Gastroenteritis EIA, Vancomycin-resistant Enterococcus Culture, *Microsporidia* Exam. | Amount of stool per transplant / administered to patients: 37.5g of stool.    Diluent used to prepare: 90mls glycerol saline buffer in total.  Diluent used to store if frozen: glycerol.  Preparation methods: Aerobic.  Time from preparation to transplant (fresh): N/A - frozen.  Time period for storage (frozen): not stated.  Route administered and frequency:  Upper GI: non; lower GI: Single infusion of FMT via enema.    Bowel purgative: Picoprep.  PPI: Not described.  Antimotility: Loperamide 8mg 2 hrs before.  Prokinetics: None.  Others: Lactulose and rifaximin were continued for all patients throughout the trial. A 5-day broad-spectrum coverage regimen was used (metronidazole 500 mg orally three times daily, ciprofloxacin 500 mg orally twice-daily, and amoxicillin 500 mg orally three times daily). All antibiotics were discontinued at least 12 hours before FMT. This regime was not used in patients randomised to standard of care arm. | FMT arm:  Patients with SAEs at day 150: 20% (*n* =2/10) (*p=*0.02).  Total SAEs at day 150: 20% (*n* =2/10) (*p=*0.01).  Patients with altered mental status by day 150: 0% (*n* =0/10) (*p=*0.03).  Total HE episodes at day 150: 0% (*n* =0/10) (*p=*0.03).  Stroop OffTime+OnTime change (day 0 and day 20); positive indicates improvement: 29.1 +/- 27.9 (*p=*0.04) (N.B. Stroop OffTime+OnTime is a validated tool for objectively assessing for hepatic encephalopathy using a smartphone app)..  PHES score change (day 0 and day 20); negative indicates improvement -3.1+/-2.1 (*p=*0.01).  MELD score change (day 0 and day 35): 0.1+/-2.0 (*p=*0.78).  Standard of care arm:  Patients with SAEs at day 150: 80% (*n* =8/10).  Total SAEs at day 150: 11.  Patients with altered mental status day 150: 50% (*n* =5/10).  Total HE eps day 150: 6  Stroop OffTime+OnTime change (day 0 and day 20): -43.5 +/- 95.7.  PHES score change (day 0 and day 20): 0.0 +/- 3.1.  MELD score change (day 0 and day 35): 0.2 +/- 2.7.  N.B. no significant difference in serum albumin, AST, ALT, WBC or haemoglobin counts between the two groups. | FMT arm:  Serious adverse events: x1 hospitalisation for acute kidney injury, and 1 was due to chest pain (all within 5 months post FMT).  Deaths: Nil.  Standard of care arm:  Serious adverse events: x11 in total. x9 events linked to liver-related complications, of which x4 needed hospitalisation. x1 patient developed pneumonia and x1 developed gastroenteritis.  Deaths: Nil. |
| Tian *et al,*  *PLoS ONE,*  2017 | Intervention: Donor FMT (one for six days in a row).  Number of patients: 30.  Female: male 19: 11.  Age (mean+/-SD): 53.1 +/- 10.2 years.  Comparator: Standard of care (education, behavioural strategies, oral laxaives; expressively told to avoid antibiotics). Macrogol permitted if no bowel movement for three days, and enema permitted if even this failed.  Number of patients: 30.  Female: male 21: 9.  Age (mean+/-SD)\*: 55.4 +/- 12.1 years.  Primary outcome: At least three complete spontaneous bowel movements (CSBMs) per week during the 12 week follow-up.  Secondary outcomes: 1) Proportion of patients with average increase of at least 1 CSBM per week; 2) Number of CSBMs per week; 3) Colonic transit time (assessed via abdominal x-ray/ radiopaque markers); 4) subjective stool consistency; 5) Wexner constipation scale.  Inclusion criteria: ≥18 yrs outpatients with cirrhosis and recurrent hepatic encephalopathy (HE) defined as at last two documented overt HE episodes requiring therapy.  Exclusion criteria: At least 18 years, BMI of 18-25 kg/m2, and slow transit constipation defined as colonic transit time of >48hr, and symptoms unresponsive to dietary modification, enemas or biofeedback in the previous six months.  Cochrane Collaboration risk of bias assessment: low risk of bias. | One universal donor used throughout (24 year old healthy university student).  Working in healthcare: No.  Donor demographics: As above.  Donor screening: Similar to FDA blood screening.  Screening blood tests: Full blood count, chemistry and iron profile, hepatitis A, B and C, HIV-1 and-2, CMV, EBV, HSV, VZV, and *Treponema pallidum.*  Screening stool tests: *Yersinia spp, Salmonella spp, Shigella spp, Campylobacter jejuni, C difficile* toxin, helminths, ova, parasites, and *Helicobacter pylori.* | Amount of stool per transplant / administered to patients: 100g of stool.  Diluent used to prepare: Either 500mls normal saline, or normal saline amended with glycerol to final concentration of 10%.  Diluent used to store if frozen: Glycerol.  Preparation methods: Not stated.  Time from preparation to transplant (fresh): 2 hours.  Time period for storage (frozen): 1-4 weeks.  Route administered and frequency:  Upper GI: all via nasojejunal tube (originally placed endoscopically); lower GI: nil.  Bowel purgative: Not described.  PPI: Not described.  Antimotility: Not described.  Prokinetics: None. | Donor FMT arm  Meeting primary outcome: 37% (*n*=11/30) (*p=*0.04).  Meeting second outcomes:  At least one more CSBM per week: 53% (*n*=16/30) (*p=*0.009).    Number of CSBMs per week: 3.2+/-1.4.  Stool consistency score: 3.9+/-1.3.  Colonic transit time (hours): 58.5+/-9.8.  Wexner constipation score: 8.6+/-1.5.  Quality of Life Assessment: Not described.  Autologous FMT arm:  Meeting primary outcome: 13% (*n*=4/30)  Meeting second outcomes:  At least one more CSBM per week: 20% (*n*=6/30).  Number of CSBMs per week: 2.1+/-1.2.  Stool consistency score: 2.4+/-1.1.  Colonic transit time (hours): 73.6+/-8.7.  Wexner constipation score: 12.7+/-2.5.  Quality of Life Assessment: Not described. | FMT arm:  50 in total (1 x sedation contraindications, x22 endoscopy-related respiratory difficulty, x12 nausea, x5 abdominal pain, x4 diarrhoea, x4 flatulence, x2 transient fever).  Placebo arm:  x4 in total (x0 sedation contraindications, x0 endoscopy-related respiratory difficulty, x0 nausea, x3 abdominal pain, x0 diarrhoea, x1 flatulence, x0 transient fever). |
| Vrieze et al, *Gastroenterology*, 2012 | Intervention: Donor FMT  Number of patients: 9.  Female: male 0: 9.  Age (mean+/-SD): 47 +/- 4 years.  Comparator: Autologous FMT.  Number of patients: 9.  Female: male 0: 9.  Age (mean+/-SD): 53 +/- 3 years.  Primary outcome: Effect of  lean donor gut microbiota infusion on insulin sensitivity  after 6 weeks.  Secondary outcomes: Change in specific small- and large-gut microbiota as well as produced  fecal short chain fatty acids  Inclusion criteria: Male Caucasian obese subjects with characteristics  of the metabolic syndrome, specifically with a body  mass index > 30 kg/m2, or waist circumference > 102 cm,  and a fasting plasma glucose level > 5.6 mmol/L.  Exclusion criteria: History of cholecystectomy were excluded, as well as subjects who used any medication, probiotics, and/or antibiotics in the past 3 months.  Cochrane Collaboration risk of bias assessment: low risk of bias. | Lean healthy Caucasian males (body mass index < 23 kg/m2.  Working in healthcare: Not stated.  Donor demographics: As above.  Donor screening: Questionnaires regarding diet and bowel habits, travel history, comorbidity including (family history of) diabetes  mellitus, and lack of medication use.  Screening blood tests: Human immunodeficiency virus; human  T-lymphotropic virus; hepatitis A, B, and C; cytomegalovirus;  Epstein–Barr virus; *Strongyloides*; and amoebiasis.  Screening stool tests: Presence of parasites (eg, *Blastocystis hominis* or *Dientamoeba fragilis*), *Clostridium difficile*, or other pathogenic bacteria (*Shigella, Campylobacter, Yersinia, Salmonella*) | Amount of stool per transplant / administered to patients: Not stated.  Diluent used to prepare: 500mls of normal saline.  Diluent used to store if frozen: N/A.  Preparation methods: Faeces was covered with sterile saline (500 ml 0.9% NaCl) to reduce exposure to oxygen, transferred to a blender, and mixed for 10 minutes. The homogenized solution then was filtered twice through a clean metal sieve.  Time from preparation to transplant (fresh): Same day.  Time period for storage (frozen): N/A.  Route administered and frequency:  Upper GI: all via nasoduodenal tube (originally placed endoscopically); lower GI: nil.  Bowel purgative: PEG solution.  PPI: Not described.  Antimotility: Not described.  Prokinetics: None. | Donor FMT arm:  Median rate of glucose disappearance, Rd: from 26.2 to 45.3 mol/kg/min; *p*<0.05).  Autologous FMT arm:  Median rate of glucose disappearance, Rd: from 18.9 to 19.5 mol/kg/min).  Quality of Life Assessment: Not described.  Secondary outcomes: No change in the total numbers of fecal bacteria (allogenic, from 10.8 +/- 0.2 to 11.0 +/- 0.4 vs autologous, from 11.6 +/- 0.6 to 11.3 +/- 0.4 log10 bacteria/g faeces, non significant [NS]). Fecal short-chain fatty acids decreased after  allogenic gut microbiota infusion (median acetate from 49.5 to 37.6; *p* <0.05; butyrate, from 14.1 to 8.9; *p* < 0.05; and propionate, from 18.2 to 16.3 mmol/kg feces; NS). | No adverse events |
| Kootte et al, *Cell Metabolism*, 2017 | Intervention: Donor FMT  Number of patients: 26.  Female: male 0: 26.  Age (mean): 54 years.  Comparator: Autologous FMT.  Number of patients: 12.  Female: male 0: 12.  Age (mean): 54 years.  Primary outcome: Change in intestinal microbiota composition upon FMT in relation to insulin sensitivity.  Secondary outcomes: Post-prandial lipid, glucose excursions and plasma metabolites  Inclusion criteria: All adult (age 21-69 years) Caucasian males, who had obesity (body mass index (BMI) > 30 kg/m2), fulfilled the National Cholesterol Education Program (NCEP)-criteria for metabolic syndrome, were treatment-naive and who where otherwise healthy.  Exclusion criteria: History of recent  weight loss, cardiovascular event, cholecystectomy and the use of any medication known to influence gut microbial composition in  the last three months (including proton pump inhibitors, antibiotics and pre-/pro-/synbiotics) or treatments targeting metabolic diseases.  Cochrane Collaboration risk of bias assessment: low risk of bias. | Lean healthy Caucasian males (body mass index < 25 kg/m2.  Working in healthcare: Not stated.  Donor demographics: As above.  Donor screening: Questionnaires regarding diet and bowel habits, travel history, comorbidity including (family history of) diabetes  mellitus, and lack of medication use.  Screening blood tests: Human immunodeficiency virus; human  T-lymphotropic virus; hepatitis A, B, and C; cytomegalovirus;  Epstein–Barr virus; *Strongyloides*; lues and amoebiasis  Screening stool tests: Pathogenic parasites (e.g., *Blastocystis hominis, dientamoeba fragilis, giardia*  *lamblia*), bacteria (*Shigella, Campylobacter, Yersinia, Salmonella,* enteropathogenic *E. coli* and *Clostridium difficile*) or viruses  (noro-, rota-, astro-, adeno (40/41/52)-, entero-, parecho- and sapovirus). | Amount of stool per transplant / administered to patients: Not stated.  Diluent used to prepare: 500mls ofnormal saline.  Diluent used to store if frozen: N/A.  Preparation methods: Faeces was covered with sterile saline (500 ml 0.9% NaCl) to reduce exposure to oxygen, transferred to a blender, and mixed for 10 minutes. The homogenized solution then was filtered twice through a clean metal sieve.  Time from preparation to transplant (fresh): Same day.  Time period for storage (frozen): N/A.  Route administered and frequency:  Upper GI: Single infusion all via nasoduodenal tube (originally placed endoscopically). A subgroup of patients receiving donor FMT had a second infusion; lower GI: nil.  Bowel purgative: PEG solution.  PPI: Not described.  Antimotility: Not described.  Prokinetics: None. | Donor FMT arm:  improved peripheral insulin sensitivity at week 6 (from 25.8 to 28.8 mol/kg/min, , *p* < 0.05. This change was no longer significant at week 18 (including those that had a second infusion).  Autologous FMT arm:  FMT had no effect at week 6 (from 22.5 to 20.8 mol/kg/min, NS)  Quality of Life Assessment: Not described.  Secondary outcomes: No significant changes in fecal butyrate levels (butyrate from 13 to 20 mmol/g faeces, *p* = 0.096). Fecal acetate levels, however, were significantly increased from 62 to 85] mmol/g feces (*p* < 0.05) after allogenic FMT, whereas fecal proprionate was borderline signifi- cantly altered (from 23 to 28 mmol/g faeces, *p* = 0.062). | No adverse events |

**Appendix D. Excluded clinical studies**

**D.1. *Clostridium difficile* infection:**

**D.1.1. Studies excluded at Sift 2 by working group:**

|  |  |
| --- | --- |
| **Paper:** | **Grounds for exclusion:** |
| Allegretti JR, Allegretti AS, Phelps E, *et al.* Asymptomatic *Clostridium difficile* carriage rate post-fecal microbiota transplant is low: a prospective clinical and stool assessment. *Clin Microbiol Infect* 2017; doi: 10.1016/j.cmi.2017.10.022 | Prospective case series of FMT for CDI, but insufficient patient data to fully populate data table (study primarily designed to evaluate *C. difficile* carriage post-FMT). |
| Aroniadis OC, Brandt LJ, Greenberg A, *et al.* Long-term follow-up study of fecal microbiota transplantation for severe and/or complicated *Clostridium difficile* infection: a multicenter experience. *J Clin Gastroenterol* 2016;50:398-402. | Case series of FMT for CDI, but insufficient patient data to fully populate data table. |
| Cammarota G, Ianiro G, Masucci L, *et al.* OC.12.9 Fecal microbiota transplantation for recurrent *C. difficile* infection: a 2-year experience from a European referral centre. *Dig Liver Dis* 2016;48 S2:e118. | Case series of FMT for CDI, but abstract only. |
| Dutta SK, Girortra M, Garg S, *et al.* Efficacy of combined jejunal and colonic fecal microbiota transplantation for recurrent *Clostridium difficile* infection. *Clin Gastroenterol Hepatol* 2014;12:1572-6. | Prospective case series of FMT for CDI, but heterogenous primary endpoint (combination of clinical symptoms and *C difficile* toxin, but assessed between 1-3 months after FMT). |
| Ganc AJ, Ganc RL, Reimao SM, *et al.* Fecal microbiota transplant by push enteroscopy to treat diarrhea caused by *Clostridium difficile. Einstein* 2015;13:338-9. | Case series of FMT for CDI, but insufficient patient data to fully populate data table. |
| Ganc A, Ganc R, Frisoli Jr A, *et al.* Fecal transplantation – an original per-oral endoscopic technique with a pediatric colonoscope. *J Gastroenterol Hepatol* 2013;28 S3:115 | Case series of FMT for CDI, but abstract only. |
| Jorup-Ronstrom C, Hakanson A, Sandell S, *et al.* Fecal transplant against relapsing *Clostridium difficile-*associated diarrhea in 32 patients. *Scand J Gastroenterol* 2012;47(5):548-52. | Case series of ‘FMT’ for CDI, but bacteriotherapy rather than true FMT. |
| Kao D, Roach B, Beck P, *et al.* A dual center, randomized trial comparing colonoscopy and oral capsule delivered fecal microbiota transplantation in the treatment of recurrent *Clostridium difficile* infection: preliminary results. *Am J Gastroenterol* 2015;110:S553. | Abstract of RCT of capsulised vs colonoscopic FMT for CDI, but same trial/ data set reported in more developed stage at later date48, so this abstract excluded. |
| Mah XJ, Paramsothy R, Lo-Cao E, *et al.* Faecal microbiota transplant (FMT) for recurrent and life threatening *Clostridium difficile* infection. *J Gastroenterol Hepatol* 2016;31:167-8. | Case series of FMT for CDI, but abstract only. |
| Mandali A, Ward A, Tauxe W, *et al.* Fecal transplant is as effective and safe in immunocompromised as non-immunocompromised patients for *Clostridium difficile. Int J Colorectal Dis* 2016;31:1059-60. | Case series of FMT for CDI, but insufficient patient data to fully populate data table. |
| Oprita R, Bratu M, Oprita B, *et al.* Fecal transplantation – the new, inexpensive, safe, and rapidly effective approach in the treatment of gastrointestinal tract disease. *J Med Life* 2016;9:160-2. | Prospective case series of FMT for CDI or UC, but insufficient patient data to fully populate data table. |
| Ott SJ, Waetzig GH, Rehman A, *et al.* Efficacy of sterile fecal filtrate transfer for treating patients with *Clostridium difficile* infection. *Gastroenterology* 2017;152:799-811. | Case series of ‘FMT’ for CDI, but only five patients. Furthermore, sterile faecal filtrate rather than true FMT. |
| Orenstein R, Dubberke E, Hardi R, *et al.* Safety and durability of RBX2660 (microbiota suspension) for recurrent *Clostridium difficile* infection: results of the PUNCH CD study. *Clin Infect Dis* 2016;62:596-602. | Prospective case series of FMT for CDI, but using ‘microbiota suspension’ derived from stool rather than conventional FMT. |
| Ray A, Jones C, Shannon B, *et al.* Does the donor matter? Results from PUNCH CD 2: a randomized controlled trial of a microbiota-based drug for recurrent *Clostridium difficile* infection. *Am J Gastro* 2016;111:S65-6. | Abstract of RCT of treatment for CDI, but ‘microbiota suspension’ rather than true FMT. |
| Ray A, Smith R, Breaux J. Fecal microbiota transplantation for *Clostridium difficile* infection: the Ochsner experience. *Ochsner Journal* 2014;14:538-44. | Case series of FMT for CDI, but heterogenous primary end point. |
| Rupali P, Mittal C, Deol A, *et al.* Fecal microbiota transplantation for *Clostridium difficile* infection in immunocompromised hosts: one easy strategy, one giant success. *Transplantation* 2014;98:687-8. | Case series of FMT for CDI, but abstract only. |
| Russell GH, Kaplan JL, Youngster I, *et al.* Fecal transplant for recurrent *Clostridium difficile* infection in children with and without inflammatory bowel disease. *J Pediatric Gastroenterol Nut* 2014;58:588-592. | Case series of FMT for CDI, but all children, and presented as separate cases rather than as group of 10 recipients. |
| Tauxe WM, Haydek JP, Rebolledo PA, *et al.* Fecal microbiota transplant for *Clostridium difficile* infection in older adults. *Ther Adv Gastroenterol* 2016;9:273-81. | Case series of FMT for CDI, but heterogenous primary end point. |
| True E, Tsoraides S, Wang H, *et al.* Predictors of failure with fecal microbiota therapy for recurrent *Clostridium difficile* colitis. *Dis Colon Rectum* 2014;57:e99-e100. | Case series of FMT for CDI, but abstract only. |
| Tvede M, Tinggaard M, Helms M. Rectal bacteriotherapy for recurrent *Clostridium difficile*-associated diarrhoea: results from a case series of 55 patients in Denmark 2000-2012. *Clin Micro Infect* 2015;21:48-53. | Case series of ‘FMT’ for CDI, but bacteriotherapy rather than true FMT. |

**D.1.2. Abstracts not fulfilling selection criteria:**

Borody TJ, Wettstein A, Nowak A, Finlayson S, Leis S. Fecal microbiota transplantation (FMT) eradicates Clostridium difficile infection (CDI) in inflammatory bowel disease (IBD). United Eur Gastroenterol J 2013;1 [Suppl]:A57.

Seril DN, Shen B. Clostridium difficile infection in patients with ileal pouches. Am J Gastroenterol 2014;109:941–7.

Ganc AJ, Ganc RL. Fecal microbiota transplantation, by means of push enteroscopy. A novel endoscopic technique, for the treatment of chronic diarrhea associated with Clostridium difficile-a pilot study. Gastrointest Endosc 2014;1:AB380-AB381.

Garg S, Fricke WF, Girotra M, Dutta A, Von Rosenvinge EC, Dutta S. Recurrent Clostridium difficile infection: A longitudinal study of alterations in fecal microbiome in patients-donor pairs before and after fecal microbiota therapy. Gastroenterology 2013;144 [Suppl 1]:S184–5.

Garg S, Fricke WF, Girotra M, Von Rosenvinge EC, Dutta A, Dutta SK. Emerging role of fecal microbiota therapy in the treatment of recurrent clostridium difficile infection in children. Gastroenterology 2013;144 {Suppl 1]:S45.

Garg S, Song Y, Han MAT, Girotra M, Fricke WF, Dutta S. Post-infectious irritable bowel syndrome in patients undergoing fecal microbiota transplantation for recurrent clostridium difficile colitis. Gastroenterology 2014;146 [Suppl 1]:S83–4.

Girotra M, Bartlett J, Koerner K, Dutta S. Combined jejunal and colonic fecal bacteriotherapy in patients with recurrent clostridium difficile infection (RCDI). Am J Gastroenterol 2011;106 [Suppl]:S162–3.

Girotra M, Dutta A, Koerner K, Bodner B, Dutta SK. Recurrent clostridium difficile infection (RCDI) in geriatric patients: A long-term follow up of simultaneous jejunal and colonic administration of fecal bacteriotherapy (FT). Gastroenterology 2012;142 [Suppl 1]:S130.

Goyal A, Chu A, Calabro K, Firek B, Bush B, Morowitz M. Safety and efficacy of fecal microbiota transplant in children with inflammatory bowel disease. J Pediatr Gastroenterol Nutr 2016;63 [Suppl 2]:S212.

Goyal A, Kufen A, Jackson Z, Morowitz M. A study of fecal microbiota transplantation in pediatric patients with inflammatory bowel disease. Inflamm Bowel Dis 2016;22 [Suppl 1]:S74.

Graham D, Attumi T, Opekun A, Metcalf G, Muzny D, Hyde E, et al. Triple bacteroides fecal replacement therapy for relapsing clostridium difficile diarrhea (fecal transplantation sans feces). Am J Gastroenterol 2013;108 [Suppl 1]:S170.

Greenberg A, Aroniadis O, Shelton C, Brandt L. Long-term follow-up study of fecal microbiota transplantation (FMT) for inflammatory bowel disease (IBD). Am J Gastroenterol 2013;108 [Suppl 1]:S540.

Greenwald D, Patel T, Barto A. Fecal microbiota transplant for treatment of refractory C. Difficile colitis: Long-term follow-up of 58 patients. Am J Gastroenterol 2014;109 [Suppl 1]:S679.

Greig J, Swope LK, Calvin H. Shaking up clostidium difficile infections: Implementation of a fecal microbiota transplant program. Am J Infect Control 2014; [Suppl 1]:S4–5.

Grzesiowski P, Hermann A, Dubaniewicz A, Kasprzyk J, Pawlik D, Zak-Pulawska Z. Effectiveness of FMT in recurrent Clostridium difficile infection. Antimicrob Resist Infect Control 2015; 4 [Suppl 1]: P27.

Gupta S, He SM, Noordhof C, Allen-Vercoe E, Petrof EO. Minimalist defined gut microbial ecosystem demonstrates protection against Clostridium difficile toxin-mediated effects in vitro via toxin degradation. Gastroenterology 2016;150 [Suppl 1]:S544.

Haran M, Tsang T, Kupfer Y, Tessler S. Intravenous immunoglobulins in severe Clostridium difficile colitis. Chest 2011;140 [Supplement]:270A

Harrison MJ, Burke D, Fleming C, McCarthy M, Shortt C, O’Callaghan G, et al. Clostridium difficile in adult cystic fibrosis (CF): Prevalence, ribotyping and toxigenic capability. A prospective study. J Cyst Fibrosis Conf 2013;12 [Suppl 1]:S6.

Holvoet T, Boelens J, Joossens M, Raes J, De Vos M, De Looze D. Fecal microbiota transplantation in irritable bowel syndrome with bloating: Results from a prospective pilot study. Gastroenterology 2015;148 [Suppl 1]:S963–4.

Holzwanger EA, Kaufman D, Foley A, Pellish R. Fecal microbiota transplantation via colonoscope: A single-center experience. Am J Gastroenterol 2016;111(PG-S1232):S1232.

Hourigan S, Ann Chen L, Grigoryan Z, Laroche G, Weidner M, Sears CL, et al. Microbiome changes associated with sustained eradication of clostridium difficile after fecal microbiota transplantation in children with and without inflammatory bowel disease. Gastroenterology 2015;148 [Suppl 1]:S45.

Hubble L, Joshua S, Glover PH, Trivedi A, Pfanner TP. Colonoscopic vs. Upper endoscopic placement of fecal microbiota transplant for recurrent clostridium difficile infection: A retrospective review. Gastroenterology 2015;148 [Suppl 1]:S728.

Ihara S, Hirata Y, Serizawa T, Suzuki N, Kinoshita H, Nakagawa H, et al. Transforming growth factor-beta signaling on dendritic cells regulates bacterial communities and gut homeostasis. Gastroenterology 2014;146 [Suppl 1]:S113.

Ihunnah C, Khoruts A, Fischer M, Afzali A, Aroniadis O, Barto A, et al. Fecal microbiota transplantation (FMT) for treatment of clostridium difficile infection (CDI) in immunocompromised patients ACG governors award for excellence in clinical research. Am J Gastroenterol 2013;108 [Suppl 1]:S179–80.

Ishikawa D, Osada T, Haga K, Kodani T, Shibuya T, Watanabe S. Combination therapy of fresh faecal microbial transplantation and antibiotics for ulcerative colitis. J Crohn’s Colitis 2016;10 [Suppl 1]:S335–6.

Jain A, Parian AM, Dudley-Brown S, Lazarev M. Fecal microbiota transplantation is safe and effective for treatment of recurrent clostridium difficile infection in inflammatory bowel disease patients. Gastroenterology 2015;148 [Suppl 1]:S869.

Jamot S, Kelly CR, Shah S. Won the battle, lost the war: Crohn’s flare after fecal microbiota transplant (FMT) for recurrent C. Difficile infection. Am J Gastroenterol 2016;111 [Suppl 1]:S833–4.

Kassam Z, Hundal R, Marshall JK, Lee CH. Fecal transplantation via retention enema is effective for recurrent or refractory Clostridium difficile-associated diarrhea. Gastroenterology 2010;139 [Suppl 1]:S207–8.

Kellermayer R, Hollister EB, Nagy-Szakal D, Ihekweazu FD, Haynes A, Pitashny M, et al. Special considerations for fecal microbiota transplantation in pediatric recurrent clostridium difficile infection. Gastroenterology 2015;148 [Suppl 1]:S961–2.

Khanna S, Kashyap P, Rainey J, Loftus E, Pardi D. Outcomes from fecal microbiota transplantation in adults with C. difficile infection and inflammatory bowel disease. Am J Gastroenterol 2013;108 [Suppl 1]:S508.

Khanna S, Weatherly R, Kammer P, Pardi D. Management and outcomes of patients with failed fecal microbiota transplantation for recurrent clostridium difficile infection. Am J Gastroenterol 2015;110 [Suppl 1]:S580.

Khanna S, Weatherly RM, Kammer PP, Loftus E V, Pardi DS. Long-term follow-up after fecal microbiota transplantation for C. difficile infection in inflammatory bowel disease patients. Gastroenterology 2015;148 [Suppl 1]:S726.

Khoruts A, Hamilton MJ, Weingarden A, Sadowsky MJ. Treatment of C. difficile by fecal transplantation. Gastrointest Endosc 2012;75 [Suppl]:AB329.

Khoruts A, Rank KM, Viskocil K, Newman KM. Diagnostic value of colonoscopy in patients receiving fecal microbiota transplantation in treatment of refractory Clostridium difficile infection. Gastroenterology 2015;148 [Suppl 1]:S729.

Kukkadapu T, Chintalapally R, Daram S. Clostridium difficile infection in adult patients with acute myeloid leukemia: Incidence, recurrence, and outcomes. Am J Gastroenterol 2015;110 [Suppl 1]:S590.

Kump PK, Grochenig HP, Spindelbock W, Hoffmann CM, Gorkiewicz G, Wenzl H, et al. Preliminary clinical results of repeatedly fecal microbiota transplantation (FMT) in chronic active ulcerative colitis. United Eur Gastroenterol J 2013;1 [Suppl]:A57.

Kump PK, Wurm P, Grochenig HP, Reiter L, Hoffmann KM, Spindelboeck W, et al. Impact of antibiotic treatment before faecal microbiota transplantation (FMT) in chronic active ulcerative colitis. United Eur Gastroenterol J 2015;3 [Suppl]:A437.

LaBarbera F, Jackson W, Surace L. FMT in our ASC: Successful fecal microbiota transplantation for recurrent clostridium difficile infections in an ambulatory surgical center. Am J Gastroenterol 2015;110 [Suppl 1]:S559–60.

Lan N, Stocchi L, Remzi FH, Shen B. Fecal microbiota transplantation for recurrent clostridium difficile infection in patients with ileal pouches. Gastroenterology 2016;150 [Suppl 1]:S542.

Landy J, Al-Hassi HO, Mann ER, Peake ST, McLaughlin SD, Ciclitira PJ, et al. A prospective controlled pilot study of fecal microbiota transplantation for chronic refractory pouchitis. Gastroenterology 2013;144 [Suppl 1]:S897.

Landy J, Omar H, Ronde E, Mann E, Peake S, McLaughlin S, et al. A prospective controlled pilot study of faecal microbiota transplantation for chronic refractory pouchitis. J Crohn’s Colitis 2013;7 [Suppl 1]:S247–8.

Licht E, Maltz C. The potential role of lactulose in the prevention of Clostridium difficile diarrhea. Am J Gastroentero. 2012;107 [Suppl 1]:S203–4.

Lin E, Jaworski A, Furnari V, Wong C, Bull M, Chapman B, et al. Twelve week storage trial of microbial viability in lyophilized and frozen fecal microbiota preparations. Gastroenterology 2015;148:S962.

Long Miao C, Mowery A, Khara H, Shellenberger M, Komar M. C. difficile enteritis after total proctocolectomy successfully treated with fecal transplant. Am J Gastroenterol 2014;109 [Suppl 1]:S442.

Mandalia A, Ward A, Kraft CS, Dhere TA. Outcomes for route and immunocompromised status do not significantly differ in fecal microbiota transplant for recurrent clostridium difficile. Gastroenterology 2014;146 [Suppl 1]:S252–3.

Martin D, Munoz R, Yoder K, Allegretti JR, Smith M, Kassam Z. Assessing the landscape of fecal microbiota transplantation programs for recurrent Clostridium difficile infection: A survey of existing practices among healthcare centers using an international public stool bank. Gastroenterology 2016;150 [Suppl 1]:S238.

Mehta SR, Kelly CR, Kao D, Dimitry J, Martin T, Allegretti JR, et al. Inpatient status, severe Clostridium difficile infection and immunocompromised state predict failure despite multiple fecal microbiota transplants: A multicenter study. Gastroenterology 2016;150 [Suppl 1]:S745–6.

Meighani A, Ramesh M, Salgia R. Successful outcomes of fecal microbiota transplantation in patients with chronic liver disease. Hepatology. 2016;63 [Suppl 1]:1016A–1017A.

Mellow M, Kanatzar A, Brandt L, Aroniadis O, Kelly C, Park T, et al. Longterm follow-up of colonoscopic Fecal Microbiota Transplant (FMT) for recurrent C. difficile infection (RCDI). Am J Gastroenterol 2011;106 {Suppl 1]:S149–50.

Mellow M, Kanatzar A. Colonoscopic fecal bacteriotherapy in the treatment of recurrent Clostridium difficile infection-results and follow-up. Am J Gastroenterol 2010;105 [Suppl 1]:S135.

Mellow M, Kohli V, Jalil S, Jabbour N. Persistent Clostridium difficile infection in a patient with decompensated liver disease: “double transplant” saves a life! Am J Gastroenterol 2012;107 [Suppl 1]:S461.

Mendelson AH, Rifkin S, Shay J, Razvi MA, Lee LA. Procedural-related and patient-related factors influence Clostridium difficile recurrence after fecal microbiota transplant. Gastroenterology 2017;152 [Suppl 1]:S949-S950.

Mikamo H. Treatment for Clostridium difficile infections. Int J Antimicrob Agents 2013;42 [Suppl]:S16.

Miller CB, Dellon E, Isaacs K, Gangarosa L. Fecal bacteriotherapy via colonoscopy as rescue therapy for refractory and recurrent Cclostridium difficile - associated diarrhea. Am J Gastroenterol 2010;105 [Suppl 1]:S323.

Mintz M, Monzur F, Chowdhury T, Rowehl L, Grewal S, Li E, et al. Comparing fecal microbial transplant outcomes in patients with recurrent Clostridium difficile or ulcerative colitis. Inflamm Bowel Dis 2016;22 [Suppl]:S31.

Misra B, Ramesh M, Sobcinski MK. Evaluation of health-related quality of life in patients treated with RBX2660 (Microbiota Suspension) for Recurrent C. difficile Infection. Am J Gastroenterol 2014;109 [Suppl 1]:S188.

Mitchell SW, Jaworski A, Bull M, Wong C, Furnari V, Chapman B, et al. Lyophilized fecal microbiota transplantation and cryoprotectants for viable bacteria preservation. Gastroenterology 2016;150 [Suppl 1]:S542–3.

Mittal C, John A, Hart BR, Miller N, Meighani A, Ramesh M. Fecal microbiota transplantation for recurrent and/or refractory Clostridium difficile infection: A large retrospective study of failure rates, predictors of failure and outcomes. Gastroenterology 2015;148 [Suppl 1]:S723–4.

Monzur F, Mintz M, Tian X, Grewal S, Khair S, Rowehl L, et al. Microbiome analysis and fecal microbiota transplant outcomes in Clostridium difficile and ulcerative colitis patients. Am J Gastroenterol 2016;111[Suppl 1]:S321.

Newton D, Hewlett A. Fecal biotherapy as treatment for recurrent Clostridium difficile infection in immunocompromised patients. Am J Gastroenterol 2013;108 [Suppl 1]:S178.

Niccum BA, Stein DJ, Wang P, Cohn SM, Hays RA. Zinc deficiency: A possible contributor to long-term FMT failure in recurrent Clostridium difficile infection. Am J Gastroenterol 2016;111 [Suppl 1]:S92.

Norin E. Experience with cultivated microbiota transplant: ongoing treatment of Clostridium difficile patients in Sweden. Microb Ecol Heal Dis 2015;26:27638.

O’Brien K, Osman M, Eysenbach L, Stoltzner Z, Day R, Norgaard KS, et al. Clinical efficacy of fecal microbiota transplantation for recurrent Clostridium difficile infection from an international public stool bank: Results from a 1,406 patient multi-center cohort. Gastroenterology 2016;150 [Suppl 1]:S539–40.

O’Brien K, Petimar J, Ling K, Omas Gurry T, Ladha A, Day R, et al. Nutritional composition of stool donors’ diets relative to that of the U.S. population: Results from 44 donors from an international stool bank for fecal microbiota transplantation. Am J Gastroenterol 2016;111 [Suppl 1]:S447–8.

Olefson SH, Jackson M, Kelly C. Clostridium difficile: The spectrum of diagnoses in patients referred for fecal microbiota transplant. Gastroenterology 2015;148 [Suppl 1]:S727.

Oprita R, Kostov A, Musat F. Clostridium difficile-associated diarrhea, a new challenge. Eur J Intern Med 2013;24:e73.

Ordway S, Harris N, Wong R. Skinning the cat twice: Refractory CDI in an solid organ transplant patient requiring 2 fecal microbiota transplants. Am J Gastroenterol 2015;110 [Suppl 1]:S171.

Osman M, Dubois N, Gangireddy V, Amaratunga K, Allegretti JR, Kassam Z. The great mimic: Food-borne illness masquerading as an infectious adverse event following fecal microbiota transplantation. Am J Gastroenterol 2016;111 [Suppl 1]:S592.

Osman M, Khoiri A, Stoltzner Z, Koelsch E, O’Brien K, Ling K, et al. Clinical effectiveness and safety of fecal microbiota transplantation in children for Clostridium difficile infection: Results from 9 pediatric centers in the United States. Am J Gastroenterol 2016;111 [Suppl 1]:S452.

Ott SJ, Waetzig GH, Rehman A, Moltzau-Anderson J, Bharti R, Grasis JA, et al. Efficacy of sterile fecal filtrate transfer for treating patients with Clostridium difficile infection. Gastroenterology 2016;152:799-811.

Paramsothy S, Borody T, Lin E, Finlayson S, Walsh A, Samuel D, et al. Obstacles to donor recruitment for faecal microbiota transplantation: Experiences from the focus study. Am J Gastroenterol 2014;109 [Suppl 1]:S188.

Paramsothy S, Borody T, Lin E, Finlayson S, Walsh A, Samuel D, et al. Obstacles to donor recruitment for faecal microbiota transplantation-Experiences from the FOCUS study. J Gastroenterol Hepatol 2014;29:135.

Parekh R, Ramesh MS, Tang J. Lymphocytic colitis in patients with recurrent Clostridium difficile colitis: Case series. Am J Gastroenterol 2016;111 [Suppl 1]:S1308.

Park L, Tzimas D, Price J, Mone A, Hirsh J, Poles M, et al. Perceptions of fecal microbiota transplantation: Factors that predict acceptance: A preliminary analysis. Am J Gastroenterol 2014;109 [Suppl 1]:S206.

Patel LN, Schairer J, Shen B. Fecal transplantation therapy for Clostridium difficile-associated pouchitis. Int J Colorectal Dis. 2014;29:263–4.

Patel P, Goyal A. Comparative analysis of the efficacy of fecal transplantation in pediatric inflammatory bowel disease patients with and without clostridium difficile infection. Inflamm Bowel Dis 2016;22 [Suppl]:S68–9.

Patel S, Kelly C, Colombel JF, Atreja A. Comparative cost analysis of fecal microbiota transplant and antibiotic treatment for recurrent Clostridium difficile infection. Am J Gastroenterol. 2013;108(PG-S169-S170):S169–70.

Patel SS, Grinspan A, Colombel JF, Atreja A. Cost effectiveness analysis of fecal microbiota transplant and antibiotic treatment for recurrent Clostridium difficile infection. Gastroenterology 2014;146 [Suppl 1]:S190–1.

Pinn D, Aroniadis O, Brandt L. Follow-up study of fecal microbiota transplantation (FMT) for the treatment of refractory irritable bowel syndrome (IBS). Am J Gastroenterol 2013;108 [Suppl 1]:S563.

Potakamuri L, Turnbough L, Maheshwari A, Kantsevoy S, Ofosu A, Thuluvath P, et al. Effectiveness of fecal microbiota transplantation for the treatment of recurrent Clostridium difficile infection: Community hospital experience. Am J Gastroenterol 2013;108 [Suppl 1]:S175.

Pyo-Twist A, Brumbaugh D, Fidanza SJ, Montero C, Dolan S, Hughes S, et al. Preliminary outcomes of a registered nurse driven fecal microbiota transplantation (FMT) procedure to treat Clostridium difficile (C. diff) infection in pediatrics. J Pediatr Gastroenterol Nutr 2016;63 [Suppl 2]:S154.

Quraishi MN, McCune V, Iqbal TH, Pathmakanthan S, Struthers JK, Moran E, et al. Faecal microbiota transplantation via nasogastric route for the treatment of recurrent and antibiotic refractory Clostridum Difficile infection: The UK experience. J Crohn’s Colitis 2015;9 [Suppl]:S323–4.

Quraishi MN, McCune VL, Iqbal T, Pathmakanthan S, Struthers JK, Moran E, et al. Faecal microbiota transplantation via nasogastric route for the treatment of recurrent and antibiotic refractory Clostridum difficile infection: The UK experience. Gastroenterology 2015;148 [Suppl 1]:S641–2.

Quraishi MN, Segal J, Mullish B, McCune V, Hawkey P, Colville A, et al. National survey of practice of faecal microbiota transplantation for Clostridium difficile infection in the United Kingdom. Gut 2016;65 [Suppl 1]:A23–4.

Quraishi N, McMillan M, Widlak M, Nell L, Quraishi K, Pathmakanthan S, et al. Patient perception towards faecal microbiota transplantation for treatment of inflammatory bowel disease. United Eur Gastroenterol J 2014;2 [Suppl]:A383.

Quraishi N, McMillan M, Widlak M, Nell L, Quraishi K, Pathmakanthan S, et al. Patient perception towards faecal microbiota transplantation for treatment of inflammatory bowel disease. J Crohn’s Colitis 2015;9 [Suppl]:S252.

Ramesh M, Misra B, Ray A, Smith R, Sobcinski MK. RBX2660 (Microbiota Suspension) for recurrent C. difficile infection: 60-day interim analysis of the PUNCH CD phase 2 safety study. Am J Gastroenterol 2014;109 [Suppl 1]:S188.

Ray A, Hardi R, Ramesh M, Sobcinski MK. Enema administration of RBX2660 (microbiota suspension) for Recurrent C. difficile infection: Lessons learned from the PUNCH CD Study. Am J Gastroenterol 2014;109 [Suppl 1]:S192–3.

Razik R, Osman M, Lieberman A, Dubois N, Allegretti JR, Smith M, et al. Characterizing patients who fail fecal microbiota transplantation for Clostridium difficile infection: Results from a 135-patient, multi-center, non-responder cohort. Am J Gastroenterol 2016;111 [Suppl 1]:S66.

Rezk AN, Stewart D, West S, Miao C, Khara HS, Komar M. Outcomes, safety and predictors of failure of fecal microbiota transplantation for refractory Clostridium difficile infection. Am J Gastroenterol 2016;111 [Suppl 1]:S82–3.

Roediger R, Grinspan A. Safety and efficacy of fecal microbiota transplantation for Clostridium difficile in a cohort of patients with a severe infection and/or IBD. Am J Gastroenterol 2016;111 [Suppl 1]:S446.

Sadowsky MJ, Weingarden A, Khoruts A, Gonzalez A, Vazquez-Baeza Y, Weiss S, et al. Short and long term changes in bacterial composition following fecal microbiota transplantation for CDI visualized in movie format. Gastroenterology 2014;146 [Suppl 1]:S838.

Sbahi H, Di Palma JA. Faecal microbiota transplantation: applications and limitations in treating gastrointestinal disorders. BMJ Open Gastroenterol 2016;3:e000087.

Scaldaferri F, Pecere S, Bruno G, Ianiro G, Laterza L, Gerardi V, et al. An Open-label, pilot study to assess feasibility and safety of fecal microbiota transplantation in patients with mild-moderate ulcerative colitis: Preliminary results. J Crohn’s Colitis 2015;9 [Suppl]:S278.

Scaldaferri F, Pecere S, Bruno G, Ianiro G, Laterza L, Gerardi V, et al. An open-label, pilot study to assess feasibility and safety of fecal microbiota transplantation in patients with mild-moderate ulcerative colitis: Preliminary results. Gastroenterology 2015;148 [Suppl 1]:S870.

Scaldaferri F, Pecere S, Lopetuso LR, Ianiro G, Laterza L, Schiavoni E, et al. An open-label, pilot study to assess feasibility and safety of fecal microbiota transplantation in patients with mild-moderate ulcerative colitis: Preliminary results. United Eur Gastroenterol J 2015;3 [Suppl]:A257.

Shah R, Robinson L, Herrera HR, Swaroop PP. Human probiotic infusion (HPI) in ulcerative colitis-’patient’s perceptions and predictors of efficacy’. Gastroenterology 2012;142 [Suppl 1]:S253.

Shogbesan O, Poudel D, Jehangir A, Fadahunsi O, Shogbesan G, Donato A. Fecal microbiota transplantation for clostridium difficile infections in immunocompromised patients: A systematic review Am J Gastroenterol 2016;111[Suppl 1]:S79.

Singh T, Yu S, Gangireddy V, Rao S. Diarrhea after fecal microbiota transplantation and usefulness of commercial stool donor for C. difficile infection. Am J Gastroenterol 2015;110 [Suppl 1]:S589–90.

Staley C, Kelly CR, Brandt LJ, Khoruts A, Sadowsky MJ. Characterization of fecal microbiota in response to heterologous versus autologous (placebo) fecal microbial transplantation: Results from a dual-center, randomized, placebo-controlled trial. Gastroenterology 2016;150 [Suppl 1]:S542.

Swanson S, Herman M, Vindigni S, Broussard E. Application of a predictive model for early failure of FMT (fecal microbiota transplant). Am J Gastroenterol 2016;111 [Suppl 1]:S82.

Tafesh Z, O’Neil S, Crawford Jr C V. Fecal microbiota transfer as rescue therapy: Is there a role in severe C. difficile infection? Am J Gastroenterol 2015;110 [Suppl 1]:S185.

Tariq R, Weatherly RM, Kammer PP, Pardi D, Khanna S. Experience and outcomes from a specialized clostridium difficile clinical practice. Gastroenterology 2016;150 [Suppl 1]:S746–7.

Van Beurden YH, De Groot PF, Van Nood E, Nieuwdorp M, Keller JJ, Goorhuis A. Complications and long term follow-up of fecal microbiota transplantation for treatment of recurrent Clostridium difficile infection. Gastroenterology. 2016;150 [Suppl 1]:S544.

Vermeire S, Joossens M, Verbeke K, Hildebrand F, Machiels K, Van den Broeck K, et al. Pilot Study on the Safety and Efficacy of Faecal Microbiota Transplantation in Refractory Crohn’s Disease. Gastroenterology 2012;142 [Suppl 1]:S-360.

Vitek P, Zela O, Mikoviny Kajzrlikova I, Kuchar J, Chalupa J. Age is the main risk factor of mortality among patients with clostridium difficile infection. United Eur Gastroenterol J 2014;2 [Suppl]:A543.

Wang PT, Fashandi AZ, Martin AN, Hays RA. Comparing fecal microbiota transplantation to total abdominal colectomy and loop ileostomy in severe and complicated clostridium difficile infections. Am J Gastroenterol 2016;111 [Suppl 1]:S94–5.

Wang PT, Schall SE, Doran AE, Tuskey AG, Hays RA. Healthy pregnancy in a newly diagnosed crohn’s patient treated with fecal microbiota transplant for recurrent Clostridium difficile infections. Am J Gastroenterol 2016;111 [Suppl]:S595–6.

Wang Y, Shen B. Fecal microbiota transplantation in refractory Clostridium difficile pouchitis. Inflamm Bowel Dis 2016;22 [Suppl 1]:S11–2.

Watson JB, Habr F, Kelly C. First reported complication of fecal microbiota transplant: Ulcerative colitis flare after FMT for relapsing Clostridium difficile infection. Gastroenterology 2012;142 [Suppl]:S540.

Weingarden A, Hamilton MJ, Sadowsky MJ, Khoruts A. Changes in bacterial composition following fecal microbiota transplantation for severe Clostridium difficie infection. Gastroenterology 2013;144 [Suppl]:S829.

Wieczorek T, Macholz M, Bethge A, Neumann F, Schreiter K, Lindner M, et al. Fecal microbiome therapy in relapsing Clostridium difficile infection-long-term results. Int J Infect Dis 2016;45:347.

Wilcox GM. Early experience with a Fecal Bacteriotherapy (FB) program for recurrent and C-difficile infection (CDI). Gastroenterology 2011;140 [Suppl]:S361.

Zhou E, Kumar V, Mansoor MS, Feuerstadt P. Pseudomembranes are infrequently seen in patients undergoing fecal microbiota transplant (FMT) for recurrent C. difficile infection (CDI). Am J Gastroenterol 2016;111 [Suppl]:S68.

Zhu J, Roach B, Kao D. Successful eradication of recurrent Clostridium difficile infection (rCDI) of small bowel with frozen encapsulated fecal microbiota transplantation (FMT) in a patient with crohn’s disease and ileostomy. In: Meeting Abstracts. Program and Abstracts from the Canadian Digestive Diseases Week 2016. Can J Gastroenterol Hepatol 2016:A110.

**D.1.3. Case series not fulfilling selection criteria**

Alhmoud T, Gavin M. An unusual complication after a fecal microbiota transplant via colonoscopy. Am J Gastroenterol 2014;109 [Suppl 1]:S424.

Allegretti JR, Day R, Kassam Z, Smith M. Empiric treatment of suspected recurrent Clostridium difficile infection with vancomycin may interfere with evaluation for fecal microbiota transplantation. Am J Gastroenterol 2016;111 [Suppl 1]:S87.

Allegretti JR, Hamilton MJ, Korzenik JR, Chan WW. Factors associated with C. difficile negative gastrointestinal symptoms after intestinal microbiome restoration. Gastroenterology 2015;148 [Suppl 1]:S643.

Allegretti JR, Korzenik JR, Hamilton MJ. Intestinal microbiome restoration for recurrent clostridium difficile infection in patients with concurrent inflammatory bowel disease. Gastroenterology. 2015;148 [Suppl 1]:S869.

Allegretti JR, Phelps E, Xu H, Kassam Z, Fischer M. Redefining cure in Clostridium difficile infection: Clinical assessment 4 weeks after fecal microbiota transplantation is predictive of standard 8-week cure endpoint. Am J Gastroenterol 2016;111 [Suppl 1]:S56.

Allegretti JR, Storm M, Smith M, Kelly CR, Kearney S, Perrotta A, et al. Strain-level analysis of microbial engraftment associated with resolution of recurrent Clostridium difficile following fecal microbiota transplantation. Gastroenterology 2016;150 [Suppl 1]:S540–1.

Anand R, Sinha A, Sivaraman A, Hasan S, Garg S, Dutta S. Quality of life index in patients with recurrent clostridium difficile colitis following fecal microbiota transplantation: Long-term outcome. Am J Gastroenterol 2015;110 [Suppl 1]:S568.

Andrews J, Costello S. The emerging role of faecal microbiota transplantation. Med Today 2014;15:62–4.

Angelberger S, Reinisch W, Makristathis A, Lichtenberger C, Dejaco C, Papay P, et al. Temporal bacterial community dynamics vary among ulcerative colitis patients after fecal microbiota transplantation. Am J Gastroenterol 2013;108:1620–30.

Angelberger S, Reinisch W, Makristathis A, Lichtenberger C, Dejaco C, Papay P, et al. Temporal bacterial community dynamics vary among ulcerative colitis patients after faecal microbiota transplantation. J Crohn’s Colitis 2013;7 [Suppl]:S291.

Arkkila P, Mattila E, Anttila VJ. [Fecal transfusion as treatment of Clostridium difficile infection]. [Finnish]. Duodecim. 2013;129:1671–9.

Asonuma K, Kuroki Y, Ino S, Hanamura S, Takano Y, Yamamura E, et al. Severe refractory Clostridium difficile infection with good response to fecal microbiota transplantation: A case report. [Japanese]. J Japanese Soc Gastroenterol. 2016;113:55–62.

Atkins KA, Kao D. Potential cost savings associated with timely fecal microbiota transplantation (FMT) for recurrent Clostridium difficile infection (RCDI). Gastroenterology 2014;146 [Suppl 1]:S252.

Balzola F, Cullen G, Hoentjen F, Ho GT, Russell R. Safety, tolerability, and clinical response after fecal transplantation in children and young adults with ulcerative colitis. Inflamm Bowel Dis Monit 2013;13:167.

Bansal S, Serban R, Kemal N, Casey K, Dunnigan K, Kurchin A. Fecal microbiota transplant for recurrent Clostridium difficile infection at a teaching hospital in upstate New York: Our experience. Am J Gastroenterol 2013;108 [Suppl 1]:S383–4.

Bartlett M, Alsafadi A. The outcomes of using fresh parental stool versus frozen anonymous-donor stool in pediatric fecal microbiota transplant. J Pediatr Gastroenterol Nutr 2016;63 [Suppl]:S314.

Borody TJ, Mitchell SW, Wong C, Jaworski A. Encapsulated lyophilized fecal microbiota therapy for the treatment of clostridium difficile infection. Am J Gastroenterol 2016;111 {Suppl 1]:S409.

Borody TJ, Warren EF, Leis S, Surace R, Ashman O. Treatment of ulcerative colitis using fecal bacteriotherapy. J Clin Gastroenterol 2003;37:42–7.

Brandt L, Aroniadis O. Long-term follow-up study of fecal microbiota transplantation (FMT) for ulcerative colitis (UC). Am J Gastroenterol 2012;107 [Suppl 1]:S657.

Buers M, Quatrara B, Niccum B, Vance S, Hays RA. All-cause hospital admissions decreased after fecal microbiota transplantation for recurrent clostridium difficile infection. Am J Gastroenterol. 2016;111 [Suppl 1]:S91–2.

Burns LJ, Dubois N, Smith MB, Mendolia GM, Burgess J, Edelstein C, et al. Donor recruitment and eligibility for fecal microbiota transplantation: Results from an international public stool bank. Gastroenterology. 2015;148 [Suppl 1]:S96–7.

Cammarota G, Ianiro G, Gasbarrini A, Masucci L, Sanguinetti M. Faecal transplantation for Clostridium difficile infection. Three cases treated in Italy. Dig Liver Dis 2014;46:475.

Cheng YW, Xu H, Rogers N, Sagi S, Bohm M, Fischer M. Sequential fecal microbiota transplant protocol: A promising alternative to colectomy in severe and severe/complicated Clostridium difficile. Am J Gastroenterol 2016;111 [Suppl 1]:S59–60.

Cherem JH, Ulloa IH. Home fecal transplantation in elderly women. Gac Med Mex 2014;150:106–7.

Chetan M, Benjamin H, Ajin J, Alireza M, Nichole M, Mayur R. Fecal transplant for recurrent and/or refractory clostridium difficile infection in patients with inflammatory bowel disease. Inflamm Bowel Dis 2014;20 [Suppl]:S72.

Costello S, La Brooy J, Tucker E, Holloway R, Schoeman M, Andrews JM. Establishment of a fecal microbiota transplant service for the treatment of recurrent Clostridium difficile colitis in the Australian public hospital setting. J Gastroenterol Hepatol 2014;29:134.

Damman C, Brittnacher M, Hayden H, Radey M, Hager K, Miller S, et al. Single colonoscopically administered fecal microbiota transplant for ulcerative colitis-a pilot study to determine therapeutic benefit and graft stability. Gastroenterology 2014;146 [Suppl 1]:S-460.

Dimitry J, Keshteli A, Kao D. Independent predictors of failure of fecal microbiota transplantation (FMT) for recurrent or refractory Cclostridium difficile infection. In: Meeting Abstracts. Program and Abstracts from the Canadian Digestive Diseases Week 2016. Can J Gastroenterol Hepatol 2016:A118.

Dimitry J, Keshteli AH, Kao D. Su1746 Predictors of Failure of Fecal Microbiota Transplantation (FMT) in the Management of Recurrent Clostridium difficile Infection. Gastroenterology 2016 Apr;150 [Suppl]:S543.

Doran A, Vance S, Warren C, Kolling G, Chaplain A, Archbald-Pannone L, et al. Microscopic colitis in recurrent C. difficile infection may resolve spontaneously after fmt. Am J Gastroenterol 2015;110 [Suppl 1]:S584.

El-Halabi M, Cheng YW, Rogers N, Sagi S, Bohm M, Xu H, et al. Changes in mortality, colectomy, and length of hospital stay after implementation of inpatient fecal microbiota transplantation program for severe Clostridium difficile infection. Am J Gastroenterol 2016;111 [Suppl]:S67.

Elliott R. Stool transplant for recurrent Clostridium difficile infection using designated screened donors in a community hospital. Am J Gastroenterol 2016;111 [Suppl 1]:S71.

Elliott RJ, Njenga M, Ladha A, Warren K, Blackler D, Stoltzner Z, et al. Stool processing speed and storage duration do not impact clinical effectiveness of fecal microbiota transplantation across 1,924 Clostridium difficile infection patients. Am J Gastroenterol 2016;111 [Suppl]:S57.

Emanuelsson F, Claesson BEB, Ljungström L, Tvede M, Ung K-A. Faecal microbiota transplantation and bacteriotherapy for recurrent Clostridium difficile infection: A retrospective evaluation of 31 patients. Scand J Infect Dis 2014;46:89–97.

Falconer S, Moss E, Andermann T, Systrom H, Mahabamunuge J, Hohmann E, et al. Fecal microbiota transplant is a potentially safe and effective treatment for clostridium difficile infection in hematopoietic stem cell recipients. Biol Blood Marrow Transplant 2016;22 [Suppl]:S53–4.

Fischer M, Bittar M, Papa E, Kassam Z, Smith M. Can you cause IBD with fecal transplantation? 31-patient case series of fecal transplantation using stool from a donor who later developed Crohn’s disease. Am J Gastroenterol 2016;111 [Suppl]:S294–5.

Fischer M, Cook G, Rogers N, Sipe B, Vuppalanchi R. Rescue therapy with fecal microbiota transplantation in hospitalized patients with severe and severe-complicated clostridium difficile infection. Am J Gastroenterol 2014;109 [Suppl]:S195.

Fischer M, Kelly C, Kao D, Kuchipudi A, Jafri SM, Blumenkehl M, et al. Outcomes of fecal microbiota transplantation for C. difficile infection in patients with inflammatory bowel disease. Am J Gastroenterol 2014;109 [Suppl]:S487.

Fischer M, Mehta S, Martin T, Cook G, Phelps E, Sipe B, et al. Predictors of failure after fecal microbiota transplantation (FMT) for the therapy of Clostridium difficile infection (CDI). Am J Gastroenterol 2015;110 [Suppl 1]:S582.

Fischer M, Phelps E, Bolla R, Storm M, Allegretti JR. Long-term risk of clostridium difficile infection recurrence with or without antibiotic exposure following successful fecal microbiota transplant. Gastroenterology 2016;150 [Suppl 1]:S23.

Fischer M, Rex DK, Cook GK. Fecal microbiota transplantation for recurrent Clostridium difficle in patients with prolonged immunosuppression. United Eur Gastroenterol J 2013;1 [Suppl]:A380.

Frank J, Hogenauer C, Grochenig HP, Hoffmann KM, Reicht G, Wenzl HH, et al. Safety of fecal microbiota transplantation in patients with chronic colitis and immunosuppressive treatement. J Crohn’s Colitis. 2015;9 [Suppl]:S245–6.

Freeman AE, Roberts SC, Chey WD, Kao JY, Rao K. New onset functional gi disorders following fecal microbiota transplant for recurrent Clostridium difficile infection-prevalence and risk factors. Gastroenterology. 2016;150 [Suppl 1]:S495.

Gallegos-Orozco JF, Paskvan-Gawryletz CD, Gurudu SR, Orenstein R. Successful colonoscopic fecal transplant for severe acute Clostridium difficile pseudomembranous colitis. Rev Gastroenterol Mex 2012;77:40–2.

Gupta A, Khanna S. Ipilimumab-associated colitis or refractory Clostridium difficile infection? BMJ Case Rep 2015;2015: bcr2015211160.

Gweon TG, Kim J, Lim CH, Park JM, Lee DG, Lee IS, et al. Fecal Microbiota Transplantation Using Upper Gastrointestinal Tract for the Treatment of Refractory or Severe Complicated Clostridium difficile Infection in Elderly Patients in Poor Medical Condition: The First Study in an Asian Country. Gastroenterol Res Pract 2016;2016:2687605.

Gweon TG, Lee KJ, Kang D, Park SS, Kim KH, Seong H, et al. A case of toxic megacolon caused by Clostridium difficile infection and treated with fecal microbiota transplantation. Gut Liver 2015;9:247–50.

Hourigan SK, Chen LA, Grigoryan Z, Laroche G, Weidner M, Sears CL, et al. Microbiome changes associated with sustained eradication of Clostridium difficile after single faecal microbiota transplantation in children with and without inflammatory bowel disease. Aliment Pharmacol Ther 2015;42:741–52.

IrreGaertner W, Madoff R, Mellgren A, Kwaan M, Melton G. Impact of postoperative clostridium difficile infection after colon and rectal operations. Color Dis 2014;16:145.

Karolewska-Bochenek K, Lazowska-Przeorek I, Banaszkiewicz A, Gawronska A, Kotowska M, Dziekiewicz M, et al. Fecal microbiota transplantation for CMV infection in pediatric patients with IBD. J Pediatr Gastroenterol Nutr 2016;62:147.

Karolewska-Bochenek K, Lazowska-Przeorek I, Grzesiowski P, Banaszkiewicz A, Albrecht P, Gawronska A, et al. Fecal microbiota transplantation in refractory pediatric UC - Preliminary data. J Crohn’s Colitis 2015;9 [Suppl 1]:S294.

Kelly C, De Leon L. Successful treatment of recurrent clostridium difficile infection with donor stool administered at colonoscopy: A case series. Am J Gastroenterol 2010;105 [Suppl 1]:S135.

Kump PK, Gröchenig H-P, Lackner S, Trajanoski S, Reicht G, Hoffmann KM, et al. Alteration of intestinal dysbiosis by fecal microbiota transplantation does not induce remission in patients with chronic active ulcerative colitis. Inflamm Bowel Dis 2013;19:2155–65.

Laszlo M, Ciobanu L, Andreica V, Pascu O. Fecal transplantation indications in ulcerative colitis. Preliminary study. Clujul Med 2016;89:224–8.

Le L, El-Nachef N. Fecal microbiota transplantation in solid organ transplant and hematopoietic stem cell transplant patients with recurrent or refractory clostridium difficile infection: A case series. Am J Gastroenterol 2016;111 [Suppl 1]:S615.

Link A, Lachmund T, Schulz C, Weigt J, Malfertheiner P. Endoscopic peroral jejunal fecal microbiota transplantation. Dig Liver Dis 2016;48:1336–9.

Lofland D, Josephat F, Partin S. Fecal transplant for recurrent Clostridium difficile infection. Clin Lab Sci 2013;26:131–5.

Petrof EO, Gloor GB, Vanner SJ, Weese SJ, Carter D, Daigneault MC, et al. Stool substitute transplant therapy for the eradication of Clostridium difficile infection: “RePOOPulating” the gut. Microbiome 2013;1:3.

Pierog A, Mencin A, Reilly NR. Fecal microbiota transplantation in children with recurrent clostridium difficile infection. Pediatr Infect Dis J 2014;33:1198–200.

Ponte A, Pinho R, Mota M, Silva J, Vieira N, Oliveira R, et al. Initial experience with fecal microbiota transplantation in Clostridium difficile infection - transplant protocol and preliminary results. Rev Esp Enfermedades Dig 2015;107:402–7.

Ray A, Jones C. Does the donor matter? Donor vs patient effects in the outcome of a next-generation microbiota-based drug trial for recurrent Clostridium difficile infection. Future Microbiol 2016;11:611–6.

Rebello D, Yen E, Lio P, Kelly CR. Unexpected benefits: Hair growth in two alopecia patients after fecal microbiota transplant. Am J Gastroenterol 2016;111 {Suppl 1]:S623–4.

Satokari R, Mattila E, Kainulainen V, Arkkila PE. Simple faecal preparation and efficacy of frozen inoculum in faecal microbiota transplantation for recurrent Clostridium difficile infection - an observational cohort study. Aliment Pharmacol Ther 2015;41:46–53.

Schulz-Stubner S, Textor Z, Anetseder M. Fecal Microbiota Therapy as Rescue Therapy for Life-Threatening Clostridium difficile Infection in the Critically Ill: A Small Case Series. Infect Control Hosp Epidemiol 2016;37:1129–31.

Silverman MS, Davis I, Pillai DR. Success of Self-Administered Home Fecal Transplantation for Chronic Clostridium difficile Infection. Clin Gastroenterol Hepatol 2010;8:471–3.

Veling N. A novel approach in the treatment of clostridium difficile: A case study. J Spinal Cord Med 2014;37:441–2.

Vigvari S, Nemes Z, Vincze A, Solt J, Sipos D, Feiszt Z, et al. Faecal microbiota transplantation in Clostridium difficile infections. Infect Dis (Auckl) 2015;47:114–6.

Webb BJ, Brunner A, Ford CD, Gazdik MA, Petersen FB, Hoda D. Fecal microbiota transplantation for recurrent Clostridium difficile infection in hematopoietic stem cell transplant recipients. Transpl Infect Dis 2016;18:628–33.

Weidner M, Hourigan S, Ling K, O’Brien K, Oliva-Hemker M. Fecal microbiota transplantation using banked donor stool is effective in the treatment of recurrent clostridium difficile infection in children. J Pediatr Gastroenterol Nutr 2016;63 [Suppl 2]:S143–4.

**D.1.4. Case reports**

Abeyesundere RL. A ward outbreak of Clostridium difficile enterocolitis. J Infect 1982;5:277–82.

Adamski JK, Jaschke BB, Uusitalo-Seppala RS, Moilanen KVJ, Pehkonen AV, Weigl W. Routine Treatment-Resistant Clostridium difficile Infection during Recovery from Myxedema. Case Reports in Gastroenterology;2017:740-6.

Agrawal M, Aroniadis OC, Brandt LJ, Kelly C, Freeman S, Surawicz C, et al. A long-term follow-up study of the efficacy and safety of fecal microbiota transplant (FMT) for Recurrent/Severe/Complicated C. Difficile Infection (CDI) in the elderly. Gastroenterology 2014;146 [Suppl 1]:S42–3.

Al-Nassir WN, Sethi AK, Li Y, Pultz MJ, Riggs MM, Donskey CJ. Both oral metronidazole and oral vancomycin promote persistent overgrowth of vancomycin-resistant enterococci during treatment of Clostridium difficile-associated disease. Antimicrob Agents Chemother 2008;52:2403–6.

Alang N, Kelly CR. Weight gain after fecal microbiota transplantation. Open Forum Infect Dis 2015;2:ofv004.

Alonso CD, Kamboj M. Clostridium difficile Infection (CDI) in solid organ and hematopoietic stem cell transplant recipients. Curr Infect Dis Rep 2014;16:414.

Alrabaa S, Noel PR, Wills T. Clostridium difficile infection: What you need to know. Consultant 2013;53:389–95.

Alsakka M, Sharabash N, Alktaifi A, Salih M, German M. Successful fecal microbiota transplantation (FMT) for recurrent Clostridium difficile infection (CDI) after subtotal colectomy. Am J Gastroenterol 2013;108 [Suppl 1]:S365–6.

Anand R, Song Y, Sinha A, Hasan S, Sivaraman A, Garg S, et al. Effect of aging on the fecal microbiome in healthy donors for fecal microbiota transplant. Gastroenterology 2015;148 [Suppl 1]:S719.

Andrews R, Gavin M. Post-infectious IBS following recurrent/ relapsing C. difficile associated diarrhea (CDAD). J Investig Med 2016;64:244.

Ang P, Cheong WK, Khoo KS. Pseudomembranous colitis in a patient treated with paclitaxel for carcinoma of the breast: A case report. Ann Acad Med Singapore 2000;29:132–4.

Aratari A, Cammarota G, Papi C. Fecal microbiota transplantation for recurrent C. difficile infection in a patient with chronic refractory ulcerative colitis. J Crohns Colitis 2015;9:367.

Asonuma K, Kuroki Y, Ino S, Hanamura S, Takano Y, Yamamura E, et al. Severe refractory Clostridium difficile infection with good response to fecal microbiota transplantation: a case report. Nippon Shokakibyo Gakkai Zasshi 2016;113:55–62.

Bamba S, Nishida A, Imaeda H, Inatomi O, Sasaki M, Sugimoto M, et al. Successful treatment by fecal microbiota transplantation for Japanese patients with refractory Clostridium difficile infection: A prospective case series. J Microbiol Immunol Infect 2017;pii:S1684-1182.

Bartosz C, Marino D, DeCross A. A highly illustrative case report detailing the profound subjective and objective response of severe pseudomembranous colitis (from Clostridium difficile) to fecal transplant. Am J Gastroenterol 2016;111 [Suppl 1]:S620.

Berro ZZ, Hamdan RH, Dandache IH, Saab MN, Karnib HH, Younes MH. Fecal microbiota transplantation for severe clostridium difficile infection after left ventricular assist device implantation: A case control study and concise review on the local and regional therapies. BMC Infect Dis 2016;16:234.

Binkovitz LA, Allen E, Bloom D, Long F, Hammond S, Buonomo C, et al. Atypical presentation of Clostridium difficile colitis in patients with cystic fibrosis. Am J Roentgenol 1999;172:517–21.

Brechmann T, Swol J, Knop-Hammad V, Willert J, Aach M, Cruciger O, et al. Complicated fecal microbiota transplantation in a tetraplegic patient with severe Clostridium difficile infection. World J Gastroenterol 2015;21:3736–40.

Broecker F, Klumpp J, Schuppler M, Russo G, Biedermann L, Hombach M, et al. Long-term changes of bacterial and viral compositions in the intestine of a recovered Clostridium difficile patient after fecal microbiota transplantation. Cold Spring Harb Mol Case Stud. 2016;2:a000448.

Broecker F, Kube M, Klumpp J, Schuppler M, Biedermann L, Hecht J, et al. Analysis of the intestinal microbiome of a recovered Clostridium difficile patient after fecal transplantation. Digestion 2013;88:243-51.

Cammarota G, Ianiro G, Masucci L, Pecere S, Bibbo S, Scaldaferri F, et al. Fecal microbiota transplantation for recurrent C. difficile infection: A 2-year experience from a European referral centre. United Eur Gastroenterol J 2015;3 [Suppl]:A131.

Chang B, Rezaie A. Post-fecal microbiota transplantation (FMT) constipation and abdominal distention due to methane-predominant bacterial overgrowth contracted from the donor. Am J Gastroenterol 2016;111 [Suppl 1]:S807–8.

Chao HC, Yu WL. Treatment failure of fecal microbiota transplant for pseudomembranous colitis due to coexistent cytomegalovirus colitis. J Microbiol Immunol Infect 2016;49:617–8.

Cho S, Spencer E, Hirten R, Grinspan A, Dubinsky M. High recurrence rate after fecal microbiota transplant for recurrent Clostridium difficile infection in pediatric inflammatory bowel disease. J Pediatr Gastroenterol Nutr 2017;65 [Suppl 2]:S279-S80.

Chu A, Michail S. Pediatric recurrent C. difficile infections-a sign of undiagnosed GI disease. J Pediatr Gastroenterol Nutr 2017;65 [Suppl 2]:S70.

Colleen K, Hassan Z, Stacy K. New diagnosis of crohn’s colitis 6 weeks after fecal microbiota transplantation (FMT). Inflamm Bowel Dis 2014;20:S21.

Collins DC. Pseudomembranous enterocolitis. Further observations on the value of donor fecal enemata as an adjunct in the treatment of pseudomembranous enterocolitis. Am J Proctol 1960;2:389–91.

Costello SP, Chung A, Andrews JM, Fraser RJ. Fecal microbiota transplant for Clostridium difficile colitis-induced toxic megacolon. Am J Gastroenterol 2015;110:775–7.

Davidovics ZH, Vance K, Etienne N, Hyams JS. Fecal transplantation successfully treats recurrent D-lactic acidosis in a child with short bowel syndrome. Jpen J Parenter Enter Nutr 2015;29:29.

De Castro CG, Ganc AJ, Ganc RL, Petrolli MS, Hamerschlack N. Fecal microbiota transplant after hematopoietic SCT: Report of a successful case. Bone Marrow Transplant 2015;50:145.

Diamond C, McNeilly T. Faecal microbiota transplantation for Clostridium difficile - a local perspective. Ulster Medical Journal 2017;86:108-10.

Didesch MM, Averill A, Oh-Park M. Peripheral neuropathy after fecal microbiota transplantation for Clostridium difficile infection: a case report. PM R 2016;8:813–6.

Duke PS, Fardy J. Recurrent Clostridium difficile infection treated with home fecal transplantation: A case report. J Med Case Rep 2014;8:393.

Dumitru IM, Dumitru E, Resul G, Curtali L, Paris S, Rugina S. Concomitant CMV and Clostridium difficile colitis in an immunocompetent patient treated with ganciclovir and fecal transplantation. J Gastrointest Liver Dis 2014;23:221–2.

Duplessis CA, You D, Johnson M, Speziale A. Efficacious outcome employing fecal bacteriotherapy in severe Crohn’s colitis complicated by refractory Clostridium difficile infection. Infection 2012;40:469–72.

Ehlermann P, Dosch AO, Katus HA. Donor fecal transfer for recurrent Clostridium difficile-associated diarrhea in heart transplantation. J Hear Lung Transplant 2014;33:551–3.

Enriquez R, Borras-Blasco J, Sirvent AE, Padilla S, Navarro-Ruiz A, Solavera J, et al. Imipenem-induced Clostridium difficile diarrhea in a patient with chronic renal failure. Saudi J Kidney Dis Transpl 2011;22:541–3.

Espinoza R, Quera R, Meyer L, Rivera D. [Fecal microbiota transplantation: first case report in Chile and review]. Rev Chil Infectol 2014;31:477–82.

Floe A, Leutscher P. [Recurrent Clostridium difficile infection treated with faecal microbiota transplantation]. Ugeskr Laeger 2014;176:17.

Freeman S, Mao E, Shah S, Kelly C. A case of recurrent Clostridium difficile enteritis treated with fecal microbiota transplant. Am J Gastroenterol 2014;109 [Suppl 1]:S328.

Garcia-Fernandez S, Morosini MI, Cobo M, Foruny JR, Lopez-Sanroman A, Cobo J, et al. Gut eradication of VIM-1 producing ST9 Klebsiella oxytoca after fecal microbiota transplantation for diarrhea caused by a Clostridium difficile hypervirulent R027 strain. Diagn Microbiol Infect Dis 2016;86:470–1.

Garg S, Walia R, Girotra M, Gjikopulli A, Mirza Y, Cuffari C, et al. A novel treatment for recurrent Clostridium difficile infection in a 20-month-old. Am J Gastroenterol 2012;107 [Suppl 1]:S556.

Gathe JC, Diejomaoh EM, Mayberry CC, Clemmons JB. Fecal transplantation for Clostridium difficile - “all stool may not be created equal.” J Int Assoc Provid AIDS Care 2016;15:107–8.

Goeser F, Schlabe S, Ruiner CE, Kramer L, Strassburg CP, Spengler U. Non-invasive fecal microbiota transplantation for recurrent Clostridium difficile infection in a patient presenting with hypertensive disorder post interventionem. Z Gastroenterol 2016;54:1143–6.

Gundling F, Tiller M, Agha A, Schepp W, Iesalnieks I. Successful autologous fecal transplantation for chronic diversion colitis. Tech Coloproctol 2015;19:51–2.

Jang MO, An JH, Jung SI, Park KH. Refractory Clostridium difficile infection cured with fecal microbiota transplantation in vancomycin-resistant enterococcus colonized patient. Intest Res 2015;13:80–4.

Kakkar E, Othman M. Fecal transplant in recurrent Clostridium difficile enteritis. J Gen Intern Med 2017;32 [Suppl 1]:S499.

Kao D, Madsen K. Fecal microbiota transplantation (FMT) in the treatment of inflammatory bowel disease (IBD): A case report. Am J Gastroenterol 2013;108 [Suppl 1]:S415–6.

Karlsson KA. Faecal transplantation for the treatment of recurrent Clostridium difficile associated diarrhoea. South African Gastroenterol Rev 2012;10:19.

Kelly CR, Olefson S, Jackson M. A challenging case of diarrhea after fecal microbiota transplant. Am J Gastroenterol 2015;110 [Suppl 1]:S156–7.

Kim JE, Gweon TG, Yeo CD, Cho YS, Kim GJ, Kim JY, et al. A case of Clostridium difficile infection complicated by acute respiratory distress syndrome treated with fecal microbiota transplantation. World J Gastroenterol 2014;20:12687–90.

Kleger A, Schnell J, Essig A, Wagner M, Bommer M, Seufferlein T, et al. Fecal transplant in refractory Clostridium difficile colitis. Dtsch Arztebl Int 2013;110:108–15.

Konturek P, Haziri D, Helfritzsch H, Hess T, Heymann S, Harsch I. Successful therapy of severe pseudomembranous Clostridium difficile colitis using combination of fecal microbiota therapy and fidaxomicin. Med Princ Pract 2016;26:182-4.

Kurtz M, Morgan M. Concomitant Clostridium difficile colitis and cytomegalovirus colitis in an immunocompetent elderly female. BMJ Case Rep. 2012;2012:pii: bcr2012007273.

Laster J, Sultan M, Mattar M. Fecal microbiota transplantation in refractory Clostridium difficile infection in children: Case report and review of the literature. Am J Gastroenterol 2015;110 [Suppl 1]:S399.

Lingala S. Fecal microbiota transplantation in critically ill patient with severe Clostridium difficile colitis. Gastroenterology 2014;144 [Suppl 146]:S251.

Loke P, Heine RG, McWilliam V, Cameron DJ, Tang ML, Allen KJ. Fecal microbial transplantation in a pediatric case of recurrent Clostridium difficile infection and specific antibody deficiency. Pediatr Allergy Immunol 2016;27:872–4.

Mandalia A, Kraft CS, Dhere T. Diverticulitis after fecal microbiota transplant for C. difficile infection. Am J Gastroenterol 2014;109:1956–7.

Marcos LA, Gersh A, Blanchard K, Foil S, Mallini B, Farrell SE, et al. Fecal transplantation to treat initial severe Clostridium difficile infection with sepsis. J Miss State Med Assoc 2015;56:38–40.

Matsushita M, Watanabe O, Nakamura M, Yamamura T, Funasaka K, Ohno E, et al. Two cases of fecal microbiota transplantation in patients with recurrent Clostridium difficile infection. J Gastroenterol Hepatol 2016;31:217.

Midani D, Criner G, Clauss H, Smith MS, Ehrlich AC. Fecal microbiota transplant as a bridge to organ transplant: an alternative indication for treatment of C. Difficile in a critically ill patient. Am J Gastroenterol 2016;111 [Suppl 1]:S616.

Million M, Hocquart M, Seghboyan JM, Griffiths K, Halfon P, Lagier JC, et al. Faecal microbiota transplantation as salvage therapy for fulminant Clostridium difficile infections. Int J Antimicrob Agents 2015;46:227–8.

Mohamed A, Hogan N, Moloney M. Faecal transplant in the management of Crohn’s colitis with persistent Clostridium difficile infection: A case report. Ir J Med Sci. 2015;184 [Suppl 1]:S236.

Morales SJ, Medvedev S, Lee A, Mattar M. A case of successful treatment of refractory Clostridium difficile colitis with fecal microbiota transplantation in a critically ill patient. Am J Gastroenterol 2015;110 [Suppl 1]:S146.

Navalkele BD, Lerner SA. Intravenous tigecycline facilitates cure of severe Clostridium difficile infection (CDI) after failure of standard therapy: A case report and literature review of tigecycline use in CDI. Open Forum Infect Dis 2016;3:ofw094.

Neelakanta A, Moudgal V, Upadhyay N, Valenstein P, Gunaratnam NT. Title: Successful treatment of refractory Clostridium difficile infection(CDI) with intestinal microbiota transplant (IMT) in two patients with inflammatory bowel disease (IBD) and its effects on IBD. Gastroenterology 2012;142 [Suppl]:S395.

Neemann K, Eichele DD, Smith PW, Bociek R, Akhtari M, Freifeld A. Fecal microbiota transplantation for fulminant Clostridium difficile infection in an allogeneic stem cell transplant patient. Transpl Infect Dis 2012;14:E161-5.

Oppfeldt AM, Dahlerup JF, Christensen LA, Hvas CL. Faecal microbiota transplantation for recurring Clostridium difficile infection in a patient with Crohn’s disease and ileorectal anastomosis. BMJ Case Rep 2016;2016:pii:bcr2016217209.

Persky SE, Brandt LJ. Treatment of recurrent Clostridium difficile-associated diarrhea by administration of donated stool directly through a colonoscope. Am J Gastroenterol 2000;95:3283–5.

Pitts K, Shah N, Uppal D, Hays RA. Fecal microbiota transplantation in a patient with liver cirrhosis: Changing the intestinal microbiota in a high-risk group. Am J Gastroenterol 2015;110 [Suppl 1]:S358.

Popa D, Laszlo M, Ciobanu L, Ucenic E, Mihalache M, Pascu O. Self-Administered home series fecal “minitransplants” for recurrent Clostridium difficile infection on a rectal remnant. J Gastrointest Liver Dis 2015;24:531–3.

Porr CI. Uncontrolled asthma - Case presentation. Allergy Eur J Allergy Clin Immunol 2014;69:585.

Porter RJ, Fogg C. Faecal microbiota transplantation for Clostridium difficile infection in the United Kingdom. Clin Microbiol Infect 2015;21:578–82.

Porter RJ. Pulsed faecal microbiota transplantation for recalcitrant recurrent Clostridium difficile infection. Clin Microbiol Infect 2015;21:e23–4.

Quera R, Espinoza R, Estay C, Rivera D. Bacteremia as an adverse event of fecal microbiota transplantation in a patient with Crohn’s disease and recurrent Clostridium difficile infection. J Crohn’s Colitis 2014;8:252–3.

Raghunathan VM, Sheng I, Lim SH. Intestinal dysbiosis and allogeneic hematopoietic progenitor cell transplantation. J Transl Med 2016;14:335.

Rahman O, Farooq H, Mahmood SB, Khalid MB, Kapoor R, Wack M. Clostridium difficile enteritis and proctitis: Novel multimodality treatment regimen postcolectomy. Crit Care Med 2016;44 [Suppl 1]:520.

Ramay FH, Amoroso A, Von Rosenvinge EC, Saharia K. Fecal microbiota transplantation for treatment of severe, recurrent, and refractory Clostridium difficile infection in a severely immunocompromised patient. Infect Dis Clin Pract 2016;24:237–40.

Robin C, Paul M, Nebbad B, Beckerich F, Lepeule R, Ait Ammar N, et al. Fecal microbiota transplantation after allogeneic HSCT for curing recurrent Clostridium difficile infection: Why using the stem cell donor again? Bone Marrow Transplant 2016;51:S199–200.

Russell G, Kaplan J, Ferraro M, Michelow IC. Fecal bacteriotherapy for relapsing Clostridium difficile infection in a child: A proposed treatment protocol. Pediatrics 2010;126:e239–42.

Saeedi BJ, Morison DG, Kraft CS, Dhere T. Fecal microbiota transplant for Clostridium difficile infection in a pregnant patient. Obstet Gynecol 2017;129:507-9.

Satokari R, Fuentes S, Mattila E, Jalanka J, de Vos WM, Arkkila P. Fecal transplantation treatment of antibiotic-induced, noninfectious colitis and long-term microbiota follow-up. Case Rep Med. 2014;2014:913867.

Schunemann M, Oette M. Fecal microbiota transplantation for Clostridium difficile-associated colitis in a severely immunocompromized critically ill AIDS patient: A case report. Aids 2014;28:798–9.

Seth AK, Rawal P, Bagga R, Jain P. Successful colonoscopic fecal microbiota transplantation for active ulcerative colitis: First report from India. Indian J Gastroenterol 2016;35:393–5.

Seth AK, Rawal P, Bagga R. Successful stool transplantation for severe ulcerative colitis: First report from India. Indian J Gastroenterol 2015;35 [Suppl]:A21–2.

Shin JY, Ko EJ, Lee SH, Shin JB, Kim SI, Kwon KS, et al. Refractory pseudomembranous colitis that was treated successfully with colonoscopic fecal microbial transplantation. Intest Res 2016;14:83–8.

Singh P, Udeh B, Dalton J, Udeh C, Hata J. Cost-effectiveness of 6 treatments for primary Clostridium difficile infection in an ICU population. Crit Care Med 2014;42 [Suppl 1]:A1474.

Singh S, Jing E, Stollman N. Self-limited sepsis syndrome following fecal microbiota therapy for refractory C. difficile infection. Dig Dis Sci 2016;61:2488–91.

Smith S. Intestinal microbiota transplantation: A case of Crohn’s colitis with superimposed Clostridium difficile infection. West Indian Med J 2013;62:675–7.

Sonpal N, Datta S, Mammen A, Haber G. The stool strikes back: Fecal transplantation for the treatment of Clostridium difficile infection. Am J Gastroenterol 2015;110 [Suppl 1]:S159.

Soota K, Telfah M, Ramesh N, Pereira M, Lingutla D. Treatment of recurrent Clostridium difficile infection with combined jejunal and colonic fecal microbiota transplant. Am J Gastroenterol 2013;108 {Suppl 1]:S398.

Stanley E, McNamara D. “Non-Resolving C. difficile infection cured by transplant.” Ir J Med Sci 2015;184 [Suppl]:S342.

Stein D, Rizvi S, Modiri AN, Fang T, Naik AS. Two case reports of toxic megacolon from Clostridium difficile infection successfully treated with fecal microbiota therapy. Gastroenterology 2015;148 [Suppl 1]:S645.

Stollman N, Smith M, Giovanelli A, Mendolia G, Burns L, Didyk E, et al. Frozen encapsulated stool in recurrent clostridium difficile: Exploring the role of pills in the treatment hierarchy of fecal microbiota transplant nonresponders. Am J Gastroenterol 2015;110:600–1.

Stollman N, Surawicz C. Fecal transplant for Clostridium difficile. Arch Intern Med 2012;172:825.

Stripling J, Kumar R, Baddley JW, Nellore A, Dixon P, Howard D, et al. Loss of vancomycin-resistant enterococcus fecal dominance in an organ transplant patient with Clostridium difficile colitis after fecal microbiota transplant. Open Forum Infect Dis 2015;2:ofv078.

Stysly B, Kukkadapu T, Singh E. Clostridium difficile in ulcerative colitis complicated by underlying aplastic anemia. Am J Gastroenterol 2014;109 [Suppl 1]:S443.

Sun W, Arunachalam A, Siddique S, Zandman D. Multi-organism bacteremia after fecal microbiota transplantation for relapsing Clostridium difficile infection. Am J Gastroenterol 2014;109 [Suppl 1]:S420.

Syed R, Rahim U, Humphrey F, Ray A. Fecal microbiota transplant for severe complicated Clostridium difficile infection via a loop ileostomy: A novel administration route. Am J Gastroenterol 2015;110 [Suppl 1]:S142.

Tafesh Z, O’Neil S, Crawford Jr C V. Frozen universal stool for fecal microbiota transfer (FMT) in recurrent C. difficile infection. Am J Gastroenterol 2015;110 [Suppl 1]:S588.

Tanaka T, Kato H, Fujimoto T. Successful fecal microbiota transplantation as an initial therapy for Clostridium difficile infection on an outpatient basis. Intern Med 2016;55:999–1000.

Tariq R, Smyrk T, Pardi DS, Tremaine WJ, Khanna S. New-onset microscopic colitis in an ulcerative colitis patient after fecal microbiota transplantation. Am J Gastroenterol 2016;111:751–2.

Tian H, Ding C, Gong J, Wei Y, McFarland L V, Li N. Freeze-dried, capsulized fecal microbiota transplantation for relapsing Clostridium difficile infection. J Clin Gastroenterol 2015;49:537–8.

Trubiano JA, Gardiner B, Kwong JC, Ward P, Testro AG, Charles PG. Faecal microbiota transplantation for severe Clostridium difficile infection in the intensive care unit. Eur J Gastroenterol Hepatol 2013;25:255–7.

Trubiano JA, Gardiner B, Kwong JC, Ward P, Testro AG, Charles PGP. Faecal microbiota transplantation for severe Clostridium difficile infection in the intensive care unit. Eur J Gastroenterol Hepatol 2013;25:255–7.

Trubiano JA, George A, Barnett J, Siwan M, Heriot A, Prince HM, et al. A different kind of “allogeneic transplant”: Successful fecal microbiota transplant for recurrent and refractory Clostridium difficile infection in a patient with relapsed aggressive B-cell lymphoma. Leuk Lymphoma 2015;56:512–4.

Walia R, Garg S, Song Y, Girotra M, Cuffari C, Fricke WF, et al. Efficacy of fecal microbiota transplantation in 2 children with recurrent Clostridium difficile infection and its impact on their growth and gut microbiome. J Pediatr Gastroenterol Nutr 2014;59:565–70.

Wang J, Xiao Y, Lin K, Song F, Ge T, Zhang T. Pediatric severe pseudomembranous enteritis treated with fecal microbiota transplantation in a 13-month-old infant. Biomed Reports 2015;3:173–5.

Wang PT, Fashandi AZ, Hays RA. Comparison of laparascopic loop ileostomy and fecal microbiota transplantation in a patient with two episodes of severe and complicated Clostridium difficile infection: A case report. Am J Gastroenterol 2016;111 [Suppl 1]:S624.

Wonderlick JS, D’Agostino R. Fecal microbiota transplantation via fluoroscopy-guided nasojejunal catheter placement: indications, technique, and the role of radiology. Abdom Radiol 2016;41:2020–5.

You D, Johnson M, Duplessis C, Speziale A. Successful Use of Fecal Bacteriotherapy in Severe Crohn’s Colitis and Refractory Clostridium difficile Infection. Am J Gastroenterol 2011;106 [Suppl 1]:S315.

You DM, Franzos MA, Holman RP. Successful treatment of fulminant Clostridium difficile infection with fecal bacteriotherapy. Ann Intern Med 2008;148:632–3.

Youssef MA, Gavin M. Fecal microbiota transplant: A case report in an immunosuppressed patient with crohn’s disease and recurrent Clostridium difficile infection. Gastroenterology 2013;144 [Suppl 1]:S626.

Yu S, Abdelkarim A, Nawras A, Hinch BT, Mbaso C, Valavoor S, et al. Fecal transplant for treatment of toxic megacolon associated with Clostridium difficile colitis in a patient with duchenne muscular dystrophy. Am J Ther 2016;23:e609–13.

Zainah H, Silverman A. Fecal Bacteriotherapy: A case report in an immunosuppressed patient with ulcerative colitis and recurrent Clostridium difficile infection. Case Reports Infect Dis 2012;2012:810943.

**D.1.5. Non-English language:**

*Chinese* Li N, Tian H, Ma C, Ding C, Ge X, Gu L, Zhang X, Yang B, Hua Y, Zhu Y, Zhou Y. Efficacy analysis of fecal microbiota transplantation in the treatment of 406 cases with gastrointestinal disorders. Zhonghua Wei Chang Wai Ke Za Zhi 2017;20:40-46.

*Chinese* Wang Y, Yang B, Ye Y, Li Z, Kang W. Therapeutic effects and the possible mechanism of fecal transplantation on rats with Clostridium difficile-associated pseudomembranous colitis. Chinese J Microbiol Immunol 2015;35:582–6.

*Chinese* Yang Y, Wang Z. Advances in study on fecal microbiota transplantation. Chinese J Gastroenterol 2014;19:1–5.

*Czech* Polak P, Freibergerova M, Husa P, Jurankova J, Svacinka R, Mikesova L, et al. Fecal bacteriotherapy for the treatment of recurrent Clostridium difficile colitis used in the Clinic of Infectious Diseases of the University Hospital Brno in 2010-2014 - a prospective study. Epidemiol Mikrobiol Imunol  Cas Spol pro Epidemiol a Mikrobiol Ces Lek Spol JE 2015;64:232–5.

*Czech* Polak P, Freibergerova M, Husa P, Jurankova J, Svacinka R, Mikesova L, et al. Fecal bacteriotherapy for the treatment of recurrent Clostridium difficile colitis used in the Clinic of Infectious Diseases of the University Hospital Brno in 2010-2014 - a prospective study. Epidemiol Mikrobiol Imunol 2015;64:232–5.

*Czech* Polak P, Freibergerova M, Jurankova J, Kocourkova H, Mikesova L, Svacinka R, et al. First experiences with faecal bacteriotherapy in the treatment of relapsing pseudomembranous colitis due to Clostridium difficile. Klin Mikrobiol Infekc Lek 2011;17:214–7.

Czech Polak P, Husa P, Freibergerova M. Colitis due to Clostridium difficile in broader context. Interni Med pro Praxi 2014;16:241–4.

*Dutch* Holvoet T, Van De Wiele T, Boelens J, Raes J, Hindryckx P, De Vos M, et al. Fecal transplantation: Overview of the indications. Tijdschr Geneeskd 2014;70:289–97.

*Dutch* Nieuwdorp M, Van Nood E, Speelman P, Van Heukelem HA, Jansen JM, Visser CE, et al. Treatment of recurrent Clostridium difficile-associated diarrhoea with a suspension of donor faeces. Ned Tijdschr Geneeskd 2008;152:1927–32.

*Dutch* Nood E, Keller JJ, Kuijper EJ, Speelman P. New treatment options for infections with Clostridiuym difficile. Ned Tijdschr Geneeskd 2014;158:3.

*Dutch* Terveer EM, van Beurden YH, Kuijper EJ, Keller JJ. Fecal microbiota transplantation, a novel therapy for recurrent Clostridium difficile infection. Ned Tijdschr Tandheelkd 2016;123:406–9.

*Dutch* van Nood E, Keller JJ, Kuijper EJ, Speelman P. New treatment options for infections with Clostridium difficile. Ned Tijdschr Geneeskd 2013;157:A6580.

*Finnish* Harkonen N. Reccurent pseudomembranous colitis treated with the donor feces. Duodecim 1996;112:1803–4.

*French* Giger A, Barberini L, Bruchez P, Castioni J, Claude F, Rochat MC, et al. General internal medicine in hospital practice: The year 2013 put into perspective by residents. Rev Med Suisse 2014;10:164–70.

*French* Kohn M, Robin C, Beckerich F, Cordonnier C. Clostridium difficile infections and blood disease: What should I know? Hematologie 2015;21:18–27.

*French* Lagier JC, Raoult D. Fecal microbiota transplantation: indications and perspectives. M S-Medecine Sci 2016;32:991–7.

*French* Lagier JC. Faecal microbiota transplantation: From practice to legislation before considering industrialization. Clin Microbiol Infect 2014;20:1112–8.

*French* Megerlin F, Fouassier E, Lopert R, Bourlioux P. Faecal microbiota transplantation: A sui generis biological drug, not a tissue. Ann Pharm Fr 2014;72:217–20.

*French* Megerlin F, Fouassier E. Faecal microbiota transplantation in France: what applicable law?. Ann Pharm Fr 2014;72:363–74.

*French* Megerlin F, Fouassier E. Faecal microbiota transplantation in France: What applicable law?. Ann Pharm Fr 2014;72:363–74.

*French* Rozier P, Fraisse T, Lauda M, Priner M, Forestier E, Paccalin M. Clostridium difficile in geriatrics. Cah l’Annee Gerontol 2014;6:107–13.

*French* Rozier P, Fraisse T, Lauda M, Priner M, Forestier E, Paccalin M. Clostridium difficile in geriatrics. Cah l’Annee Gerontol 2014;6:107–13.

*French* Seksik P. Clostridium difficile-associated colitis. Hepato-Gastro Oncol Dig 2016;23:775–84.

*French* Sokol H, Galperine T, Kapel N, Bourlioux P, Seksik P, Barbut F, et al. Fecal microbiota transplantation for treatment of relapsing clostridium difficile infection: Guidelines for clinical practice. Hepato-Gastro Oncol Dig 2015;22:278–90.

*French* Surawicz CM, Alexander J. Treatment of refractory and recurrent Clostridium difficile infection. Nat Rev Gastroenterol Hepatol 2011;8:330-9.

*French* Surawicz CM. The microbiota and infectious diarrhea. Gastroenterol Clin Biol 2010;34 [Suppl 1]:S29-36.

*French* Surawicz CM. Clostridium difficile infection: risk factors, diagnosis and management. Curr Treat Options Gastroenterol 2015;13:121–9.

*French* Terrier MCZ, Frossard JL, Simonet ML. Recurrent Clostridium difficile infections : The importance of the intestinal microbiota. Rev Med Suisse 2013;9:1898–904.

*French* Tissot F, Maillard MH. Clostridium difficile infections: Update on new European recommandations. Rev Med Suisse 2014;10:913–9.

*French* Voide C, Asner S, Giulieri S, Cavassini M, Merz L, Tissot F, et al. Infectious diseases. Rev Med Suisse 2014;10:61–5.

*French* Werner CC. Fecal transplantation in the treatment of Clostridium difficile infections. Rev Med Suisse 2013;9:388–9.

*German* Eufferlein T, Kleger A, Nitschmann S. Recurrent Clostridium difficile infection. Treatment with duodenal infusion of donor feces. Internist 2014;55:455–9.

*German* Hagel S, Stallmach A, Vehreschild M, Angeli W, Bachmann O, Gross M, et al. Fecal microbiota transplant in patients with recurrent Clostridium difficile infection - A retrospective multicenter observational study from the MicroTrans registry. Dtsch Arztebl Int 2016;113:583–9.

*German* Hibbeler B. Clostridium difficile: Fecal bacteriotherapy as an option. Dtsch Arztebl Int 2016;113:A185.

*German* Liebhardt E, Seufferlein T, Wagner M. Fecal microbiota transplantation for Clostridium difficile infection. Arzneimitteltherapie. 2016;34:285–91.

*German* Lubbert C, Weis S. Drug therapy of infectious diarrhea: part 1: acute diarrhea. Internist 2013;54:1383–92.

*German* Lubbert C, Weis S. Drug therapy of infectious diarrhea: Part 1: Acute diarrhea. Internist 2013;54:1383–92.

*German* Lubbert C. Fecal microbiota transplantation (FMT): Indications for treatment and future perspectives. Diabetologe. 2016;12:409–19.

*German* Menzel J. Fecal transplantation for refractory chronic Clostridium difficile infection. Gastroenterologe 2013;8:336–7.

*German* Ramsauer B, Konig C, Sabelhaus T, Ockenga J, Otte JM. Fecal microbiota transplantation in relapsing clostridium difficile colitis. MMW-Fortschritte der Medizin 2016;158:17–20.

*German* Rohrenbach J, Matthess A, Maier R, Von Bunau R. Treatment of children with E. coli strain Nissle 1917. Results of a prospective data collection with 668 patients. Padiatr Prax 2009;73:645–52.

*German* Rosien U, Hagel S, Gotz M. Stool transplant for recurrent Clostridium difficile infection. Gastroenterologe 2015;10:122–6.

*German* Salzberger B, Rauscher C. The microbiome of the gut in critically ill patients. Med Klin Intensivmed Notfmed 2015;110:521–5.

*German* Schmelz R, Hampe J. Fecal microbiota transplantation: when and for whom?. Dtsch Medizinische Wochenschrift 2014;139:1237–9.

*German* Schmitz F. Fecal transplantation is highly effective in the treatment of recurrent Clostridium difficile infection. Gastroenterologe 2013;8:54–5.

*German* Seufferlein T, Kleger A, Nitschmann S. Recurrent Clostridium difficile infection. Treatment with duodenal infusion of donor feces. Internist 2014;55:455–9.

*German* Stallmach A. Clostridium difficile infection : What is currently available for treatment?. Internist 2016;57:1182–90.

*German* Stallmach A. Clostridium difficile infection: What is currently available for treatment?. Internist 2016;57:1182–90.

*German* Storr M, Starostzik C. Stool transplantation: also an option for irritable bowel syndrome?. MMW Fortschr Med 2014;156:16.

*German* Storr M. Donor stool now available in capsules. MMW Fortschr Med 2015;157 Suppl 1:32.

*German* Trautmann M. Fecal transplantation in Clostridium difficile colitis: New studies about a long-known therapeutic option. Krankenhauspharmazie 2013;34:414–5.

*German* Rosien U, Hagel S, Götz M. Erratum to: Stool transplant for recurrent Clostridium difficile infection. Gastroenterologe 2015;10:110.

*German* von Muller L. New aspects on Clostridium difficile infection. Dtsch Medizinische Wochenschrift 2016;141:1144–7.

*German* Weis S, John E, Lippmann N, Mossner J, Lubbert C. Clostridium difficile infection (CDI) in the course of time - an issue only for the internist?. Zentralbl Chir 2014;139:460–8.

*German* Zoller V, Laguna AL, Prazeres Da Costa O, Buch T, Goke B, Storr M. Fecal microbiota transfer (FMT) in a patient with refractory irritable bowel syndrome. Dtsch Medizinische Wochenschrift 2015;140:1232–6.

*German* Zoller V, Laguna AL, Prazeres Da Costa O, Buch T, Goke B, Storr M. Fecal microbiota transfer (FMT) in a patient with refractory irritable bowel syndrome. Dtsch Medizinische Wochenschrift 2015;140:1232–6.

*Greek* Mentis AFA, Gypas F, Mentis AF. Human enteric microbiome: Its role in health and disease. Arch Hell Med 2013;30:272–88.

*Hebrew* Israeli E, Shoenfeld Y. Harnessing nature for treating infectious and autoimmune diseases: good and bad bacteria. Harefuah 2013;152:188–189,249.

*Hebrew* Maharshak N. Use of fecal microbial transplantations for disease states in Israel. Harefuah 2015;154:152–154,213.

*Hungarian* Kovacs G. To the Editors, regarding feces transplantation. Orv Hetil 2013;154:434–5.

*Hungarian* Nagy GG, Varvolgyi C, Balogh Z, Orosi P, Paragh G. Detailed methodological recommendations for the treatment of Clostridium difficile-associated diarrhea with faecal transplantation. Orv Hetil 2013;154:10–9.

*Hungarian* Nagy GG, Varvolgyi C, Paragh G. Successful treatment of life-threatening, treatment resistant Clostridium difficile infection associated pseudomembranous colitis with faecal transplantation. Orv Hetil 2012;153:2077–83.

*Hungarian* Szabolcs V, Zsuzsanna N, Aron V, Jen S, David S, Zsofia F, et al. Experience with fecal microbiota transplantation in the treatment of clostridium difficile infection. Orv Hetil 2014;155:1758–62.

*Hungarian* Vigvari S, Nemes Z, Vincze A, Solt J, Sipos D, Feiszt Z, et al. Experience with fecal transplantation in the treatment of Clostridium difficile infection. Orv Hetil 2014;155:1758–62.

*Italian* Russello G, Brovarone F, Bardaro M, Carretto E. Treating Clostridium difficile infection with faecal transplantation: Donor microbiological testing. Infez Med 2014;22:5–10.

*Japanese* Nakamur I, Kunihiro M, Kato H. Bacteremia due to Clostridium difficile. [Japanese]. Kansenshogaku zasshi 2004;78:1026–30.

*Japanese* Ohkusa T, Koido S. Gut Microbiota and Internal Diseases: Update Information. Topics: II. Fecal microbiota transplantation and its clinical application. Nippon Naika Gakkai Zasshi 2015;104:42–7.

*Japenese* Osada T, Ishikawa D, Watanabe S. Fecal microbiota transplantation therapy for patients with gastrointestinal tract diseases. Nippon Shokakibyo Gakkai Zasshi 2015;112:1973–81.

*Japense* Suzuki K, Kitahora T, Yokota A. Clinical studies of acute hemorrhagic colitis associated with antibiotic therapy. 3. Fecal bacterial flora and fecal short chain fatty acids. IRYO 1984;38:570–576,543.

*Korean* Kim SW. Treatment of refractory or recurrent Clostridium difficile infection. Korean J Gastroenterol 2012;60:71–8.

*Korean* Ko JS. The intestinal microbiota and human disease. Korean J Gastroenterol 2013;62:85–91.

*Norwegian* Lund-Tonnesen S, Berstad A, Schreiner A, Midtvedt T. Clostridium difficile-associated diarrhea treated with homologous feces. Tidsskr Den Nor Laegeforening 1998;118:1027–30.

*Polish* Malopolska M, Fol M. Intestinal microbiota transplantation for the treatment of Clostridium difficile infection. Med Dosw Mikrobiol 2015;67:207–19.

*Polish* Piekarska M, Wandalowicz AD, Miigoc H. Clostridium difficile infecion--diagnostics, prevention and treatment. Pol Merkur Lek 2014;36:278–82.

*Polish* Rebizak E, Sierant K, Labuzek K, Okopien B. Fecal transplantation the future therapy?. Pol Merkur Lek 2015;39:73–6.

*Serbian* Suljagic V, Djordjevic D, Lazic S, Mijovic B. Epidemiological characteristics of nosocomial diarrhea caused by Clostridium difficile in a tertiary level hospital in Serbia. Srp Arh Celok Lek 2013;141:482–9.

*Slovakian* Sturdik I, Hlavaty T, Payer J. Fecal microbiota transplantation. Vnitr Lek 2016;62:147–51.

*Spanish* Garcia-Garcia-de-Paredes A, Rodriguez-de-Santiago E, Aguilera-Castro L, Ferre-Aracil C, Lopez-Sanroman A. Fecal microbiota transplantation. Gastroenterol Hepatol 2015;38:123–34.

*Spanish* Halabe Cherem J, Hoyo Ulloa I. Successful home-made fecal transplant for an elderly woman. Gac Med Mex 2014;150:106–7.

*Spanish* Hernandez-Rocha C, Pidal P, Ajenjo MC, Quera R, Quintanilla M, Lubascher J, et al. Chilean consensus of prevention, diagnosis and treatment of Clostridium difficile-associated diarrhea. Rev Chil Infectol 2016;33:98–118.

*Spanish* Montejano Sanchez R. Duodenal infusion of donor feces for recurrent Clostridium difficile. Rev Clin Esp. 2013;213:213.

*Spanish* Moscoso F, Simian D, Rivera D, Acuna G, Quera R. Fecal microbiota transplantation in recurrent Clostridium difficile infection. Report of one case. Rev Med Chil 2015;143:531–5.

*Spanish* Munez E, Ramos A, Banos I, Cuervas-Mons V. Fecal transplantation for the treatment of relapsing diarrhea associated with Clostridium difficile infection in a liver transplantation patient. Med Clin (Barc) 2016;146:e3-4.

*Spanish* Pareja-Sierra T. Diarrhea associated with Clostridium difficile in the elderly: new perspectives. Rev Esp Geriatr Gerontol 2014;49:188–93.

*Swiss* Giger A, Barberini L, Bruchez P, Castioni J, Claude F, Cosma Rochat M, et al. General internal medicine in hospital practice: the year 2013 put into perspective by residents. Rev Med Suisse 2014;10:164,166-170.

**D.1.6. Basic sciences:**

SciIhekweazu F, Fofanova T, Nagy-Szakal D, Hulten K, Queliza K, Opekun A, et al. Complex and defined bacteriotherapy can inhibit acute colitis in mice. J Pediatr Gastroenterol Nutr 2016;63:S277–8.

Grehan MJ, Borody TJ, Leis SM, Campbell J, Mitchell H, Wettstein A. Durable alteration of the colonic microbiota by the administration of donor fecal flora. J Clin Gastroenterol 2010;44:551–61.

Gu S, Chen Y, Zhang X, Lu H, Lv T, Shen P, et al. Identification of key taxa that favor intestinal colonization of Clostridium difficile in an adult Chinese population. Microbes Infect 2016;18:30–8.

Halpin AL, de Man TJ, Kraft CS, Perry KA, Chan AW, Lieu S, et al. Intestinal microbiome disruption in patients in a long-term acute care hospital: A case for development of microbiome disruption indices to improve infection prevention. Am J Infect Control 2016;44:830–6.

Hamilton MJ, Weingarden AR, Unno T, Khoruts A, Sadowsky MJ. High-throughput DNA sequence analysis reveals stable engraftment of gut microbiota following transplantation of previously frozen fecal bacteria. Gut Microbes 2013;4:125–35.

Hecker MT, Obrenovich ME, Cadnum JL, Jencson AL, Jain AK, Ho E, et al. Fecal microbiota transplantation by freeze-dried oral capsules for recurrent clostridium difficile infection. Open Forum Infect Dis 2016;3:ofw091.

Hevia A, Delgado S, Margolles A, Sanchez B. Application of density gradient for the isolation of the fecal microbial stool component and the potential use thereof. Sci Rep 2015;5:16807.

Jalanka J, Mattila E, Jouhten H, Hartman J, de Vos WM, Arkkila P, et al. Long-term effects on luminal and mucosal microbiota and commonly acquired taxa in faecal microbiota transplantation for recurrent Clostridium difficile infection. BMC Med 2016;14:155.

Khanna S, Montassier E, Patel R, Kammer PP, Knights D, Pardi D, et al. Gut microbiome signatures at the time of primary clostridium difficile infection predict recurrence. Gastroenterology 2016;148 [Suppl 1]:S23.

Khanna S, Montassier E, Schmidt B, Lynch D, Bernard C, Lekatz H, et al. Gut microbiota changes as predictors of treatment failure in primary clostridium difficile infection. Am J Gastroenterol 2015;110 [Suppl 1]:S578.

Khanna S, Vazquez-Baeza Y, Gonzalez A, Weiss S, Schmidt B, Muniz-Pedrogo D, et al. Changes in microbial ecology after fecal microbiota transplantation for recurrent C. Difficile infection depends on underlying inflammatory bowel disease. Am J Gastroenterol 2016;111 [Suppl 1]:S75.

Khoruts A, Dicksved J, Jansson JK, Sadowsky MJ. Changes in the composition of the human fecal microbiome after bacteriotherapy for recurrent Clostridium difficile-associated diarrhea. J Clin Gastroenterol 2010;44:354–60.

Kumar R, Maynard CL, Eipers P, Goldsmith KT, Ptacek T, Grubbs JA, et al. Colonization potential to reconstitute a microbe community in patients detected early after fecal microbe transplant for recurrent C. difficile. BMC Microbiol 2016;16:5.

Kumar V, Zhou E, Mansoor MS, Feuerstadt P. Treatment of initial recurrence of C. Difficile infection (CDI) with vancomycin may not prevent eventual need for fecal microbial transplantation (FMT). Am J Gastroenterol 2016;111 [Suppl ]:S93.

Landy J, Walker AW, Li J V, Al-Hassi HO, Ronde E, English NR, et al. Variable alterations of the microbiota, without metabolic or immunological change, following faecal microbiota transplantation in patients with chronic pouchitis. Sci Rep 2015;5:12955.

Li SS, Zhu A, Benes V, Costea PI, Hercog R, Hildebrand F, et al. Durable coexistence of donor and recipient strains after fecal microbiota transplantation. Science 2016;352:586–9.

Lichtman JS, Ferreyra JA, Ng KM, Smits SA, Sonnenburg JL, Elias JE. Host-microbiota interactions in the pathogenesis of antibiotic-associated diseases. Cell Rep 2016;14:1049–61.

Likotrafiti E, Manderson KS, Fava F, Tuohy KM, Gibson GR, Rastall RA. Molecular identification and anti-pathogenic activities of putative probiotic bacteria isolated from faeces of healthy elderly individuals. Microb Ecol Health Dis 2004;16:105–12.

Lofgren ET, Moehring RW, Anderson DJ, Weber DJ, Fefferman NH. A mathematical model to evaluate the routine use of fecal microbiota transplantation to prevent incident and recurrent Clostridium difficile infection. Infect Control Hosp Epidemiol 2014;35:18–27.

Low DE, Shahinas D, Silverman M, Sittler T, Chiu C, Kim P, et al. Toward an understanding of changes in diversity associated with fecal microbiome transplantation based on 16s rRNA gene deep sequencing. MBio 2012;3:5.

Luna R, Pitashny M, Runge J, Shang Y, Hollister E, Nagy-Szakal D, et al. Microbiome characterization as a diagnostic tool in fecal microbiome transplantation. J Mol Diagnostics 2013;15:874–5.

Millan B, Hotte N, Mathieu O, Burguiere P, Tompkins TA, Kao D, et al. Effects of fecal microbial transplantation on the gut resistome in patients with recurrent Clostridium difficile infection. Gastroenterology 2015;148 [Suppl]:S120.

Millan B, Park H, Hotte N, Fedorak R, Kao D, Madsen K. Antibiotics and bowel preparation enhance the ability of fecal microbial transplantation to reshape the gut microbiota in IL-10-/- mice. In: Meeting Abstracts. Program and Abstracts from the Canadian Digestive Diseases Week 2016. Can J Gastroenterol Hepatol 2016:A258.

Millan B, Park H, Hotte N, Mathieu O, Burguiere P, Tompkins TA, et al. Fecal Microbial Transplants Reduce Antibiotic-resistant Genes in Patients with Recurrent Clostridium difficile Infection. Clin Infect Dis 2016;62:1479–86.

Moelling K, Broecker F. Fecal microbiota transplantation to fight Clostridium difficile infections and other intestinal diseases. Bacteriophage 2016;6: e1251380.

Murdoch DA, Gibbs S, Price CGA, Easmon S, Franklin J, Lister TA, et al. Effect of ceftazidime and gentamicin on the oropharyngeal and faecal flora of patients with haematological malignancies. J Antimicrob Chemother 1990;26:419–28.

Nord CE, Kager L, Philipson A, Stiernstedt G. Impact of imipenem/cilastatin therapy on faecal flora. Eur J Clin Microbiol 1984;3:475–7.

Peer X, An G. Agent-based model of fecal microbial transplant effect on bile acid metabolism on suppressing clostridium difficile infection: An example of agent-based modeling of intestinal bacterial infection. J Pharmacokinet Pharmacodyn 2014;41:493–507.

Schenck LP, Hirota S, Armstrong G, MacDonald J, Beck P. Investigating the effect of antibiotics on gut microbiota components and subsequent Clostridium difficile infection. FASEB 2014;28 [Suppl 1]:LB516.

Schenck LP, Hirota SA, Armstrong GD, MacDonald JA, Beck PL. Elucidating intestinal microbiota components that play a protective or deleterious role during clostridium difficile infections. Gastroenterology 2013;144 [Suppl 1]:S185.

Seekatz AM, Aas J, Gessert CE, Rubin TA, Saman DM, Bakken JS, et al. Recovery of the gut microbiome following fecal microbiota transplantation. MBio 2014;5:e00893-14.

Seekatz AM, Rao K, Santhosh K, Young VB. Dynamics of the fecal microbiome in patients with recurrent and nonrecurrent Clostridium difficile infection. Genome Med 2016;8:47.

Seekatz AM, Theriot CM, Molloy CT, Wozniak KL, Bergin IL, Young VB. Fecal microbiota transplantation eliminates Clostridium difficile in a murine model of relapsing disease. Infect Immun 2015;83:3838–46.

Shanahan F. Separating the microbiome from the hyperbolome. Genome Med 2015;7:17.

Shankar V, Hamilton MJ, Khoruts A, Kilburn A, Unno T, Paliy O, et al. Species and genus level resolution analysis of gut microbiota in Clostridium difficile patients following fecal microbiota transplantation. Microbiome 2014;2:13.

Soma G, Inagawa H. Methods to Prevent or Treat Refractory Diseases by Focusing on Intestinal Microbes Using LPS and Macrophages. Anticancer Res 2015;35:4393–6.

Song Y, Garg S, Girotra M, Maddox C, Von Rosenvinge EC, Dutta A, et al. Microbiota dynamics in patients treated with fecal microbiota transplantation for recurrent Clostridium difficile infection. PLoS One. 2013;8:e81330.

Spinler JK, Brown A, Ross CL, Boonma P, Conner ME, Savidge TC. Administration of probiotic kefir to mice with Clostridium difficile infection exacerbates disease. Anaerobe. 2016;40:54–7.

Tian Z, Liu J, Liao M, Li W, Zou J, Han X, et al. Beneficial effects of fecal microbiota transplantation on ulcerative colitis in mice. Dig Dis Sci 2016;61:2262–71.

Vermeire S, Joossens M, Verbeke K, Wang J, Machiels K, Sabino J, et al. Donor species richness determines faecal microbiota transplantation success in inflammatory bowel disease. J Crohns Colitis 2016;10:387–94.

Villafuerte-Galvez JA, Patel IJ, Xu H, Yang X, Chen X, Kelly CP. Elevated serum IL-27 concentrations predict adverse outcomes in Clostridium difficile associated diarrhea. Gastroenterology 2014;146 [Suppl 1]:S253–4.

Weingarden A, Gonzalez A, Vazquez-Baeza Y, Weiss S, Humphry G, Berg-Lyons D, et al. Dynamic changes in short- and long-term bacterial composition following fecal microbiota transplantation for recurrent Clostridium difficile infection. Microbiome 2015;3:10.

Weingarden AR, Chen C, Bobr A, Yao D, Lu Y, Nelson VM, et al. Microbiota transplantation restores normal fecal bile acid composition in recurrent Clostridium difficile infection. AJP Gastrointest Liver Physiol 2014;306:G310–9.

Weingarden AR, Chen C, Zhang N, Graiziger CT, Dosa PI, Steer CJ, et al. Ursodeoxycholic acid inhibits Clostridium difficile spore germination and vegetative growth, and prevents the recurrence of ileal pouchitis associated with the infection. J Clin Gastroenterol 2016;50:624–30.

Weingarden AR, Dosa PI, DeWinter E, Steer CJ, Shaughnessy MK, Johnson JR, et al. Changes in colonic bile acid composition following fecal microbiota transplantation are sufficient to control Clostridium difficile germination and growth. PLoS One 2016;11:e0147210.

Weingarden AR, Hamilton MJ, Sadowsky MJ, Khoruts A. Resolution of severe Clostridium difficile infection following sequential fecal microbiota transplantation. J Clin Gastroenterol 2013;47:735–7.

**D.1.7. Narrative reviews**

Actis GC. The gut microbiome. Inflamm Allergy - Drug Targets 2014;13:217–23.

Adamu BO, Lawley TD. Bacteriotherapy for the treatment of intestinal dysbiosis caused by Clostridium difficile infection. Curr Opin Microbiol 2013;16:596–601.

Agito MD, Atreja A, Rizk MK. Fecal microbiota transplantation for recurrent C difficile infection: Ready for prime time? Cleve Clin J Med 2013;80:101–8.

Allegretti JR, Hamilton MJ, J.R. A, M.J. H, Allegretti JR, Hamilton MJ. Restoring the gut microbiome for the treatment of inflammatory bowel diseases. World J Gastroenterol 2014;20:3468–74.

Allegretti JR, Korzenik JR, Hamilton MJ. Fecal microbiota transplantation via colonoscopy for recurrent C. difficile infection. J Vis Exp 2014;(94).

Allegretti JR, Phelps E, Xu H, Kassam Z, Fischer M. Redefining cure in clostridium difficile infection: Clinical assessment 4 weeks after fecal microbiota transplantation is predictive of standard 8-week cure endpoint. Am J Gastroenterol 2016;111 [Suppl 1]:S56.

Allen-Vercoe E, Petrof EO. Artificial stool transplantation: Progress towards a safer, more effective and acceptable alternative. Expert Rev Gastroenterol Hepatol 2013;7:291–3.

Allen-Vercoe E, Reid G, Viner N, Gloor GB, Hota S, Kim P, et al. A Canadian Working Group report on fecal microbial therapy: microbial ecosystems therapeutics. Can J Gastroenterol 2012;26:457–62.

Almeida R, Gerbaba T, Petrof EO. Recurrent Clostridium difficile infection and the microbiome. J Gastroenterol 2016;51:1–10.

Amirtha T. Microbiome research. Banking on stool despite an uncertain future. Science 2016;352:1261–2.

Anand R, Girotra M, Garg S, Dutta S. Safety and efficacy of fecal microbiota transplantation (FMT) for recurrent Clostridium difficile infection (RCDI) in septuagenarians, octogenarians, and nonegenarians: A single-center experience. Am J Gastroenterol 2014;109 [Suppl 1]:S195.

Anderson JL, Edney RJ, Whelan K. Systematic review: Faecal microbiota transplantation in the management of inflammatory bowel disease. Aliment Pharmacol Ther 2012;36:503–16.

Anonymous. Donor faeces for recurrent Clostridium difficile diarrhoea? BMJ 2013;346:f376.

Anonymous. Faecal microbiota transplantation. Drug Ther Bull 2014;52:141–4.

Anonymous. Fecal microbiota therapy for Clostridium difficile infection: A health technology assessment. Ont Health Technol Assess Ser. 2016;16:17.

Anonymous. Fecal microbiota transplantation for treating recurrent Clostridium difficile infection. OR Manager 2012;28:15–8.

Anonymous. Fecal microbiota transplantation for treating recurrent Clostridium difficile infection. Manag Care 2013;22:18–9.

Anonymous. Fecal microbiota transplantation for treatment of recurrent C. difficile infection. Clin Privil White Pap 2013;:1–15.

Anonymous. Fecal microbiota transplantation: Where is it leading? Gastroenterol Hepatol 2014;10:307–9.

Anonymous. Infection: FMT: a safe treatment for Clostridium difficile infection in immunocompromised patients. Nat Rev Gastroenterol Hepatol 2014;11:454.

Anonymous. More on faecal microbiota transplantation Drug Ther Bull 2015;53:76–7.

Anonymous. Novel therapy for C. difficile infections. Infusions of donated feces may help those with recurrent infections. Harv Health Lett 2011;36:7.

Anonymous. Probiotics are beneficial in Clostridium difficile infection: Healthy microbiota by probiotics or fecal transplantation prevent diarrhea. Pharm Weekbl Wet Platf 2014;149:10.

Anonymous. Solving a C.difficile problem. If antibiotics fail, a stool transplant can help cure a severe infection. Johns Hopkins Med Lett Health After 50 2014;25:3.

Anonymous. Therapy: FMT effective in patients with severe and/or complicated CDI Nat Rev Gastroenterol Hepatol 2015;21.

Anonymous. Treat Clostridium difficile infection based on its severity and number of previous episodes. Drugs Ther Perspect 2012;28:10–3.

Anonymous. SAGES clinical guidelines for Faecal Microbiota Transplantation (FMT), August 2015. https://www.sages.co.za/content/images/FMT\_guidelines\_(003).pdf [Accessed 20th July 2018].

Antonopoulos DA, Chang EB. Transplanting a microbial organ: The good, the bad, and the unknown. MBio 2016;7:e00572-16.

Apostolescu C, Moroti R, Molagic V, Gheorghite V, Telepan D, Popoiu M, et al. Gut microbiota and its complex role. The experience of the national institute for infectious diseases ‘Prof. Dr. Matei Bals’ in fecal bacteriotherapy for Clostridium difficile infection. BMC Infect Dis 2013;13 [Suppl 1]:O19

Aroniadis OC, Brandt LJ, Greenberg A, Borody TJ, Kelly C, Mellow M, et al. Long-term follow-up study of fecal microbiota transplantation (FMT) for severe or complicated clostridium difficile infection (CDI). Gastroenterology 2013 [Suppl 1];144:S185.

Aroniadis OC, Brandt LJ. Fecal microbiota transplantation: past, present and future. Curr Opin Gastroenterol 2013;29:79–84.

Aroniadis OC, Brandt LJ. Intestinal microbiota and the efficacy of fecal microbiota transplantation in gastrointestinal disease. Gastroenterol Hepatol 2014;10:230–7.

Austin M, Mellow M, Tierney WM. Fecal microbiota transplantation in the treatment of Clostridium difficile infections. Am J Med 2014;127:479–83.

Avery L, Hasan M. Fecal bacteriotherapy for Clostridium difficile infections - its time has come. Clin Microbiol Newsl 2013;35:119–24.

Badger VO, Ledeboer NA, Graham MB, Edmiston CE. Clostridium difficile: Epidemiology, pathogenesis, management, and prevention of a recalcitrant healthcare-associated pathogen. J Parenter Enter Nutr 2012;36:645–62.

Bafeta A, Yavchitz A, Riveros C, Batista R, Ravaud P. Methods and reporting studies assessing fecal microbiota transplantation: A systematic review. Ann Intern Med 2017;167:34-9.

Bagdasarian N, Rao K, Malani PN. Diagnosis and treatment of Clostridium difficile in adults: A systematic review. JAMA 2015;313:398-408.

Bakken JS. Fecal bacteriotherapy for recurrent Clostridium difficile infection. Anaerobe 2009;15:285–9.

Bakken JS. Feces transplantation for recurrent Clostridium difficile infection: US experience and recommendations. Microb Ecol Heal Dis 2015;26:27657.

Bakken JS. Staggered and tapered antibiotic withdrawal with administration of kefir for recurrent Clostridium difficile infection. Clin Infect Dis 2014;59:858–61.

Bakken JS, Borody T, Brandt LJ, Brill JV, Demarco DC, Franzos MA, et al. Treating Clostridium difficile Infection With Fecal Microbiota Transplantation. Clin Gastroenterol Hepatol 2011 Dec;9:1044-9.

Balzola F, Cullen G, Ho GT, Russell R. Fecal microbiota transplantation: Indication, methods, evidence and further directions: Commentary. Inflamm Bowel Dis Monit 2014;14:56–7.

Barbut F, Collignon A, Butel MJ, Bourlioux P. Fecal microbiota transplantation: Review. Ann Pharm Fr 2015;73:13–21.

Barbut F, Guery B, Eckert C. How to treat Clostridium difficile infections in 2014?. Reanimation 2014;23:284–97.

Barbut F. Alleviating the burden of CDI: Current and emerging treatment options. Int J Antimicrob Agents 2013;42:S11.

Barnes D, Park KT. Donor considerations in fecal microbiota transplantation. Current Gastroenterology Reports. 2017;19:10.

Baron TH, Kozarek RA. Fecal microbiota transplant: We know its history, but can we predict its future? Mayo Clin Proc 2013;88:782–5.

Bartnicka A, Szachta P, Galecka M. Faecal microbiota transplant - prospects and safety. Pomeranian J life Sci 2015;61:282–6.

Batista R, Kapel N, Megerlin F, Chaumeil JC, Barbut F, Bourlioux P, et al. Fecal microbiota transplantation in recurrent Clostridium difficile infections. Framework and pharmaceutical preparation aspects. Ann Pharm Fr 2015;73:323–31.

Bauer MP, van Dissel JT. Alternative strategies for Clostridium difficile infection. Int J Antimicrob Agents 2009;33 [Suppl 1]:S51–6.

Baxter M, Colville A. Adverse events in faecal microbiota transplant: a review of the literature. J Hosp Infect 2016;92:117–27.

Benes J, Husa P, Nyc O, Polivkova S. Diagnosis and therapy of Clostridium difficile infection: Czech national guidelines. Klin Mikrobiol Infekc Lek 2014;20:56–66.

Benes J, Husa P, Nyc O. Recommendations for diagnosis and therapy of colitis caused by Clostridium difficile. Klin Mikrobiol Infekc Lek 2012;18:160–7.

Berg AM, Farraye FA. Duodenal infusion of stool is more effective than vancomycin in patients with recurrent Clostridium difficile. Evid Based Med 2013;18:220–1.

Berg D, Clemente JC, Colombel JF. Can inflammatory bowel disease be permanently treated with short-term interventions on the microbiome? Expert Rev Gastroenterol Hepatol 2015;9:781–95.

Biehl L. Fecal microbiota transfer. Transfusion Medicine and Hemotherapy 2017;44 [Suppl 1]:22.

Biltaji E, Varier R, Smith K, Roberts M, Lafleur J, Nelson RE. Cost-effectiveness analysis of treatment strategies for initial Clostridium difficile infection. Value Heal 2014;17:A38.

Blackburn LM, Bales A, Caldwell M, Cordell L, Hamilton S, Kreider H. Fecal microbiota transplantation in patients with cancer undergoing treatment. Clin J Oncol Nurs 2015;19:111–4.

Bloukh SI. Clostridium difficile infection: An overview of the disease and its pathogenesis, diagnosis, treatment, prevention and management. Res J Pharm Biol Chem Sci 2013;4:1219–32.

Bojanova DP, Bordenstein SR. Fecal Transplants: What Is Being Transferred? PLoS Biol 2016;14:e1002503.

Bookstaver PB, Ahmed Y, Millisor VE, Siddiqui W, Albrecht H. Clostridium difficile: case report and concise review of fecal microbiota transplantation. J S C Med Assoc 2013;109:62–6.

Borgia G, Maraolo AE, Foggia M, Buonomo AR, Gentile I. Fecal microbiota transplantation for Clostridium difficile infection: Back to the future. Expert Opin Biol Ther 2015;15:1001–14.

Borody T, Fischer M, Mitchell S, Campbell J. Fecal microbiota transplantation in gastrointestinal disease: 2015 update and the road ahead. Expert Rev Gastroenterol Hepatol 2015;9:1379–91.

Borody T, Torres M, Campbell J, Leis S, Nowak A. Reversal of inflammatory bowel disease (IBD) with recurrent faecal microbiota transplants (FMT). Am J Gastroenterol 2011;106:S366.

Borody T, Wettstein A, Campbell J, Leis S, Torres M, Finlayson S, et al. Fecal microbiota transplantation in ulcerative colitis: Review of 24 years experience. Am J Gastroenterol 2012;107 [Suppl 1]:S665.

Borody TJ, Brandt LJ, Paramsothy S, Agrawal G. Fecal microbiota transplantation: A new standard treatment option for Clostridium difficile infection. Expert Rev Anti Infect Ther 2013;11:447–9.

Borody TJ, Brandt LJ, Paramsothy S. Therapeutic faecal microbiota transplantation: Current status and future developments. Curr Opin Gastroenterol 2014;30:97–105.

Borody TJ, Campbell J. Fecal microbiota transplantation: Current status and future directions. Expert Rev Gastroenterol Hepatol 2011;5:653–5.

Borody TJ, Campbell J. Fecal microbiota transplantation. Techniques, applications, and issues. Gastroenterol Clin North Am 2012;41:781–803.

Borody TJ, Connelly N, Mitchell SW. Fecal microbiota transplantation in gastrointestinal diseases: What practicing physicians should know. Pol Arch Med Wewn 2015;125:852–8.

Borody TJ, Finlayson S, Paramsothy S. Is Crohn’s disease ready for fecal Microbiota transplantation? J Clin Gastroenterol 2014;48:582–3.

Borody TJ, Finlayson S. Fecal microbiota transplantation for Clostridium difficile infection: A surgeon’s perspective. Semin Colon Rectal Surg 2014;25:163–6.

Borody TJ, Khoruts A. Fecal microbiota transplantation and emerging applications. Nat Rev Gastroenterol Hepatol 2011;9:88–96.

Borody TJ, Paramsothy S, Agrawal G. Fecal microbiota transplantation: Indications, methods, evidence, and future directions. Curr Gastroenterol Rep 2013;15:1–7.

Borody TJ, Peattie D, Kapur A. Could fecal microbiota transplantation cure all Clostridium difficile infections? Future Microbiol 2014;9:1–3.

Borody TJ, Peattie D, Mitchell SW. Fecal microbiota transplantation: Expanding horizons for Clostridium difficile infections and beyond. Antibiotics 2015;4:254–66.

Borody TJ, Warren EF, Leis SM, Surace R, Ashman O, Siarakas S. Bacteriotherapy using fecal flora: toying with human motions. J Clin Gastroenterol 2004;38:475–83.

Bourlioux P, workgroup of the French Academy of P. Faecal microbiota transplantation: Key points to consider. Ann Pharm Fr 2015;73:163–8.

Bourlioux P. Faecal microbiota transplantation: Key points to consider. Ann Pharm Fr 2015;73:163–8.

Bowman KA, Broussard EK, Surawicz CM. Fecal microbiota transplantation: Current clinical efficacy and future prospects. Clin Exp Gastroenterol 2015;8:285–91.

Boyle ML, Ruth-Sahd LA, Zhou Z. Fecal microbiota transplant to treat recurrent Clostridium difficile infections. Crit Care Nurse 2015;35:51–64, 65.

Brandt LJ, Aroniadis OC. An overview of fecal microbiota transplantation: Techniques, indications, and outcomes. Gastrointest Endosc 2013;78:240–9.

Brandt LJ, Borody TJ, Campbell J. Endoscopic fecal microbiota transplantation: “First-line” treatment for severe clostridium difficile infection? J Clin Gastroenterol 2011;45:655–7.

Brandt LJ, Reddy SS. Fecal microbiota transplantation for recurrent Clostridium difficile infection. J Clin Gastroenterol 2011;45 [Suppl 3]:S159–67.

Brandt LJ. Fecal microbiota transplant Respice, Adspice, Prospice. J Clin Gastroenterol 2015;49:S65–8.

Brandt LJ. Fecal transplantation for the treatment of Clostridium difficile infection. Gastroenterol Hepatol 2012;8:191–4.

Brandt LJ. FMT: First step in a long journey. Am J Gastroenterol 2013;108:1367–8.

Brezina J, Bajer L, Spicak J, Draatich P. Faecal microbial transplantation in inflammatory bowel disease. Gastroenterol a Hepatol 2016;70:51–6.

Bridges E, McNeill M, Munro N. Research in review: Driving critical care practice change. Am J Crit Care 2016;25:76–84.

Broecker F, Klumpp J, Moelling K. Long-term microbiota and virome in a Zurich patient after fecal transplantation against Clostridium difficile infection. Ann New York Acad Sci. 2016;1372:29-41.

Brown WR. Fecal microbiota transplantation in treating Clostridium difficile infection. J Dig Dis 2014;15:405–8.

Burke KE, Lamont JT. Fecal transplantation for recurrent Clostridium difficile infection in older adults: A review. J Am Geriatr Soc 2013;61:1394–8.

Burton HE, Mitchell SA, Watt M. The cost effectiveness of treatments for Clostridium difficile infection: A systematic review. Value in Health 2016;19:A218

Cammarota G, Ianiro G, Bibbo S, Gasbarrini A. Fecal microbiota transplantation a new old kid on the block for the management of gut microbiota-related disease. J Clin Gastroenterol 2014;48:S80–4.

Cammarota G, Ianiro G, Bibbo S, Gasbarrini A. Gut microbiota modulation: probiotics, antibiotics or fecal microbiota transplantation? Intern Emerg Med 2014;9:365–73.

Cammarota, G.; Ianiro, G.; Gasbarrini, A. Fecal microbiota transplantation for the treatment of Clostridium difficile infection: A systematic review. J Clin Gastroenterol 2014;48:693-702.

Cammarota G, Ianiro G, Tilg H, Rajilic-Stojanovic M, Kump P, Satokari R, et al. European consensus conference on faecal microbiota transplantation in clinical practice. Gut 2017;66:569-80.

Carlucci C, Petrof EO, Allen-Vercoe E. Fecal Microbiota-based Therapeutics for recurrent Clostridium difficile infection, ulcerative colitis and obesity. EBioMedicine 2016;13:37–45.

Carstensen JW, Hansen AK. Faecal transplantation as a treatment for Clostridium difficile infection, ulcerative colitis and the metabolic syndrome. Ugeskr Laeger 2014;176:17.

Chapman BC, Moore HB, Overbey DM, Morton AP, Harnke B, Gerich ME, et al. Fecal microbiota transplant in patients with Clostridium difficile infection: A systematic review. J Trauma Acute Care Surg 2016;81:756-64

Chen B, Avinashi V, Dobson S. Fecal microbiota transplantation for recurrent Clostridium difficile infection in children. Journal Infect 2017;74:S120-S7.

Choi HH, Cho YS. Fecal Microbiota Transplantation: Current Applications, Effectiveness, and Future Perspectives. Clin Endosc 2016;49:257–65.

Cohen NA, Ami RB, Guzner-Gur H, Santo ME, Halpern Z, Maharshak N. Fecal microbiota transplantation for Clostridium difficile-associated diarrhea. Isr Med Assoc J 2015;17:510–4.

Cramer JP. Infusion of donor feces in recurrent Clostridium difficile infection? - Infusion of donor feces: Promising intervention with several question marks. Dtsch Medizinische Wochenschrift 2013;138:566.

Crow JR, Davis SL, Chaykosky DM, Smith TT, Smith JM. Probiotics and fecal microbiota transplant for primary and secondary prevention of Clostridium difficile infection. Pharmacotherapy 2015;35:1016–25.

Crum-Cianflone NF, Sullivan E, Ballon-Landa G. Fecal microbiota transplantation and successful resolution of multidrug-resistant-organism colonization. J Clin Microbiol 2015;53:1986–9.

Cui BT, Wang M, Ji GZ, Fan ZN, Zhang FM. Fecal microbiota transplantation: From the 4th century to 2013. World Chinese J Dig 2013;21:3222–9.

Dai C, Jiang M, Sun MJ. Fecal microbiota transplantation for treatment of Clostridium difficile infection. J Clin Gastroenterol 2015;49:171–2.

Dai T, Tang T. Research progress of fecal microbiota transplantation. Zhonghua Weichang Waike Zazhi 2015;18:733–7.

Dakhoul L, Parikh K, Berkelhammer C. Fecal microbiota transplant in treatment of Clostridium difficile colitis-pooled data analysis and a systematic review. Gastroenterology 2015;146 [Suppl 1]:S404.

Daloiso V, Minacori R, Refolo P, Sacchini D, Craxi L, Gasbarrini A, et al. Ethical aspects of fecal microbiota transplantation (FMT). Eur Rev Med Pharmacol Sci 2015;19:3173–80.

Damman CJ, Miller SI, Surawicz CM, Zisman TL. The microbiome and inflammatory bowel disease: is there a therapeutic role for fecal microbiota transplantation? Am J Gastroenterol 2012;107:1452–9.

Davidovics ZH, Hyams JS. Fecal transplantation: Re-discovering the value of stool. Curr Opin Pediatr 2013;25:618–23.

Davidovics ZH, Sylvester FA. Medical stool: The future of treatment for inflammatory bowel disease? J Pediatr Gastroenterol Nutr 2013;56:583.

De Vos WM. Fame and future of faecal transplantations - developing next-generation therapies with synthetic microbiomes. Microb Biotechnol 2013;6:316–25.

Debast SB, Bauer MP, Kuijper EJ, Allerberger F, Bouza E, Coia JE, et al. European Cociety of Clinical Microbiology and Infectious Diseases: Update of the treatment guidance document for Clostridium difficile infection Clinical Microbiology and Infection 2014;20:1-26.

Di Bella S, Drapeau C, Garcia-Almodovar E, Petrosillo N. Fecal microbiota transplantation: the state of the art. Infect Dis Rep 2013;5:e13.

Di Bella S, Gouliouris T, Petrosillo N. Fecal microbiota transplantation (FMT) for Clostridium difficile infection: Focus on immunocompromised patients. J Infect Chemother 2015;21:230–7.

Dickinson B, Surawicz CM. Infectious Diarrhea: An Overview. Curr Gastroenterol Rep 2014;16.

Dickson I. Therapy: Sterile faecal transfer for C. difficile infection. Nat Rev Gastroenterol Hepatol 2017;14:4.

Dodin, M.; Katz, D. E.. Faecal microbiota transplantation for Clostridium difficile infection. Int J Clin Practice 2014;68:363-8.

Dougherty T, Taneja S, Borum ML. More than just Clostridium difficile infection: The potential role of fecal microbiota transplantation in patients with inflammatory bowel disease. Am J Gastroenterol 2016;111 [Suppl 1]:S833.

Drekonja D, Reich J, Gezahegn S, Greer N, Shaukat A, MacDonald R, et al. Fecal microbiota transplantation for Clostridium difficile infection a systematic review. Ann Intern Med 2015;162:630-8.

Edelstein CA, Kassam Z, Daw J, Smith MB, Kelly CR. The regulation of fecal microbiota for transplantation: An international perspective for policy and public health. Clin Res Regul Aff 2015;32:99–107.

Edmond MB. The power of poop: Fecal microbiota transplantation for Clostridium difficile infection. Trans Am Clin Climatol Assoc 2016;127:71–80.

El-Matary W, Simpson R, Ricketts-Burns N. Fecal microbiota transplantation: Are we opening a can of worms? Gastroenterology 2012;143:e19.

El-Matary W. Fecal microbiota transplantation: Long-term safety issues. Am J Gastroenterol 2013;108:1537–8.

Elopre L, Rodriguez M. Fecal microbiota therapy for recurrent Clostridium difficile infection in HIV-infected persons. Ann Intern Med 2013;158:779–80.

Esposito S, Umbrello G, Castellazzi L, Principi N. Treatment of Clostridium difficile infection in pediatric patients. Expert Rev Gastroenterol Hepatol 2015;9:747–55.

Ettinger G, Burton JP, Reid G. If microbial ecosystem therapy can change your life, what’s the problem? BioEssays 2013;35:508–12.

Evrensel A, Ceylan ME. Fecal microbiota transplantation and its usage in neuropsychiatric disorders. Clin Psychopharmacol Neurosci 2016;14:231–7.

Famularo G, Trinchieri V, De Simone C. Fecal bacteriotherapy or probiotics for the treatment of intestinal diseases? Am J Gastroenterol 2001;96:2262–4.

Ferre Aracil C, Aguilera Castro L, Rodriguez de Santiago E, Garcia Garcia de Paredes A, Lopez San Roman A. Fecal microbiota transplantation - something more than merely a therapeutic curiosity. Rev Esp Enfermedades Dig 2015;107:19.

Floch MH. Editorial: Fecal bacteriotherapy, fecal transplant, and the microbiome. J Clin Gastroenterol 2010;44:529–30.

Floch MH. The power of poop: Probiotics and fecal microbial transplant. J Clin Gastroenterol 2012;46:625–6.

Friedman-Moraco RJ, Mehta AK, Lyon GM, Kraft CS. Fecal microbiota transplantation for refractory Clostridium difficile colitis in solid organ transplant recipients. Am J Transplant 2014;14:477–80.

Fu N, Wong T. Clostridium difficile Infection in Patients with Inflammatory Bowel Disease. Curr Infect Dis Rep. 2016;18:19.

Fuentes S, de Vos WM. How to manipulate the microbiota: fecal microbiota transplantation. Adv Exp Med Biol 2016;902:143–53.

Fuessl HS. Fecal microbiota transplantation helps in Clostridium difficile colitis: Commentary. MMW-Fortschritte der Medizin 2012;154:38.

Fumery M, Corcos O, Kapel N, Stefanescu C, Thomas M, Joly F. Interest and techniques of fecal transplantation. J des Anti-Infectieux 2013;15:187–92.

Furuya-Kanamori L, Doi SAR, Paterson DL, Helms SK, Yakob L, McKenzie SJ, et al. Upper versus lower gastrointestinal delivery for transplantation of fecal microbiota in recurrent or refractory Clostridium difficile infection: A collaborative analysis of individual patient data from 14 studies. J Clin Gastroenterol 2017;51:145-50.

Gallo A, Passaro G, Gasbarrini A, Landolfi R, Montalto M. Modulation of microbiota as treatment for intestinal inflammatory disorders: An uptodate. World J Gastroenterol. 2016;22:7186–202.

Garcia-Garcia-de-Paredes A, Rodriguez-de-Santiago E, Aguilera-Castro L, Ferre-Aracil C, Lopez-Sanroman A. Fecal microbiota transplantation. Gastroenterol Hepatol 2015;38:123–34.

Gens KD, Elshaboury RH, Holt JS. Fecal microbiota transplantation and emerging treatments for Clostridium difficile infection. J Pharm Pract 2013;26:498–505.

Gianotti RJ, Moss AC. The use and efficacy of fecal microbiota transplantation for refractory Clostridium difficile in patients with inflammatory bowel disease. Inflamm Bowel Dis 2016;22:2704–10.

Giordani A, Bove V, Cianchi D. Nursing skills for management of fecal microbiota transplantation in pediatric patient with clostridium difficile infection. Transpl Int 2015;28:427.

Goldberg EJ, Bhalodia S, Jacob S, Patel H, Trinh K V, Varghese B, et al. Clostridium difficile infection: A brief update on emerging therapies. Am J Heal Pharm 2015;72:1007–12.

Goldenberg SD. Faecal microbiota transplantation for recurrent Clostridium difficile infection and beyond: Risks and regulation. J Hosp Infect 2016;92:115–6.

Gough E, Shaikh H, Manges AR. Systematic review of intestinal microbiota transplantation (fecal bacteriotherapy) for recurrent Clostridium difficile infection. Clin Infect Dis 2011;53:994–1002.

Grady NG, Petrof EO, Claud EC. Microbial therapeutic interventions. Semin Fetal Neonatal Med 2016;21:418–23.

Granitto MH, Norton CK. Fecal microbiota transplantation in recurrent C. difficile infection. Nurs Crit Care 2016;11:25–30.

Grinspan AM, Kelly CR. Fecal microbiota transplantation for ulcerative colitis: Not just yet. Gastroenterology 2015;149:15–8.

Groen AK, Nieuwdorp M. An evaluation of the therapeutic potential of fecal microbiota transplantation to treat infectious and metabolic diseases. EMBO Mol Med 2017;9:1–3.

Gross M, Meyer C. Stool transplantation for relapsing Cl. difficile colitis. Z Gastroenterol 2013;51:1441–3.

Guo WT, Dong LN, Wang JP, Liu P. New advances in clinical application of fecal microbiota transplantation. World Chinese J Dig 2014;22:4593–8.

Guo WT, Wang JP, Liu P, Dong LN. New advances in clinical application of fecal microbiota transplantation. J Dig Dis 2014;15:118–9.

Guo B, Harstall C,Louie T, Veldhuyzen van Zanten S, Dieleman LA. Systematic review: faecal transplantation for the treatment of *Clostridium difficile*-associated disease. Aliment Pharmacol Ther 2012;35:865-75.

Gupta S, Allen-Vercoe E, Petrof EO. Fecal microbiota transplantation: In perspective. Therap Adv Gastroenterol 2016;9:229–39.

Gutierrez-Delgado EM, Garza-Gonzalez E, Martinez-Vazquez MA, Gonzalez-Gonzalez JA, Maldonado-Garza HJ, Mendoza-Olazaran S, et al.Acta Gastro-Enterologica Belgica 2016;79:268-70.

Hammad TA, Khan MA, Srour K, Abdelfattah T, Alastal Y, Lee WM, et al. Efficacy and safety of oral, capsulized, frozen fecal microbiota transplantation for recurrent Clostridium difficile infection. A systematic review and meta-analysis. Gastroenterology. 2017;152 [Suppl 1]:S346.

Han S, Shannahan S, Pellish R. Fecal microbiota transplant: Treatment options for Clostridium difficile infection in the intensive care unit. J Intensive Care Med 2016;31:577–86.

Hashash JG, Binion DG. Managing Clostridium difficile in Inflammatory Bowel Disease (IBD). Curr Gastroenterol Rep 2014;16:393.

Health Quality, Ontario Fecal Microbiota Therapy for Clostridium difficile Infection: A Health Technology Assessment.

Hebbard AI, Slavin MA, Reed C, Teh BW, Thursky KA, Trubiano JA, et al. The epidemiology of Clostridium difficile infection in patients with cancer. Expert Rev Antiinfective Ther 2016;14:1077–85.

Hebbard AIT, Slavin MA, Reed C, Teh BW, Thursky KA, Trubiano JA, et al. The epidemiology of Clostridium difficile infection in patients with cancer. Expert Rev Anti Infect Ther 2016;14:1077–85.

Holmes E, Wijeyesekera A, Taylor-Robinson SD, Nicholson JK. The promise of metabolic phenotyping in gastroenterology and hepatology. Nat Rev Gastroenterol Hepatol 2015;12:458–71.

Honda H, Dubberke ER. Clostridium difficile infection in solid organ transplant recipients. Curr Opin Infect Dis 2014;27:336–41.

Honda H, Dubberke ER. The changing epidemiology of Clostridium difficile infection. Curr Opin Gastroenterol 2014;30:54–62.

Hookman P, Barkin JS. Clostridium difficile associated infection, diarrhea and colitis. World J Gastroenterol 2009;15:1554–80.

Hourigan SK, Oliva-Hemker M. Fecal microbiota transplantation in children: A brief review. Pediatr Res 2016;80:2–6.

Hryckowian AJ, Pruss KM, Sonnenburg JL. The emerging metabolic view of Clostridium difficile pathogenesis. Curr Opin Microbiol 2017;35:42–7.

Hryckowian AJ, Pruss KM, Sonnenburg JL. The emerging metabolic view of Clostridium difficile pathogenesis. Curr Opin Microbiol 2016;35:42–7.

Hudson LE, Anderson SE, Corbett AH, Lamb TJ. gleaning insights from fecal microbiota transplantation and probiotic studies for the rational design of combination microbial therapies. Clin Microbiol Rev 2017;30:191-231.

Hudson LE, Anderson SE, Corbett AH, Lamb TJ. Gleaning insights from fecal microbiota transplantation and probiotic studies for the rational design of combination microbial therapies. Clin Microbiol Rev 2017;30:191–231.

Huebner ES, Surawicz CM. Treatment of recurrent Clostridium difficile diarrhea. Gastroenterol Hepatol 2006;2:203–8.

Hur KY, Lee MS. Gut microbiota and metabolic disorders. Diabetes Metab J 2015;39:198–203.

Hussack G, Tanha J. An update on antibody-based immunotherapies for Clostridium difficile infection. Clin Exp Gastroenterol 2016;9:209–24.

Ianiro G, Bibbò S, Gasbarrini A, Cammarota G. Therapeutic Modulation of Gut Microbiota: Current Clinical Applications and Future Perspectives. Curr Drug Targets 2014 31;15:762–70.

Ianiro G, Bibbò S, Scaldaferri F, Gasbarrini A, Cammarota G. Fecal microbiota transplantation in inflammatory bowel disease: beyond the excitement. Medicine (Baltimore). 2014;93:e97.

Ince MN, Blazar BR, Edmond MB, Tricot G, Wannemuehler MJ. Understanding luminal microorganisms and their potential effectiveness in treating intestinal inflammation. Inflamm Bowel Dis 2016;22:194–201.

Iv EC, Iii EC, Johnson DA. Clinical update for the diagnosis and treatment of Clostridium difficile infection. World J Gastrointest Pharmacol Ther 2014;5:1–26.

Jarrad AM, Karoli T, Blaskovich MA, Lyras D, Cooper MA. Clostridium difficile drug pipeline: challenges in discovery and development of new agents. J Med Chem 2015;58:5164–85.

Jaworski A, Borody TJ, Leis S, Gadalla S, Dawson V. Treatment of first-time Clostridium difficile infection with fecal microbiota transplantation. Am J Gastroenterol 2015;110 [Suppl 1]:S587.

Jaworski A, Mitchell SW, Wong C, Chapman B, Bull M, Gadalla S, et al. FMT; how do alternate formats compare? Am J Gastroenterol 2016;111 [Suppl 1]:S438.

Jaworski A, Mitchell SW, Wong C, Gadalla S, Borody TJ. Patient with relapsing C. difficile successfully treated with lyophilised encapsulated faecal microbiota transplant product. J Gastroenterol Hepatol 2016;31:161.

Jehangir A, Bennett K, Fareedy SB, Rettew A, Shaikh B, Qureshi A, et al. Recurrent C. difficile in a patient with IgG deficiency. Case Rep Gastrointest Med. 2015:356293.

Jeon YD, Hong N, Kim JH, Park SH, Kim SB, Song IJ, et al. Fecal transplantation using a nasoenteric tube during an initial episode of severe Clostridium difficile infection. Infect Chemother 2016;48:31–5.

Jia N. A misleading reference for fecal microbiota transplant. Am J Gastroenterol 2015;110):1731.

Jiang ZD, Ajami N, Lasco T, Petrosino J, Hochman F, Ankoma-Sey V, et al. Fresh, frozen, or lyophilized fecal microbiota transplantation (FMT) for multiple recurrent C. difficile Infection (CDI). Am J Gastroenterol 2014;109 [Suppl 1]:S213.

Jiang ZD, Dupont H, Ajami N, Lasco T, Ke S, Petrosino J, et al. Donor species richness determines fecal microbiota transplantation success in patients with recurrent Clostridium difficile infection. Gastroenterology 2016;150 [Suppl 1]:S895.

Jiang ZD, DuPont H, Ke S. A mouse model of clostridium difficile infection (CDI) suitable for study of human fecal microbiota transplantation (FMT). Am J Gastroenterol 2015;110 [Suppl]:S577.

Jiang ZD, Hoang LN, Lasco TM, Garey KW, DuPont HL. Physician attitudes toward the use of fecal transplantation for recurrent Clostridium difficile infection in a metropolitan area. Clin Infect Dis 2013;56:1059–60.

Johnson S. Recurrent Clostridium difficile infection: A review of risk factors, treatments, and outcomes. J Infect 2009;58:403–10.

Jones JD, Murphy DW. Rescue fecal microbiota transplantation in refractory severe and complicated clostridium difficile infection using frozen stool specimens. Gastroenterology 2015;148 [Suppl 1]:S641.

Jones L, Jones C. Does the donor matter? Donor vs. patient effects in the outcome of next-generation fecal transplant for recurrent Clostridium difficile infection. Gastroenterology 2015;148 [Suppl 1]:S328–9.

Joseph J, Singhal S, Patel GM, Anand S. Clostridium difficile colitis: Review of the therapeutic approach. Am J Ther 2014;21:385–94.

Jung Lee W, Lattimer LD, Stephen S, Borum ML, Doman DB. Fecal microbiota transplantation: A review of emerging indications beyond relapsing Clostridium difficile toxin colitis. Gastroenterol Hepatol (NY) 2015;11:24–32.

Kahn SA, Goeppinger SR, Rubin DT. Fecal microbiota transplantation: an interest in IBD? Nestle Nutr Inst Workshop Ser 2014;79:101–14.

Kahn SA, Goeppinger SR, Rubin DT. Fecal microbiota transplantation: A new therapy for IBD? Proceeding with caution. Inflamm Bowel Dis Monit 2013;13:127–34.

Kahn SA, Young S, Rubin DT. Colonoscopic fecal microbiota transplant for recurrent Clostridium difficile infection in a child. Am J Gastroenterol 2012;107:1930–1.

Kaiser AM, Hogen R, Bordeianou L, Alavi K, Wise PE, Sudan R, et al. Clostridium Difficile infection from a surgical perspective. J Gastrointest Surg 2015;19:1363–77.

Kang DJ, Hylemon PB, Bajaj JS. Fecal transplant to mitigate hyperammonemia and hepatic encephalopathy in animal models. Ann Hepatol 2015;14:762–3.

Kapel N, Thomas M, Corcos O, Mayeur C, Barbot-Trystram L, Bouhnik Y, et al. Practical implementation of faecal transplantation. Clin Microbiol Infect 2014;20:1098–105.

Karadsheh Z, Sule S. Fecal transplantation for the treatment of recurrent Clostridium difficile infection. N Am J Med Sci 2013;5:339–43.

Kassam Z, Blackler D, Osman M, Dubois N, Ling K, Burns L, et al. Novel safety features in fecal microbiota transplantation for recurrent Clostridium difficile infection: Quality assurance and adverse events workflow. Am J Gastroenterol 2015;110 [Suppl 1]:S589.

Kassam Z, Lee CH, Hunt RH. Review of the emerging treatment of Clostridium difficile infection with fecal microbiota transplantation and insights into future challenges. Clin Lab Med 2014;34:787–98.

Kassam Z, Lee CH, Yuan Y, Hunt RH. Fecal microbiota transplantation for clostridium difficile infection: Systematic review and meta-analysis. Am J Gastroenterol 2013;108:500-8.

Kee VR. Clostridium difficile infection in older adults: A review and update on its management. Am J Geriatr Pharmacother 2012;10:14–24.

Keller JJ, Kuijper EJ. Treatment of recurrent and severe Clostridium difficile infection. Annu Rev Med 2015;66:373–86.

Keller PM, Weber MH. Rational therapy of Clostridium difficile infections. Visz Gastrointest Med Surg 2014;30:304–9.

Kellermayer R. Prospects and challenges for intestinal microbiome therapy in pediatric gastrointestinal disorders. World J Gastrointest Pathophysiol 2013;4:91–3.

Kelly CP. Fecal microbiota transplantation--an old therapy comes of age. N Engl J Med 2013;368:474–5.

Kelly CR, Kahn S, Kashyap P, Laine L, Rubin D, Atreja A, et al. Update on fecal microbiota transplantation 2015: indications, methodologies, mechanisms, and outlook. Gastroenterology 2015;149:223–37.

Kelly P. Infectious diarrhoea. Med (United Kingdom) 2015;43:253–8.

Kerman DH. Endoscopic Delivery of Fecal Biotherapy in Inflammatory Bowel Disease. Gastrointest Endosc Clin N Am 2016;26:707–17.

Khan MA, Sofi AA, Ahmad U, Alaradi O, Khan AR, Hammad T, et al. Efficacy and safety of, and patient satisfaction with, colonoscopic-administered fecal microbiota transplantation in relapsing and refractory community- and hospital-acquired Clostridium difficile infection. Can J Gastroenterol Hepatol 2014;28:434-438

Khanna S, Pardi DS. Clostridium difficile infection: Management strategies for a difficult disease. Therap Adv Gastroenterol 2014;7:72–86.

Khanna S, Pardi DS. Clostridium difficile infection: New insights into management. Mayo Clin Proc 2012;87:1106–17.

Khanna S, Tosh PK. A clinician’s primer on the role of the microbiome in human health and disease. Mayo Clin Proc 2014;89:107–14.

Khanna S, Pardi DS, Kelly CR, Kraft CS, Dhere T, Henn MR, et al. A novel microbiome therapeutic increases gut microbial diversity and prevents recurrent Clostridium difficile infection. J Infect Dis 2016;214:173-181.

Khoruts A, Sadowsky MJ, Hamilton MJ. Development of fecal microbiota transplantation suitable for mainstream medicine. Clin Gastroenterol Hepatol 2015;13:246–50.

Khoruts A, Sadowsky MJ. Therapeutic transplantation of the distal gut microbiota. Mucosal Immunol 2011;4:4–7.

Khoruts A, Sadowsky MJ. Understanding the mechanisms of faecal microbiota transplantation. Nat Rev Gastroenterol Hepatol 2016;13:508–16.

Khoruts A, Weingarden AR. Emergence of fecal microbiota transplantation as an approach to repair disrupted microbial gut ecology. Immunol Lett 2014;162:77–81.

Khoruts A. Faecal Microbiota transplantation in 2013: Developing human gut microbiota as a class of therapeutics. Nat Rev Gastroenterol Hepatol 2014;11:79–80.

Khoruts A. Fecal microbiota transplantation-early steps on a long journey ahead. Gut Microbes 2017;8:199-204.

Kim S, Lee Y, Kim SH. Safety and effectiveness of fecal microbiota transplantation: A systematic review. J Kor Med Assoc 2017;60:761-8.

Kim YG, Jang BI. Current advances related to Clostridium difficile infection. Indian J Med Res 2015;141:172–4.

Knight CL, Surawicz CM. Clostridium difficile Infection. Med Clin North Am 2013;97:523–36.

Kociolek LK, Gerding DN. Breakthroughs in the treatment and prevention of Clostridium difficile infection. Nat Rev Gastroenterol Hepatol 2016;13:150–60.

Koenigsknecht MJ, Young VB. Faecal microbiota transplantation for the treatment of recurrent Clostridium difficile infection: Current promise and future needs. Curr Opin Gastroenterol 2013;29:628–32.

Konig J, Brummer RJ. Alteration of the intestinal microbiota as a cause of and a potential therapeutic option in irritable bowel syndrome. Benef Microbes 2014;5:247–61.

Konig J, Siebenhaar A, Hogenauer C, Arkkila P, Nieuwdorp M, Noren T, et al. Consensus report: faecal microbiota transfer - clinical applications and procedures. Aliment Pharmacol Ther 2017;45:222-39.

Konturek PC, Haziri D, Brzozowski T, Hess T, Heyman S, Kwiecien S, et al. Emerging role of fecal microbiota therapy in the treatment of gastrointestinal and extra-gastrointestinal diseases. J Physiol Pharmacol 2015;66:483–91.

Konturek PC, Hess T. Stool transplantation - Gut bacteria as a novel therapeutic option. MMW-Fortschritte der Medizin 2015;157:61–3.

Korman TM. Diagnosis and Management of Clostridium difficile Infection. Semin Respir Crit Care Med 2015;36:31–43.

Kronman MP, Nielson HJ, Adler AL, Giefer MJ, Wahbeh G, Singh N, et al. Fecal microbiota transplantation via nasogastric tube for recurrent Clostridium difficile infection in pediatric patients. J Pediatr Gastroenterol Nutr 2015;60:23-6.

Kump PK, Krause R, Allerberger F, Hogenauer C. Faecal microbiota transplantation--the Austrian approach. Clin Microbiol Infect 2014;20:1106–11.

Kump P, Hogenauer C. Any Future for Fecal Microbiota Transplantation as Treatment Strategy for Inflammatory Bowel Diseases?. Dig Dis 2016;34 [Suppl 1]:74–81.

Lagier JC. Gut microbiota and Clostridium difficile infections. Hum Microbiome J 2016;2:10–4.

Landy J, Al-Hassi HO, McLaughlin SD, Walker AW, Ciclitira PJ, Nicholls RJ, et al. Faecal transplantation therapy for gastrointestinal disease. Aliment Pharmacol Ther 2011;34:409–15.

Langdon A, Crook N, Dantas G. The effects of antibiotics on the microbiome throughout development and alternative approaches for therapeutic modulation. Genome Med BioMed Central 2016;8:39.

Lankelma JM, Nieuwdorp M, de Vos WM, Wiersinga WJ. The gut microbiota in internal medicine: Implications for health and disease. Neth J Med 2015;73:61–8.

Le Monnier A, Zahar JR, Barbut F. Update on Clostridium difficile infections. Med Mal Infect 2014;44:354–65.

Leffler DA, Lamont JT. Clostridium difficile infection. N Engl J Med 2015;372:1539–48.

Lemon KP, Armitage GC, Relman DA, Fischbach MA. Microbiota-targeted therapies: An ecological perspective. Sci Transl Med 2012;4:137rv5.

Leszczyszyn JJ, Radomski M, Leszczyszyn AM. Intestinal microbiota transplant - Current state of knowledge. Reumatologia 2016;54:24–8.

Lewis SS, Anderson DJ. Treatment of Clostridium difficile infection: Recent trial results. Clin Investig (Lond) 2013;3:875–86.

Liubakka A, Vaughn BP. Clostridium difficile infection and fecal microbiota transplant. AACN Adv Crit Care 2016;27:324–37.

Lo Vecchio A, Cohen MB. Fecal microbiota transplantation for Clostridium difficile infection: Benefits and barriers. Curr Opin Gastroenterol 2014;30:47–53.

Lo Vecchio A, Zacur GM. Clostridium difficile infection: An update on epidemiology, risk factors, and therapeutic options. Curr Opin Gastroenterol 2012;28:1–9.

Lopez J, Grinspa A. Fecal microbiota transplantation for inflammatory bowel disease. Gastroenterol Hepatol 2016;12:374–9.

Lubbert C, John E, von Muller L. Clostridium difficile infection: guideline-based diagnosis and treatment. Dtsch Arztebl Int 2014;111:723–31.

Lubbert C. Antimicrobial therapy of acute diarrhoea: A clinical review. Expert Rev Anti Infect Ther 2016;14:193–206.

Malikowski T, Khanna S, Pardi DS. Fecal microbiota transplantation for gastrointestinal disorders. Curr Opin Gastroenterol 2017;33:8–13.

Malnick S, Melzer E. Human microbiome: From the bathroom to the bedside. World J Gastrointest Pathophysiol 2015;6:79–85.

Manges AR, Steiner TS, Wright AJ. Fecal microbiota transplantation for the intestinal decolonization of extensively antimicrobial-resistant opportunistic pathogens: a review. Infect Dis (Auckl) 2016;48:587–92.

Marra F, Ng K. Controversies around epidemiology, diagnosis and treatment of Clostridium difficile infection. Drugs 2015;75:1095–118.

Marshall LL, Peasah S, Stevens GA. Clostridium difficile infection in older adults: Systematic review of efforts to reduce occurrence and improve outcomes. Consult Pharm 2017;32:24-41.

Martin J, Mawer D, Wilcox MH. Clostridium difficile: Biological therapies. Curr Opin Infect Dis 2013;26:454–60.

Martin J, Wilcox M. New and emerging therapies for Clostridium difficile infection. Curr Opin Infect Dis 2016;29:546–54.

Martins FS. Fecal Microbiota Transplantation for Ulcerative Colitis: FoMenTing Change? Dig Dis Sci 2016;61:2154–5.

Mathur H, Rea MC, Cotter PD, Paul Ross R, Hill C. The potential for emerging therapeutic options for Clostridium difficile infection. Gut Microbes 2015;5:696–710.

Matsuoka K, Mizuno S, Hayashi A, Hisamatsu T, Naganuma M, Kanai T. Fecal microbiota transplantation for gastrointestinal diseases. Keio J Med 2014;63:69–74.

Mattner J, Schmidt F, Siegmund B. Faecal microbiota transplantation-A clinical view. Int J Med Microbiol 2016;306:310–5.

McCune VL, Struthers JK, Hawkey PM. Faecal transplantation for the treatment of Clostridium difficile infection: A review. Int J Antimicrob Agents 2014;43:201–6.

Merenstein D, El-Nachef N, Lynch S V. Fecal microbial therapy: Promises and pitfalls. J Pediatr Gastroenterol Nutr 2014;59:157–61.

Mergenhagen KA, Wojciechowski AL, Paladino JA. A review of the economics of treating Clostridium difficile infection. Pharmacoeconomics 2014;32:639–50.

Mizusawa M, Doron S, Gorbach S. Clostridium difficile diarrhea in the elderly: Current issues and management options. Drugs and Aging 2015;32:639–47.

Moayyedi P, Marshall J, Yuan Y, Hunt R. Canadian Association of Gastroenterology position statement: Fecal microbiota transplant therapy. Can J Gastroenterol Hepatol 2014;28:66–8.

Moayyedi P. Fecal transplantation: Any real hope for inflammatory bowel disease? Curr Opin Gastroenterol 2016;32:282–6.

Monsour  Jr. HP, Quigley EM. The Microbiome: What Will the Future Hold? Semin Liver Dis 2016;36:354–9.

Moore T, Rodriguez A, Bakken JS. Fecal microbiota transplantation: A practical update for the infectious disease specialist. Clin Infect Dis 2014;58:541–5.

Mosby D, Lopresto BI, Bacon A, Levy S. Systematic review: Fecal microbiota transplantation in the treatment of pediatric gastrointestinal diseases. Inflamm Bowel Dis 2016;22:S73.

Moayyedi P, Yuan Y, Baharith H, Ford AC. Faecal microbiota transplantation for Clostridium difficile-associated diarrhoea: a systematic review of randomised controlled trials. Med J Aust 2017;207:166-72.

Mulcahy-O’Grady H, Workentine ML. The challenge and potential of metagenomics in the clinic. Front Immunol 2016;7:29.

Mullish BH, Marchesi JR, Thursz MR, Williams HR. Microbiome manipulation with faecal microbiome transplantation as a therapeutic strategy in Clostridium difficile infection. QJM 2015;108:355–9.

Mullish BH, McDonald JAK, Pechlivanis A, Rees DN, Williams HRT, Marchesi JR, et al. Understanding the efficacy of faecal microbiota transplantation in Clostridium difficile infection: Re-Establishment of gut microbiota with the ability to degrade bile? Gut. 2016;65:A184.

Mullish BH, Williams HR. Obstacles to establishing an NHS faecal transplant programme. BMJ 2015;351:h6043.

Myers F. Beyond mainstream: making the case for fecal bacteriotherapy. Nursing (Lond) 2011;41:50–3.

Navarro F, Liu Y, Rhoads JM. Can probiotics benefit children with autism spectrum disorders? World J Gastroenterol 2016;22:10093–102.

Nicholson MR, Osgood CL, Acra SA, Edwards KM. Clostridium difficile infection in the pediatric transplant patient. Pediatr Transplantation 2015;19:792-8.

Nitzan O, Elias M, Chazan B, Raz R, Saliba W. Clostridium difficile and inflammatory bowel disease: role in pathogenesis and implications in treatment. World J Gastroenterol 2013;19:7577–85.

Obi O, Hampton D, Anderson T, Leung P, Abdul MKM, Chandra G, et al. Fecal microbiota transplant for treatment of resistant C. Difficile infection using a standardized protocol: A community hospital experience. Am J Gastroenterol 2014;109 [Suppl]:S629.

Ofosu A. Clostridium difficile infection: A review of current and emerging therapies. Ann Gastroenterol 2016;29:147–54.

Orenstein R, Griesbach CL, Dibaise JK. Moving fecal microbiota transplantation into the mainstream. Nutr Clin Pract 2013;28:589–98.

Paasche S. Fecal microbiota transplantation: An innovative approach to treating Clostridium difficile disease. J Am Acad Physician Assist 2013;26:46–9.

Pacheco SM, Johnson S. Important clinical advances in the understanding of Clostridium difficile infection. Curr Opin Gastroenterol 2013;29:42–8.

Padua D, Pothoulakis C. Novel approaches to treating Clostridium difficile-associated colitis. Expert Rev Gastroenterol Hepatol 2016;10:193–204.

Pant C, Sferra TJ, Deshpande A, Minocha A. Clinical approach to severe Clostridium difficile infection: Update for the hospital practitioner. Eur J Intern Med 2011;22:561–8.

Pathak R, Enuh HA, Patel A, Wickremesinghe P. Treatment of relapsing Clostridium difficile infection using fecal microbiota transplantation. Clin Exp Gastroenterol. 2014;7:1-6.

Petrof EO, Khoruts A. From stool transplants to next-generation microbiota therapeutics. Gastroenterology 2014;146:1573–82.

Quraishi MN, Widlak M, Bhala N, Moore D, Price M, Sharma N, et al. Systematic review with meta-analysis: the efficacy of faecal microbiota transplantation for the treatment of recurrent and refractory Clostridium difficile infection. Aliment Pharmacol Ther 2017;46:479-93.

Rabe SM. Treatment of recurrent Clostridium difficile infection with fecal transplantation. Gastroenterol Nurs 2014;37:156–63,64.

Raghunath V, Levy M, Koo K, Foo H, Borody TJ, Wong J. Recurrent Clostridium difficile infection in a renal transplant recipient successfully treated with fecal microbiota transplantation. Nephrology 2014;19:98.

Rao K, Higgins PD. Epidemiology, diagnosis, and management of Clostridium difficile infection in patients with inflammatory bowel disease. Inflamm Bowel Dis 2016;22:1744–54.

Rao K, Safdar N. Fecal microbiota transplantation for the treatment of Clostridium difficile infection. J Hosp Med 2016;11:56–61.

Rao K, Young VB, Aronoff DM. Fecal microbiota therapy: Ready for prime time?. Infect Control Hosp Epidemiol 2014;35:28–30.

Rao K, Young VB. Fecal Microbiota Transplantation for the Management of Clostridium difficile Infection. Infect Dis Clin North Am 2015;29:109–22.

Rao K, Young VB, Malani PN. Capsules for Fecal Microbiota Transplantation in Recurrent Clostridium difficile Infection: The New Way Forward or a Tough Pill to Swallow?. JAMA 2017;318:1979-80.

Raoult D. Faecal transplantation and infectious diseases practitioners. Clin Microbiol Infect 2014;20:1097.

Raoult D. The return of microbes. Clin Microbiol Infect 2016;22:822–3.

Ray K. Infection : Microbiota reconstitution for resistance to Clostridium difficile infection-fight fire with fire?. Nat Rev Gastroenterol Hepatol 2015;12:4.

Rineh A, Kelso MJ, Vatansever F, Tegos GP, Hamblin MR. Clostridium difficile infection: Molecular pathogenesis and novel therapeutics. Expert Rev Anti Infect Ther 2014;12:131–50.

Rodriguez C, Taminiau B, Van Broeck J, Delmee M, Daube G. Clostridium difficile infection and intestinal microbiota interactions. Microb Pathog 2015;89:201–9.

Rogers GB, Bruce KD. Challenges and opportunities for faecal microbiota transplantation therapy. Epidemiol Infect 2013;141:2235–42.

Rohlke F, Stollman N. Fecal microbiota transplantation in relapsing Clostridium difficile infection. Therap Adv Gastroenterol 2012;5:403–20.

Rossen NG, MacDonald JK, de Vries EM, D'Haens GR, de Vos WM, Zoetendal EG et al. Fecal microbiota transplantation as novel therapy in gastroenterology: A systematic review. World J Gastroenterol 2015;21:5359-71.

Rubin DT, Kirsner JB. Fecal microbiota transplantation for the treatment of inflammatory bowel disease. Gastroenterol Hepatol 2015;11:618–20.

Rubin DT. Curbing our enthusiasm for fecal transplantation in ulcerative colitis. Am J Gastroenterol 2013;108:1631–3.

Rubin TA, Gessert CE, Aas J. Stool transplantation for older patients with Clostridium difficile infection. J Am Geriatr Soc 2009;57:2386–7.

Russell GH. Too early to determine whether fecal microbiota transplant has therapeutic promise for ulcerative colitis? J Pediatr Gastroenterol Nutr 2015;60:3.

Russell RK, Protheroe A, Roughton M, Croft N, Murphy MS, Spray C, et al. Inpatient paediatric UC care in the UK in 2011 is characterised by increasing rates of rescue therapy and stool cultures but low use of pucai scores. Gut 2012;61:A22.

Sageer M, Barto A. Recurrent Clostridium difficile infection: The scope of the problem and management decisions. Semin Colon Rectal Surg 2014;25:158–62.

Salman S, Vardatsikos G, Avard D, Palmour N, Dewar K, Zawati MH. FMT happens: Regulating fecal microbiota therapy in Canada; What you need to know. World Med Heal Policy 2016;8:95–106.

Sampath K, Levy LC, Gardner TB. Fecal transplantation: Beyond the aesthetic. Gastroenterology 2013;145:1151–3.

Satokari R, Mattila E, Kainulainen V, Arkkila PE. Editorial: a simple faecal preparation for faecal microbiota transplantation--authors’ reply. Aliment Pharmacol Ther 2015;41:321.

Scaldaferri F, Pecere S, Petito V, Zambrano D, Fiore L, Lopetuso LR, et al. Efficacy and mechanisms of action of fecal microbiota transplantation in ulcerative colitis: Pitfalls and promises from a first meta-analysis. Transplant Proc 2016;48:402–7.

Schenck LP, Beck PL, MacDonald JA. Gastrointestinal dysbiosis and the use of fecal microbial transplantation in Clostridium difficile infection. World J Gastrointest Pathophysiol 2015;6:169–80.

Scott KP, Antoine JM, Midtvedt T, van Hemert S. Manipulating the gut microbiota to maintain health and treat disease. Microb Ecol Heal Dis 2015;26:25877.

Shin JH, Chaves-Olarte E, Warren CA. Clostridium difficile Infection. Microbiol Spectr 2016;4:3.

Siebenhaar A, Rosien U. Fecal microbiome transfer. Internist Prax 2016;56:269–77.

Singh B, Qin N, Reid G. Microbiome regulation of autoimmune, gut and liver associated diseases. Inflamm Allergy - Drug Targets 2015;14:84–93.

Singh N, Suskind D, Wahbeh G. Fecal bacteriotherapy in a 6 year old patient with ulcerative colitis and Clostridium difficile. Inflamm Bowel Dis 2012;18:S69.

Singh R, Nieuwdorp M, ten Berge IJ, Bemelman FJ, Geerlings SE. The potential beneficial role of faecal microbiota transplantation in diseases other than Clostridium difficile infection. Clin Microbiol Infect 2014;20:1119–25.

Sirisinha S. The potential impact of gut microbiota on your health: Current status and future challenges. Asian Pacific J Allergy Immunol 2016;34:249–64.

Smits LP, Bouter KE, de Vos WM, Borody TJ, Nieuwdorp M. Therapeutic potential of fecal microbiota transplantation. Gastroenterology 2013;145:946–53.

Smits WK, Lyras D, Lacy DB, Wilcox MH, Kuijper EJ. Clostridium difficile infection. Nat Rev Dis Prim 2016;2:1–20.

Sokol H, Galperine T, Kapel N, Bourlioux P, Seksik P, Barbut F, et al. Faecal microbiota transplantation in recurrent Clostridium difficile infection: Recommendations from the French Group of Faecal microbiota Transplantation. Dig Liver Dis 2016;48:242–7.

Steinert A, Radulovic K, Niess J. Gastro-intestinal tract: The leading role of mucosal immunity. Swiss Med Wkly 2016;146:w14293.

Stuntz M, Des Vignes F. Treating Clostridium difficile infections: Should fecal microbiota transplantation be reclassified from investigational drug to human tissue? Contemp Clin Trials Commun 2015;1:39–41.

Surawicz CM. Fecal microbiota transplantation: What we know and what we need to know. Ann Intern Med 2015;162:662–3.

Suwantarat N, Bobak DA. Fecal bacteriotherapy for recurrent Clostridium difficile infection: What’s old is new again? Curr Infect Dis Rep 2013;15:101–3.

Tamma PD, Sandora TJ. Clostridium difficile infection in children: Current state and unanswered questions. J Pediatric Infect Dis Soc 2012;1:230–43.

Tang G, Yin W, Liu W. Is frozen fecal microbiota transplantation as effective as fresh fecal microbiota transplantation in patients with recurrent or refractory Clostridium difficile infection: A meta-analysis? Diagn Microbiol Infect Dis. 2017;88:322-9.

Tariq R, Khanna S. Clostridium difficile infection: Updates in management. Indian J Gastroenterol 2016;36:3-10.

Taur Y, Pamer EG. Harnessing microbiota to kill a pathogen: Fixing the microbiota to treat Clostridium difficile infections. Nat Med 2014;20:246–7.

Taur Y, Pamer EG. The intestinal microbiota and susceptibility to infection in immunocompromised patients. Curr Opin Infect Dis 2013;26:332–7.

Thomas L V, Suzuki K, Zhao J. Probiotics: a proactive approach to health. A symposium report. Br J Nutr 2015;114 [Suppl 1]:S1-15.

Tran MC, Claros MC, Goldstein EJ. Therapy of Clostridium difficile infection: Perspectives on a changing paradigm. Expert Opin Pharmacother 2013;14:2375–86.

Trifan A, Stoica O, Stanciu C, Cojocariu C, Singeap AM, Girleanu I, et al. Clostridium difficile infection in patients with liver disease: a review. Eur J Clin Microbiol Infect Dis 2015;34:2313–24.

Trubiano JA, Cheng AC, Korman TM, Roder C, Campbell A, May ML, et al. Australasian Society of Infectious Diseases updated guidelines for the management of Clostridium difficile infection in adults and children in Australia and New Zealand. Intern Med J 2016;46:479–93.

Unal CM, Steinert M. Novel therapeutic strategies for Clostridium difficile infections. Expert Opin Ther Targets 2016;20:269–85.

Vaishnavi C. Fecal microbiota transplantation for management of Clostridium difficile infection. Indian J Gastroenterol 2014;33:301–7.

Van Dissel JT. Alternative strategies for Clostridium difficile infection. Antonie van Leeuwenhoek, Int J Gen Mol Microbiol 2009;95:41.

van Nispen tot Pannerden CM, Verbon A, Kuipers EJ. Recurrent Clostridium difficile infection: What are the treatment options? Drugs 2011;71:853–68.

van Nood E, Speelman P, Kuijper EJ, Keller JJ. Struggling with recurrent Clostridium difficile infections: Is donor faeces the solution? Euro Surveill 2009;14:34.

Van Nood E, Speelman P, Nieuwdorp M, Keller J. Fecal microbiota transplantation: Facts and controversies. Curr Opin Gastroenterol 2014;30:34–9.

Vandenplas Y, Pierard D, De Greef E. Fecal microbiota transplantation: Just a fancy trend? J Pediatr Gastroenterol Nutr 2015;61:4–7.

Vemuri RC, Gundamaraju R, Shinde T, Eri R. Therapeutic interventions for gut dysbiosis and related disorders in the elderly: antibiotics, probiotics or faecal microbiota transplantation?. Benef Microbes 2016;:1–15.

Venuto C, Butler M, Ashley ED, Brown J. Alternative therapies for Clostridium difficile infections. Pharmacother J Hum Pharmacol Drug Ther 2010;30:1266–78.

Venuto C, Butler M, Dodds Ashley E, Brown J. Alternative therapies for Clostridium difficile infections. Pharmacotherapy 2010;30:1266–78.

Verbeke KA, Boesmans L, Boets E. Modulating the microbiota in inflammatory bowel diseases: prebiotics, probiotics or faecal transplantation?. Proc Nutr Soc England; 201473:490–7.

Verspohl E. Therapy of Clostridium difficile-associated diarrhea. Fecal microbiota transplants: History and clinical trials. Med Monatsschr Pharm. 2016;39(12 PG-539-542):539–42.

Vestal R. Fecal Microbiota Transplant. Hosp Med Clin 2016;5:58–70.

Vincent C, Manges AR. Antimicrobial use, human gut microbiota and Clostridium difficile colonization and infection. Antibiotics 2015;4:230–53.

Vincent Y, Manji A, Gregory-Miller K, Lee C. A review of management of Clostridium difficile infection: Primary and recurrence. Antibiotics 2015;4:411–23.

Vindigni SM, Broussard EK, Surawicz CM. Alteration of the intestinal microbiome: Fecal microbiota transplant and probiotics for Clostridium difficile and beyond. Expert Rev Gastroenterol Hepatol 2013;7:615–28.

Vindigni SM, Surawicz CM. The gut microbiome: A clinically significant player in transplantation?. Expert Rev Clin Immunol 2015;11:781–3.

von Ameln-Mayerhofer A. Clostridium difficile infection - an update. Med Monatsschr Pharm 2015;38:211-9.

Vyas D, L’Esperance H E, Vyas A. Stool therapy may become a preferred treatment of recurrent Clostridium difficile?. World J Gastroenterol 2013;19:4635–7.

Walia R, Kunde S, Mahajan L. Fecal microbiota transplantation in the treatment of refractory Clostridium difficile infection in children: An update. Curr Opin Pediatr 2014;26:573–8.

Walker AW, Lawley TD. Therapeutic modulation of intestinal dysbiosis. Pharmacol Res 2013;69:75–86.

Walsh CJ, Guinane CM, O’Toole PW, Cotter PD. Beneficial modulation of the gut microbiota. FEBS Lett 2014;588:4120–30.

Waltz P, Zuckerbraun B. Novel therapies for severe Clostridium difficile colitis. Curr Opin Crit Care 2016;22:167–73.

Wang AY, Popov J, Pai N. Fecal microbial transplant for the treatment of pediatric inflammatory bowel disease. World J Gastroenterol 2016;22:10304–15.

Wang SN, Cao HL, Wang BM. Systematic review: Adverse events of fecal microbiota transplantation. J Dig Dis 2016;17:59.

Wang ZK, Yang YS, Chen Y, Yuan J, Sun G, Peng LH. Intestinal microbiota pathogenesis and fecal microbiota transplantation for inflammatory bowel disease. World J Gastroenterol 2014;20:14805–20.

Weissman JS, Coyle W. Stool transplants: Ready for prime time? Curr Gastroenterol Rep 2012;14:313–6.

West CE, Renz H, Jenmalm MC, Kozyrskyj AL, Allen KJ, Vuillermin P, et al. The gut microbiota and inflammatory noncommunicable diseases: associations and potentials for gut microbiota therapies. J Allergy Clin Immunol 2015;135:3–14.

Wiedel N, Gilbert J, Baloun B, Nelson C. Clostridium difficile associated diarrhea. S D Med. 2016;69:124–7.

Wischmeyer PE, McDonald D, Knight R. Role of the microbiome, probiotics, and “dysbiosis therapy” in critical illness. Curr Opin Crit Care 2016;22:347–53.

Wise J. Frozen faecal matter works as well as fresh for transplantation in C difficile patients. BMJ 2016;352:i138.

Woodworth MH, Carpentieri C, Sitchenko KL, Kraft CS. Challenges in fecal donor selection and screening for fecal microbiota transplantation: A review. Gut Microbes 2017;8:225-37.

Woodworth MH, Neish EM, Miller NS, Dhere T, Burd EM, Carpentieri C, et al. Laboratory testing of donors and stool samples for fecal microbiota transplantation for recurrent Clostridium difficile infection. J Clin Microbiol 2017;55:1002-10.

Xu MQ, Cao HL, Wang WQ, Wang S, Cao XC, Yan F, et al. Fecal microbiota transplantation broadening its application beyond intestinal disorders. World J Gastroenterol 2015;21:102–11.

Yang X, Wu M. Fecal microbiota transplantation and inflammatory bowel disease. Chinese J Gastroenterol 2016;21:491–3.

Ye L. Fecal microbiota transplantation: A potential therapy for inflammatory bowel disease?. J Dig Dis 2015;16:81.

Young VB. Therapeutic manipulation of the microbiota: past, present, and considerations for the future. Clin Microbiol Infect 2016;22:905–9.

Youngster I, Gerding DN. Editorial: Making Fecal Microbiota Transplantation Easier to Swallow: Freeze-Dried Preparation for Recurrent Clostridium difficile Infections. Am J Gastroenterol 2017;112:948-50.

Youngster I. Fecal micobiota transplants - The clinical perspective. Int J Infect Dis 2016;45:37.

Yuille S, Mackay WG, Morrison DJ, Tedford MC. Optimising gut colonisation resistance against Clostridium difficile infection. Eur J Clin Microbiol Infect Dis 2015;34:2161–6.

Zagaria MAE. Fecal transplantation for recurrent Clostridium difficile infection. Pharmacist 2014;39:20–2.

Zainah H, Hassan M, Shiekh-Sroujieh L, Hassan S, Alangaden G, Ramesh M. Intestinal microbiota transplantation, a simple and effective treatment for severe and refractory Clostridium difficile infection. Dig Dis Sci 2015;60:181–5.

Zalig S, Rupnik M. Clostridium difficile infection and gut microbiota. Semin Colon Rectal Surg 2014;25:124–7.

Zanella Terrier MC, Frossard JL, Simonet ML. Recurrent Clostridium difficile infections: the importance of the intestinal microbiota. Rev Med Suisse 2013;9:1898,1900-1904.

Zanella Terrier MC, Simonet ML, Bichard P, Frossard JL. Recurrent Clostridium difficile infections: The importance of the intestinal microbiota. World J Gastroenterol 2014;20:7416–23.

**D.1.8. Commentary/ editorials/ opinion:**

Brandt LJ. Editorial commentary: Fecal microbiota transplantation: Patient and physician attitudes. Clin Infect Dis 2012;55:1659–60.

Glauser W. Risk and rewards of fecal transplants. CMAJ 2011;183:541–2.

Goyal H, Singla U. Infectious Diseases Society of America or American College of Gastroenterology guidelines for treatment of Clostridium difficile infection: Which one to follow?. Am J Med 2015;128:4.

Hecht GA, Blaser MJ, Gordon J, Kaplan LM, Knight R, Laine L, et al. What is the value of a food and drug administration investigational new drug application for fecal microbiota transplantation to treat clostridium difficile infection? Clin Gastroenterol Hepatol 2014;12:289–91.

Hellemans R, Naegels S, Holvoet J. Fecal transplantation for recurrent Clostridium difficile colitis, an underused treatment modality. Acta Gastroenterol Belg 2009;72:269–70.

Heuer AH. Fecal transplantation with side effect: Bearer of hope for Clostridium difficile patients is still insufficiently researched. Dtsch Apotheker Zeitung 2016;156:46.

Johnson S, Gerding DN. Fecal fixation: fecal microbiota transplantation for Clostridium difficile infection. Clin Infect Dis 2016;9:9.

Karakan T. Fecal microbiota transplant in immunocompromised patients: Encouraging results in a vulnarable population. Turkish J Gastroenterol 2014;25:346.

Keller JJ, Van Nood E, Speelman P, Kuijper EJ. Application of feces transplantation for treatment of relapsing Clostridium difficile infection. Antonie van Leeuwenhoek, Int J Gen Mol Microbiol 2009;95:40–1.

Kellermayer R. Burdening questions about Clostridium difficile in pediatric inflammatory bowel diseases. J Pediatr Gastroenterol Nutr 2015;60:421–2.

Kelly CR. Editorial: A simple faecal preparation protocol for faecal microbiota transplantation. Aliment Pharmacol Ther 2015;41:320.

Kuperman AA, Koren O. The era of fecal microbiota transplantation. Isr Med Assoc J 2015;17:515–6.

Laffin M, Millan B, Madsen KL. Fecal microbial transplantation as a therapeutic option in patients colonized with antibiotic resistant organisms. Gut Microbes 2017;8:221-4.

Louie T, Adams PC. Nature’s therapy for recurrent Clostridium difficile diarrhea. Can J Gastroenterol 2008;22:455–6.

Lynch S V. Fecal microbiota transplantation for recurrent Clostridium difficile infection in pediatric patients: Encouragement wrapped in caution. J Pediatr Gastroenterol Nutr 2015;60:1–3.

Malani PN, Rao K. Expanded evidence for frozen fecal microbiota transplantation for clostridium difficileinfection a fresh take. JAMA 2016;315:137–8.

Mardani M. Intestinal microbiota transplantation for recurrent Clostridium difficile infection. Iran J Clin Infect Dis 2011;6:103.

Marsh JW, Curry SR. Therapeutic approaches for clostridium difficile infections. Curr Protoc Microbiol 2013;30:9A.3.1-3.9

Mayor S. Donor faecal transplantation is highly curative in recurrent C difficile infection, trial finds. BMJ 2016;354:i4638.

McFarland L V. The role of compassion in the practice of evidence-based medicine. Am J Gastroenterol 2012;107:768–9.

McKinney M. Despite “eww” factor... fecal transplants gain ground against C. diff. Mod Healthc 2013;43:12–3.

McKinney M. FDA slaps regs on fecal transplants. Increased steps for C. diff treatment draw mixed reactions from providers. Mod Healthc 2013;43:10.

Nieuwdorp M. Faecal microbiota transplantation. Br J Surg 2014;101:887–8.

Olson DC, Scobey MW. The challenge of Clostridium difficile infection. N C Med J 2016;77:206–10.

Owens C, Broussard E, Surawicz C. Fecal microbiota transplantation and donor standardization. Trends Microbiol 2013;21:443–5.

Pakyz AL, Moczygemba LR, Vanderwielen LM, Edmond MB. Fecal microbiota transplantation for recurrent Clostridium difficile infection: The patient experience. Am J Infect Control 2016;44 [Suppl]:554–9.

Pamer EG. Fecal microbiota transplantation: Effectiveness, complexities, and lingering concerns. Mucosal Immunol 2014;7:210–4.

Patel K V, Digby-Bell JL, Goel RM, Henry N, Sanderson JD, Irving PM, et al. Faecal microbiota transplantation: Implementing a new treatment for recurrent/refractory Clostridium difficile infection using banked stool in a tertiary UK centre. Gut 2015;64:A23.

Patel K, Spector TD. Estimating the risks of faecal transplants. J Hosp Infect 2016;92:128–9.

Rutecki GW. An “aesthetically unappealing” transplant: Fecal microbiota. Consultant 2013;53:338.

Sachs RE, Edelstein CA. Ensuring the safe and effective FDA regulation of fecal microbiota transplantation. J Law Biosci 2015;2:396–415.

Senior K. Faecal transplantation for recurrent C difficile diarrhoea. Lancet Infect Dis 2013;13:200–1.

Sokol H. Toward rational donor selection in faecal microbiota transplantation for IBD. J Crohns Colitis 2016;10:375–6.

**D.1.9. Letters**

Anonymous. Fecal Transplant for Clostridium difficile-Reply. Arch Intern Med 2012;172:825–6.

Green MR, Acharya UH, Yeager AM. Is fidaxomicin the drug of choice for treating Clostridium difficile - associated diarrhea in patients with cancer? J Clin Oncol 2013;31:4376–8.

Gundacker ND, Morrow CD, Rodriguez M. Letter: a simple out-patient faecal microbiota transplant technique. Aliment Pharmacol Ther 2016;44:101.

Gutman J, Kurchin A. Split donation fecal microbiota transplantation. Am J Gastroenterol 2013;108):1659–60.

Ho N, Prasad V. Clostridium difficile diarrhea and fecal transplantation. J Clin Gastroenterol 2011;45:742–3.

Ho N, Prasad V. Lacking the incentive to cure? Recurring Clostridium difficile diarrhea and our reluctance to use fecal transplantation. J Clin Gastroenterol 2011;45:379–80.

Hodes RM. Fecal flora reconstitution for amyotrophic lateral sclerosis. J Clin Gastroenterol 2013;47:655.

Hogenauer C, Kump PK, Krause R. Tempered enthusiasm for fecal transplantation? Clin Infect Dis 2014;59:1348–9.

Ianiro G, Gasbarrini A, Cammarota G. Letter: Faecal microbiota transplantation - Not a one-size-fits-all approach. Aliment Pharmacol Ther 2014;40:119.

Jouhten H, Mattila E, Arkkila P, Satokari R. Reduction of antibiotic resistance genes in intestinal microbiota of patients with recurrent Clostridium difficile infection after fecal microbiota transplantation. Clin Infect Dis 2016;63:710–1.

Kassam Z, Lee CH, Yuan Y, Hunt RH. Navigating long-term safety in fecal microbiota transplantation. Am J Gastroenterol 2013;108:1538.

Konstantinov SR, Peppelenbosch MP. Fecal microbiota transfer may increase irritable bowel syndrome and inflammatory bowel diseases-associated bacteria. Gastroenterology 2013;144:e19–20.

Malnick SD, Oppenheim A, Melzer E. Immune thrombocytopenia caused by fecal microbial transplantation in a patient with severe recurrent Clostridium difficile infection. J Clin Gastroenterol 2015;49:888–9.

Martin L. Modified fecal transplantation. J Clin Gastroenterol 2011;45:742.

Matuchansky C. Fecal microbiota transplantation: the case of immunocompromised patients. Am J Med 2015;128:e21.

Mawer DP, Wilcox MH. Clarifying the management of Clostridium difficile infection. BMJ 2015;351:h6130.

Mittal C, Miller N, Meighani A, Hart BR, John A, Ramesh M. Fecal microbiota transplant for recurrent Clostridium difficile infection after peripheral autologous stem cell transplant for diffuse large B-cell lymphoma. Bone Marrow Transplant 2015;50:1010.

Pecere S, Sabatelli M, Fantoni M, Ianiro G, Gasbarrini A, Cammarota G. Letter: Faecal microbiota transplantation in combination with fidaxomicin to treat severe complicated recurrent Clostridium difficile infection. Aliment Pharmacol Ther 2015;42:1030.

Schwartz M, Gluck M, Koon S. Norovirus gastroenteritis after fecal microbiota transplantation for treatment of clostridium difficile infection despite asymptomatic donors and lack of sick contacts. Am J Gastroenterol 2013;108:1367.

Sha S, Wu K. Letter: Faecal microbiota transplantation - Not a one-size-fits-all approach; Authors’ reply. Aliment Pharmacol Ther 2014;40:119–20.

Sohn KM, Cheon S, Kim YS. Can fecal microbiota transplantation (FMT) eradicate fecal colonization with vancomycin-resistant enterococci (VRE)? Infect Control Hosp Epidemiol 2016;37:1519–21.

Solari PR, Fairchild PG, Noa LJ, Wallace MR. Tempered enthusiasm for fecal transplant. Clin Infect Dis 2014;59:319.

Solari PR, Wallace MR. Reply to Krause et al. Clin Infect Dis 2014;59:1349.

Spector T, Knight R. Authors’ reply to Mawer and Wilcox and Mullish and Williams. BMJ 2015;351:h6132.

Spector T, Knight R. Faecal transplants. BMJ. 2015;351:h5149.

Tacke D, Wisplinghoff H, Kretzschmar A, Farowski F, Koehler P, Herweg J, et al. First implementation of frozen, capsulized faecal microbiota transplantation for recurrent Clostridium difficile infection into clinical practice in Europe. Clin Microbiol Infect 2015;21:e82–4.

Wang XJ, Kraft CS, Dhere T. Use of standard donors in fecal microbiotal transplants. South Med J 2015;108:68–9.

Youngster I, Hohmann EL. Fecal microbiota transplantation for Clostridium difficile infection--reply. JAMA 2015;313:726.

**D.1.10. Not relevant, miscellaneous**

Ahir HB, Marcella S, Jiang Y, Mayes A, Burnett H, Rajpura J. Systematic literature review of economic evaluations and healthcare resource utilisation studies in the treatment of Clostridium difficile infection. Value in Health 2017;20:A791

Allegretti J, Eysenbach LM, El-Nachef N, Fischer M, Kelly C, Kassam Z. The current landscape and lessons from fecal microbiota transplantation for inflammatory bowel disease: Past, present, and future. Inflammatory Bowel Diseases 2017;23:1710-7.

Allegretti JR, Bry L, Gerber G, Clish C, Korzenik JR. Investigation of dysbiosis and bile salt composition associated with C. difficile infection. Am J Gastroenterol 2015;110:S573–4.

Allegretti JR, Kao DH, Sitko J, Fischer M, Kassam Z. Prevalence of early antibiotic use post-fecal microbiota transplantation and corresponding risk of FMT failure. Gastroenterology 2017;152 [Suppl]:S342-S3.

Allegretti JR, Kassam Z, Chan WW. Small Intestinal Bacterial Overgrowth: Should Screening Be Included in the Pre-fecal Microbiota Transplantation Evaluation? Dig Dis Sci 2017;62:1-5.

Allegretti JR, Kassam Z, Smith M, Korzenik JR, Chan WW. Irregular bowel movements following fecal microbiota transplantation (FMT) are associated with pre-existing irritable bowel syndrome but not FMT-related factors. Gastroenterology 2016;150 [Suppl 1]:S742.

Alonso CD, Braun DA, Patel I, Akbari M, Oh DJ, Jun T, et al. A multicenter, retrospective, case-cohort study of the epidemiology and risk factors for Clostridium difficile infection among cord blood transplant recipients. Transpl Infect Dis 2017;19:e12728.

Anand R, Song Y, Garg S, Girotra M, Sinha A, Sivaraman A, et al. Effect of Aging on the Composition of Fecal Microbiota in Donors for FMT and Its Impact on Clinical Outcomes. Dig Dis Sci 2017;62:1002-8.

Andermann TM, Rezvani A, Bhatt AS. Microbiota manipulation with prebiotics and probiotics in patients undergoing stem cell transplantation. Curr Hematol Malig Rep 2016;11:19–28.

Anonymous. ALS Untangled No. 21: Fecal transplants. Amyotroph Lateral Scler Front Degener 2013;14:482–5.

Anonymous. AMMI Canada-CACMID 2012 Annual Conference Abstracts. Can J Infect Dis Med Microbiol Conf AMMI Canada CACMID. 2012;23.

Anonymous. Erratum: Oral, capsulized frozen fecal microbiota transplantation for relapsing Clostridium difficile infection (JAMA (2014) 312:17 (1772-1778) DOI: 10.1001/jama.2014.13875). JAMA 2015;313:729.

Anonymous. Faecal microbiota transplantation for ulcerative colitis. Drug Ther Bull 2017;55:51.

Arkkila P, Hillamaa A, Jalanka J, Mattila E, Anttila V, Satokari R. Long-term safety and effect on gastrointestinal symptoms of fecal microbiota transplantation. United European Gastroenterology Journal 2017;5 [Suppl]:A757.

Armstrong MJ, Pathmakanthan S, Iqbal TH. Fecal microbiota transplantation for Clostridium difficile infection. JAMA 2015;313:725–6.

Assar S, Nakhle A, Lazar M. Eat your heart out: Right heart collapse from bowel obstruction. American Journal of Respiratory and Critical Care Medicine Conference: American Thoracic Society International Conference, ATS. 2017;195.

Bagdasarian N, Rao K, Malani PN. Changing epidemiology and control of Clostridium difficile in older adults. Curr Transl Geriatr Gerontol Reports 2013;2:143–50.

Bajaj JS, Fagan A, Sikaroodi M, White MB, Sterling RK, Gilles H, et al. Liver transplant modulates gut microbial dysbiosis and cognitive function in cirrhosis. Liver Transplantation 2017;23:907-14.

Barketi-Klai A, Hoys S, Lambert-Bordes S, Collignon A, Kansau I. Role of fibronectin-binding protein A in Clostridium difficile intestinal colonization. J Med Microbiol 2011;60:1155–61.

Barnes D, Park KT, Smith M, Kassam Z. Feasibility of a competitively selected universal donor fecal microbiota transplantation protocol and characterization of post-transplant microbiota modification. J Pediatr Gastroenterol Nutr 2016;63:S142–3.

Barnes DM, Park KT, Kassam Z, Smith MB. Optimizing fecal microbiota transplant: An innovative method to competitively select a universal donor. Am J Gastroenterol 2015;110 [Suppl 1]:S985.

Baro E, Galperine T, Denies F, Lannoy D, Lenne X, Odou P, et al. Cost-effectiveness analysis of five competing strategies for the management of multiple recurrent community-onset Clostridium difficile infection in France. PLoS ONE 2017;12:e0170258.

Bashan A, Gibson TE, Friedman J, Carey VJ, Weiss ST, Hohmann EL, et al. Universality of human microbial dynamics. Nature 2016;534:259–62.

Battaglioli E, Hale V, Chen J, Jeraldo P, Rekdal VM, Huq L, et al. Prophylactic fecal microbial transplant restores Clostridium difficile colonization resistance in a dysbiotic subset of diarrhea associated human microbial communities modeled in germ free mice. Gastroenterology. 2017;152 [Suppl]:S348.

Baty V, Mougin B. What about public perception of antibiotics in the era of the fecal microbiota transplantation? between the devil and the deep blue sea. Am J Gastroenterol 2013;108:1540.

Baumgart DC. The human microbiome. Dtsch Medizinische Wochenschrift 2015;140:1451–6.

Baxter M, Ahmad T, Colville A, Sheridan R. Fatal aspiration pneumonia as a complication of fecal microbiota transplant. Clin Infect Dis 2015;61:136–7.

Bella CJ, Coulson S, Vitetta L. Is co-prescribing a multi-strain probiotic the solution for treating and preventing proton pump inhibitor (PPIs) induced Clostridium difficile associated diarrhoea (CDAD) while maintaining evidence based pharmacotherapy? Adv Integr Med 2014;1:52–4.

Benes J, Polivkova S. Antibiotic treatment of clostridial colitis. Epidemiol Mikrobiol Imunol 2016;65:15–24.

Berg AM, Kelly CP, Farraye FA. Clostridium difficile infection in the inflammatory bowel disease patient. Inflamm Bowel Dis 2013;19:194-204.

Beus A. Recurrent Clostridium difficile infections: Significance and treatment. Infektoloski Glas 2011;31:155–61.

Bhanvadia A, Zhu R, Amarnani A, Yang J, Smith M, Grossman EB, et al. Gut microbiota profiling in patients with clostridium difficile infections at urban safety net hospitals: A comparison to the human microbiome project. Gastroenterology 2016;150 [Suppl 1]:S895–6.

Bi Z, Lu Y, Weigarden AR, Yao D, Wang L, Khoruts A, et al. Identification of p-cresol sulfate and secondary bile salts in human urine as sensitive biomarkers of fecal microbiota transplantation in R-CDI patients. FASEB Journal Conference: Experimental Biology. 2017;31 [Suppl].

Biedermann L, Rogler G. Clostridium difficile colitis. Gastroenterologe 2014;9:350–9.

Biedermann L, Rogler G. Clostridium difficile infection. Gastroenterologe. 2017;12:237-52.

Biedermann L, Rogler G. The intestinal microbiota: its role in health and disease. Eur J Pediatr 2015;174:151–67.

Bilal M, Khehra R, Strahotin C, Mitre R. Long-term follow-up of fecal microbiota transplantation for treatment of recurrent clostridium difficile infection in a dual solid organ transplant recipient. Case Rep Gastroenterol 2015;9:156–9.

Blosser R. Probiotic infusion during colonoscopy is an effective therapeutic alternative for refractory or recurrent C. Difficile colitis. Am J Gastroenterol 2013;108 [Suppl 1]:S181.

Brace C, Gloor GB, Ropeleski M, Allen-Vercoe E, Petrof EO. Microbial composition analysis of Clostridium difficile infections in an ulcerative colitis patient treated with multiple fecal microbiota transplantations. J Crohns Colitis 2014;8:1133–7.

Brandt LJ. American Journal of Gastroenterology Lecture: Intestinal microbiota and the role of fecal microbiota transplant (FMT) in treatment of C. difficile infection. Am J Gastroenterol 2013;108:177–85.

Breaux JL, Ray A, Michael S. Characteristics of patients undergoing fecal microbiota transplantation for clostridium difficile infection: One institution's story. Gastroenterology. 2017;152 (Supplement 1):S633.

Broecker F, Klumpp J, Moelling K. Long-term microbiota and virome in a Zurich patient after fecal transplantation against Clostridium difficile infection. Ann N Y Acad Sci 2016;1372:29-41

Broecker F, Russo G, Klumpp J, Moelling K. Stable core virome despite variable microbiome after fecal transfer. Gut Microbes 2016;7:1–7.

Broecker F, Russo G, Klumpp J, Moelling K. Stable core virome despite variable microbiome after fecal transfer. Gut Microbes 2017;8:214-20.

Brumboiu MI, Poolay Mootien C, Petrus DI, Tzaneva V, Manole FI. The host defense mechanisms and diarrhea with Clostridium difficile: Who are the patients?. Eur J Clin Invest 2015;45:55.

Bruminhent J, Cawcutt KA, Thongprayoon C, Petterson TM, Kremers WK, Razonable RR. Epidemiology, risk factors, and outcome of Clostridium difficile infection in heart and heart-lung transplant recipients. Clinical Transplantation 2017;31:e12968.

Budree S, Elliott RJ, Rao S, Njenga M, Ladha A, Allegretti JR, et al. Donor stool processing time: The effect on the intestinal microbiome and clinical outcomes of fecal microbiota transplantation in Clostridium difficile infection. Gastroenterology 2017;152 [Suppl 1]:S1006.

Budree S, Panchal P, Tu E, Kahn S, Kassam Z, Osman M. Access and effectiveness of fecal microbiome transplantation for recurrent clostridium difficile infection in the United States pediatric population: A universal stool bank experience. J Pediatr Gastroenterol Nutr 2017;64:68-9.

Budree S, Rao S, Allegretti JR, Fischer M, Kelly CR, Smith M, et al. The association of donor stool consistency by bristol stool scale on microbial profile and clinical outcomes of fecal microbiota transplantation in clostridium difficile infection. Gastroenterology 2017;152 [Suppl 1]:S630.

Budree S, Tu E, Leith T, Allegretti JR, Rao S, Day R, et al. The association of stool donor diet on microbial profile and clinical outcomes of fecal microbiota transplantation in clostridium difficile infection. Gastroenterology. 2017;152 [Suppl 1]:S630-S1.

Budree S, Wong WF, Tu E, Rao S, Allegretti JR, Fischer M, et al. Do specific bacteria drive clinical cure in fecal microbiota transplantation for clostridium difficile infection?: Clinical, microbial and metabolomic characterization of universal FMT donors. Gastroenterology. 2017;152 [Suppl 1]:S349.

Bush BR, Rogers MB, Firek B, Kufen A, Jackson Z, Morowitz M, et al. Dynamic changes in the intestinal microbiota following fecal microbiota transplantation for refractory inflammatory bowel disease in children. Gastroenterology. 2016;150 [Suppl 1]:S541.

Callejas-Diaz A, Gea-Banacloche JC. Clostridium difficile: Deleterious impact on hematopoietic stem cell transplantation. Curr Hematol Malig Rep 2014;9:85–90.

Cammarota G, Ianiro G, Magalini S, Gasbarrini A, Gui D. Decrease in surgery for Clostridium difficile infection after starting a program to transplant fecal microbiota. Ann Intern Med 2015;163:487–8.

Cammarota G, Pecere S, Ianiro G, Masucci L, Curro D. Principles of DNA-based gut microbiota assessment and therapeutic efficacy of fecal microbiota transplantation in gastrointestinal diseases. Dig Dis 2016;34:279–85.

Carlet J. The gut is the epicentre of antibiotic resistance. Antimicrob Resist Infect Control 2012;1:39.

Cattaneo C. Gram-positive infections: New and old pathogens in haematological patient. Haematologica 2015;100:191–3.

Chehoud C, Dryga A, Hwang Y, Nagy-Szakal D, Hollister EB, Luna RA, et al. Transfer of viral communities between human individuals during fecal microbiota transplantation. MBio 2016;7:e00322-16.

Chen LA, Hourigan S, Radin A, Weidner M, Oliva-Hemker MM, Sears C, et al. Bile acid composition changes over 6 months following fecal microbiota transplantation in children with recurrent C. Difficile infections. Am J Gastroenterol 2016;111 [Suppl 1]:S453–4.

Chintalapally R, Kukkadapu T, Parikh S, Mangaonkar AA, Boppidi HR, Kota V, et al. Clostridium difficile infection in adult patients with acute myeloid leukemia: Incidence, recurrence, and outcomes. J Clin Oncol Conf 2015;33[Suppl].

Chitnavis M V, Hays RA. Acute-on-chronic neutropenic fever as a complication following fecal microbiota transplantation (FMT) in a patient with shwachman-diamond syndrome. Am J Gastroenterol 2015;110 [Suppl 1]:S492.

Cho J, Sampathkumar P, Seville MT, Kashyap P. Detecting outcomes from clostridium difficile screening on admission in patients admitted to a bone marrow transplant unit. Gastroenterology 2017;152 [Suppl 1]:S345.

Chu ND, Smith MB, Perrotta AR, Kassam Z, Alm EJ. Profiling living bacteria informs preparation of fecal microbiota transplantations. PLoS ONE 2017;12:e0170922.

Chuong KH, O’Doherty KC, Secko DM. Media Discourse on the social acceptability of fecal transplants. Qual Health Res 2015;25:1359–71.

Cicerone C, Bruno G, Lamonaca L, D'Abramo A, Oliva A, Zingaropoli MA, et al. Fecal microbiota transplantation via enema for recurrent Clostridium difficile infection modulates the inflammatory host response and restores intestinal dysbiosis. Digestive and Liver Disease. 2017;49 [Suppl 2]:e102.

Cicerone C, Bruno G, Lamonaca L, Trancassini M, Corazziari ES. Fecal microbiota transplantation for recurrent clostridium difficile infection: Transplant protocol by retention enema and preliminary results. Digestive and Liver Disease. 2017;49 [Suppl 2]:e175.

Claassen E. Healthy microbiota by probiotics or fecal transplantation prevent diarrhea: Probiotics are beneficial in case of Clostridium difficile infection. Pharm Weekbl 2014;149:16–7.

Claes IJJ, Vargas Garcia CE, Lebeer S. Novel opportunities for the exploitation of host-microbiome interactions in the intestine. Curr Opin Biotechnol 2015;32:28–34.

Cocanour CS. Best strategies in recurrent or persistent Clostridium difficile infection. Surg Infect (Larchmt) 2011;12:235–9.

Cohen NA, Maharshak N. Novel indications for fecal microbial transplantation: Update and review of the literature. Dig Dis Sci 2017;62:1131-45.

Collins SM, Kassam Z, Bercik P. The adoptive transfer of behavioral phenotype via the intestinal microbiota: Experimental evidence and clinical implications. Curr Opin Microbiol 2013;16:240–5.

Comito D, Cascio A, Romano C. Microbiota biodiversity in inflammatory bowel disease. Ital J Pediatr 2014;40:32.

Costello SP, Tucker EC, La Brooy J, Schoeman MN, Andrews JM. Establishing a fecal microbiota transplant service for the treatment of Clostridium difficile infection. Clin Infect Dis 2016;62:908–14.

Costello SP, Van Der Poorten D, Andrews JM. Fecal microbiota transplantation for recurrent Clostridium difficile infection: When regulatory affairs do not keep pace with evidence-based medicine. J Gastroenterol Hepatol (Australia) 2017;32:156-7.

Costello SP, Waters O, Bryant RV, Katsikeros R, Makanyanga J, Schoeman M, et al. Short duration, low intensity, pooled fecal microbiota transplantation induces remission in patients with mild moderately active ulcerative colitis: A randomised controlled trial. Gastroenterology 2017;152 [Suppl 1]:S198-S9.

Crabtree S, Gupta J. Knowledge and attitudes towards faecal bacteriotherapy on ITU. Intensive Care Med 2014;40 [Suppl]:S106.

Culligan EP, Sleator RD. Advances in the microbiome: Applications to Clostridium difficile infection. J Clin Med 2016;5:pii E83.

Curry SR. Clostridium difficile. Clin Lab Med. 2017;37:341-69.

Davidovics ZH, Vance K, Etienne N, Hyams JS. Fecal Transplantation Successfully Treats Recurrent D-Lactic Acidosis in a Child with Short Bowel Syndrome. J Parent Enteral Nutr 2017;41(5):896-7.

de Groot PF, Frissen MN, de Clercq NC, Nieuwdorp M. Fecal microbiota transplantation in metabolic syndrome: History, present and future. Gut Microbes 2017;8:253-67.

De Leon LM, Watson JB, Kelly CR. Transient flare of ulcerative colitis after fecal microbiota transplantation for recurrent clostridium difficile infection. Clin Gastroenterol Hepatol 2013;11:1036–8.

De Santis S, Cavalcanti E, Mastronardi M, Jirillo E, Chieppa M. Nutritional keys for intestinal barrier modulation. Front Immunol 2015;6:612.

del Campo-Moreno R, Alarcon-Cavero T, D'Auria G, Delgado-Palacio S, Ferrer-Martinez M. Microbiota and Human Health: characterization techniques and transference. Enferm Infecc Microbiol Clin 2018;36:241-5.

Dennis M, Salpeter MJ, Hota S. Low awareness but positive attitudes toward fecal transplantation in ontario physicians. Can J Infect Dis Med Microbiol 2015;26:30–2.

Dinh A, Bouchand F, Le Monnier A. Current treatment and epidemiology of Clostridium difficile infections. Rev Med Interne 2015;36:596–602.

Donnelly SC. Elements: In this month’s issue. QJM 2015;108:351.

Dore J, Multon MC, Behier JM, participants of Giens Xxxii RTN. The human gut microbiome as source of innovation for health: Which physiological and therapeutic outcomes could we expect? Therapie 2017;72:21-38.

Downs IA, Brandt LJ, Oneto C, Feuerstadt P, Aroniadis OC. Perceptions of fecal microbiota transplantation for diarrhea predominant irritable bowel syndrome. Am J Gastroenterol 2016;111 [Suppl 1]:S1250–1.

Drekonja DM. Clostridium difficile infection: Current, forgotten and emerging treatment options. J Comp Eff Res 2014;3:547–57.

Dryden G. Use of serum-derived bovine immunoglobulin/protein isolate (SBI) to manage refractory ulcerative colitis symptoms and avoid surgery. Am J Gastroenterol 2014;109 [Suppl 1]:S440.

Dunwoody R, Steel A, Landy J, Simmonds N. Clostridium difficile and cystic fibrosis: Management strategies and the role of faecal transplantation. Paediatric Respiratory Reviews 2018;26:16-8.

DuPont HL. Diagnosis and management of Clostridium difficile infection. Clin Gastroenterol Hepatol 2013;11:1216–23.

Ebigbo A, Messmann H. Challenges of Clostridium difficile infection. Med Klin Intensivmed Notfmed 2013;108:624–7.

El Feghaly RE, Bangar H, Haslam DB. The molecular basis of Clostridium difficile disease and host response. Curr Opin Gastroenterol 2015;31:24–9.

El Feghaly RE, Stauber JL, Deych E, Gonzalez C, Tarr PI, Haslam DB. Markers of intestinal inflammation, not bacterial burden, correlate with clinical outcomes in Clostridium difficile infection. Clin Infect Dis 2013;56:1713–21.

El-Nachef N, Piceno YM, Kassam Z, Zydek M, Ablaza AJ, Leith T, et al. Fecal microbiota transplantation is safe and effective in chronic pouchitis patients. Gastroenterology 2017;152 [Suppl 1]:S1009.

Elias J, Lichtman J, Sonnenburg J. Quantifying dynamic host-microbiota signatures of antibiotic-associated GI infection: What can the host proteome tell us? FASEB Journal Conf Exp Biol 2015;29 [Suppl]:575.21.

Fang Y, Chen J, Yu J, Luo Y, Lou J. The preliminary investigation of fecal microbiota transplantation for pediatric recurrent chronic bowel disease and literary review. J Pediatr Gastroenterol Nutr 2016;62:233–4.

Farrell JJ, Martin D, Bogner A, Thompson S V, Taylor AM, Swanson KS, et al. Evolving composition of the human intestinal microbiota following fecal transplantation. Gastroenterology. 2016;150 [Suppl 1]:S430.

Fasullo MJ, Al-Azzawi Y, Abergel J. Microscopic colitis after fecal microbiota transplant. ACG Case Reports Journal. 2017;4:e87.

Fenner I, Lensing C, Katz A, Petersen H. Clostridium difficile - Diagnosis by culture or PCR? Int J Med Microbiol 2009;299:43.

Ferm S, Varadi N, Fisher C, Gutkin E. Serum-derived bovine immunoglobulin as novel adjunct in complicated clostridium difficile colitis treatment. ACG Case Reports Journal 2017;4:e64.

Fischer M, Kao DH, Phelps EL, Smith JD, Roach B, Kassam Z, et al. Should we recommend anti-clostridium difficile antibiotic or probiotic prophylaxis?: Risk of Clostridium difficile infection with systemic antimicrobial therapy following successful fecal microbiota transplant. Gastroenterology 2017;152 [Suppl 1]:S1005.

Fischer M, Kelly CR, Phelps EL, Wang E, Roach B, Smith JD, et al. Quality of bowel preparation does not affect outcome of fecal microbiota transplantation for the therapy Clostridium difficile infection. Gastroenterology 2017;152 [Suppl 1]:S1004-S5.

Fischer M, Khan M, Phelps EL, Safdar N, Misch EA, Kaur N, et al. Fecal microbiota transplantation is safe and effective for the treatment of Clostridium difficile infection in solid organ transplant recipients. Gastroenterology 2017;152 [Suppl 1]:S1005.

Fischer M, Phelps E, Cook G, Sipe B, Rex DK, Xu H. Clostridium difficile pcr testing post fecal microbiota transplantation (FMT) predicts success. Am J Gastroenterol 2015;110 [Suppl 1]:S580.

Fischer M, Rex DK, Sipe BW. Letter: faecal microbiota transplantation in combination with fidaxomicin to treat severe complicated recurrent Clostridium difficile infection--authors’ reply. Aliment Pharmacol Ther 2015;42:1031.

Fischer M, Rex DK, Sipe BW. Letter: Faecal microbiota transplantation in combination with fidaxomicin to treat severe complicated recurrent Clostridium difficile infection - Authors’ reply. Aliment Pharmacol Ther 2015;42:1031.

Fischer M, Sipe B, Torbeck M, Xu H, Kassam Z, Allegretti JR. Does fecal microbiota transplantation from an obese donor lead to weight gain? A case series of 70 recipients. Gastroenterology 2017;152 [Suppl 1]:S1004.

Fischer M, Torbeck M, Cook G, Mazur S, Phelps E, Sipe B, et al. Weight change after fecal microbiota transplantation (FMT) is not associated with donor body mass index (BMI). Am J Gastroenterol 2015;110 [Suppl 1]:S585.

Flamaing J. Treatment of Clostridium difficileassociated diarrhoea: Guidelines. Tijdschr Geneeskd. 2015;71:1592–5.

Floch MH, Walker WA, Madsen K, Sanders ME, Macfarlane GT, Flint HJ, et al. Recommendations for probiotic use - 2011 update. J Clin Gastroenterol 2011;45 [Suppl 3]:S168–71.

Founas A, Wakade Z, Ramachanran P, Ghodoussi A, Tocco J, Moore J, et al. Small bowel obstruction successfully treated with lubiprostone. Am J Gastroenterol 2015;110 [Suppl 1]:S404.

Freedberg DE, Abrams JA. Recent therapeutic advances in gastroenterology and hepatology. Adv Ther 2013;30:855–7.

Freedberg DE, Toussaint NC, Ratner AJ, Whittier S, Wang TC, Wang H, et al. Proton pump inhibitors alter specific taxa in the human fecal microbiome: Results of a crossover trial. Gastroenterology 2015;148 [Suppl 1]:S619.

Friedman-Korn T, Livovsky DM, Maharshak N, Aviv Cohen N, Paz K, Bar-Gil Shitrit A, et al. Fecal Transplantation for Treatment of Clostridium Difficile Infection in Elderly and Debilitated Patients. Dig Dis Sci 2019;63:198-203.

Fuentes S, van Nood E, Tims S, Heikamp-de Jong I, ter Braak CJ, Keller JJ, et al. Reset of a critically disturbed microbial ecosystem: faecal transplant in recurrent Clostridium difficile infection. ISME J 2014;8:1621–33.

Fujimori S. What are the effects of proton pump inhibitors on the small intestine? World J Gastroenterol 2016;22:6817–9.

Fujimori S. What are the effects of proton pump inhibitors on the small intestine? World J Gastroenterol 2015;21:6817–9.

Galperine T, Sokol H, Guery B. Fecal microbiota transplantation: Do we need harmonization? Clin Infect Dis 2017;64:1292.

Gasbarrini G, Bonvicini F, Gramenzi A. Probiotics history. J Clin Gastroenterol 2016;50 [Suppl]:S116–9.

Gedgaudas R, Urba M, Petkevicius V, Jonaitis L, Kiudelis G, Kupcinskas L, et al. First case series of fecal microbiota transplantation for recurrent Clostridium difficile infection in baltic countries. United European Gastroenterology Journal 2017;5 [Suppl 1]:A313.

Gianotti RJ, Moss AC. Fecal microbiota transplantation: From Clostridium difficile to inflammatory bowel disease. Gastroenterol Hepatol 2017;13:209-13.

Gibson D, Kendrick S, Simpson E, Costello D, Davis R, Szetela A, et al. Implementation of xenon ultraviolet-C disinfection robot to reduce hospital acquired infections in hematopoietic stem cell transplant population. Biol Blood Marrow Transplantat 2017;23 [Suppl]:S367.

Gollwitzer ES, Marsland BJ. Microbiota abnormalities in inflammatory airway diseases - Potential for therapy. Pharmacol Ther 2014;141:32–9.

Gomollon F. Developments in the treatment of inflammatory bowel disease: 2014 overview. Gastroenterol Hepatol. 2014;37 [Suppl 3]:14–21.

Gorkiewicz G, Wurm P, Hogenauer C, Spindelbock W. Life-threatening antibiotic-associated enterocolitis and severe dysbiosis in critically ill intensive care unit patients. Virchows Arch 2015;467 [Suppl]:S37.

Gotz VP, Rand KH. Medical management of antimicrobial-associated diarrhea and colitis. Pharmacother J Hum Pharmacol Drug Ther 1982;2:100–9.

Goudarzi M, Seyedjavadi SS, Goudarzi H, Mehdizadeh Aghdam E, Nazeri S. Clostridium difficile Infection: Epidemiology, Pathogenesis, Risk Factors, and Therapeutic Options. Scientifica (Cairo) 2014;2014:916826.

Goyal A, Yeh A, Siebold L, Calabro K, Firek B, Bush BR, et al. Clinical efficacy and microbiome findings following fecal microbiota transplant in children with refractory inflammatory bowel disease. Gastroenterology 2017;152 [Suppl 1]:S959.

Graness N, Swidsinski A, Schusser GF. Equine fecal microbiota in association with systemic use of antimicrobial drugs in horses with acute colitis. Equine Vet Educat 2017;29:16.

Greathouse KL, Harris CC, Bultman SJ. Dysfunctional families: Clostridium scindens and secondary bile acids inhibit the growth of Clostridium difficile. Cell Metab 2015;21:9–10.

Groschel DH. Clostridium difficile infection. Crit Rev Clin Lab Sci 1996;33:203–45.

Habib I, Huq N, Muddana V. Standardized openbiome product as a treatment for Clostridium difficile infections: A single center experience. Gastroenterology 2017;152 [Suppl 1]:S951.

Han S, Lee K, Lee KA, Paik H, Lee J, Kim M, et al. Importance of acquisition of carbapenemase (KPC)-producing enterobacteriaceae in solid organ transplant recipients: A single-center experience. Am J Transplant 2017;17:327.

He Z, Zhang F. Principle, Protocol and Risk Management of Chinese Fecal Microbiota Bank. Chinese J Gastroenterol 2017;22:193-8.

Hecht GA, Orenstein R, Dubberke ER, Lee C, Khanna S. Lack of association with patient demographics and outcomes in punch CD 2, a randomized controlled trial of RBX2660, a microbiota-based drug for recurrent Clostridium difficile infection. Gastroenterology 2017;152 [Suppl 1]:S951-S2.

Hecker MT, Ho E, Donskey CJ. Fear of failure: engaging patients in antimicrobial stewardship after fecal transplantation for recurrent Clostridium difficile infection. Infect Control Hosp Epidemiol 2017;38:127–9.

Hell M, Bernhofer C, Stalzer P, Kern JM, Claassen E. Probiotics in Clostridium difficile infection: Reviewing the need for a multistrain probiotic. Benef Microbes 2013;4:39–51.

Hove H, Tvede M, Mortensen PB. Antibiotic-associated diarrhoea, Clostridium difficile, and short-chain fatty acids. Scand J Gastroenterol 1996;31:688–93.

Hrebinko K, Zuckerbraun BS. Clostridium difficile: What the surgeon needs to know. Seminars Colon Rectal Surg 2018;29:28-36.

Iacob T, TaTulescu DF, Dumitrascu DL. Therapy of the postinfectious irritable bowel syndrome: An update. Clujul Medical 2017;90:133-8.

Ianiro G, Masucci L, Simonelli C, Sanguinetti M, Gasbarrini A, Cammarota G. Single-infusion fecal microbiota transplantation is not effective in treating severe Clostridium difficile infection. United European Gastroenterology Journal. 2017;5 [Suppl 1):A155.

iations across the United States: A 10-year nationwide analysis. Gastrointestinal Endoscopy 2017;85 [Suppl 1]:AB246-AB7.

Jackson M, Olefson S, MacHan JT, Kelly CR. A high rate of alternative diagnoses in patients referred for presumed Clostridium difficile infection. J Clin Gastroenterol 2016;50:742–6.

Jansen JW. Fecal microbiota transplant vs oral vancomycin taper: Important undiscussed limitations. Clin Infect Dis 2017;64:1292-3.

Jiang ZD, Alexander A, Ke S, Valilis EM, Hu S, Li B, et al. Stability and efficacy of frozen and lyophilized fecal microbiota transplant (FMT) product in a mouse model of Clostridium difficile infection (CDI). Anaerobe 2017;48:110-4.

Joseph OD, Thompson SV, Bogner A, Martin D, Farrell JJ, Swanson KS, et al. Longitudinal study of the human gastrointestinal microbiota following fecal microbiota transplant (FMT) for Clostridium difficile infections. FASEB Journal 2017;31[Suppl 1]:Ib326.

Joshi NM, Goodhand J, Alazawi W, Das S, Wilks M, Rampton D. Predicting treatment failure in C. difficile infection: A prospective observational cohort study. Gut. 2016;65 [Suppl]:A209.

Jump RL, Pultz MJ, Donskey CJ. Vegetative Clostridium difficile survives in room air on moist surfaces and in gastric contents with reduced acidity: a potential mechanism to explain the association between proton pump inhibitors and C. difficile-associated diarrhea? Antimicrob Agents Chemother 2007;51:2883–7.

Jump RLP, Donskey CJ. Clostridium difficile in the Long-Term Care Facility: Prevention and Management Topical Collection on Infectious Diseases in the Elderly. Curr Geriatr Reports 2015;4:60–9.

Jump RLP, Pultz MJ, Donskey CJ. Vegetative Clostridium difficile survives in room air on moist surfaces and in gastric contents with reduced acidity: A potential mechanism to explain the association between proton pump inhibitors and C. difficile-associated diarrhea? Antimicrob Agents Chemother 2007;51:2883–7.

Juszczuk K, Grudlewska K, Mikucka A, Gospodarek E. Fecal microbiota transplantation - methods of treatment of recurrent Clostridium difficile infections and other diseases. Postepy Hig Med Dosw 2017;71:220-6.

Kao PC, Han QJ, Liu S, Li XJ, Inman KS, Chia N. Letter to the editor: The surge of type 2 diabetes mellitus in China - An international alert: Physical exercise and low-caloric diet may reduce the risks of type 2 diabetes mellitus and dementia. Ann Clin Lab Sci 2016;46:114–8.

Karakan T. Fecal microbiota transplantation for treating recurrent hepatic encephalopathy: Ready for clinical application? Turk J Gastroenterol 2017;28:425-6.

Kashani A, Shih DQ. Fecal microbiota transplantation is highly effective for treatment of Clostridium difficile infection in patiants with inflammatory bowel disease; a meta-analysis. Gastroenterology. 2017;152 [Suppl 1]:S988.

Kassam Z, Fridman S, Burgess J, Fischer M, Amaratunga K, Edelstein C, et al. The cost-effectiveness of competing strategies for managing multiply recurrent Clostridium difficile infection: Examining the impact of universal stool banks and encapsulated fecal microbiota transplantation. Am J Gastroenterol 2015;110 [Suppl 1]:S933–4.

Kassam Z, Lieberman A, Munoz R, Edelstein C, Osman M, Smith M, et al. The impact of stool banks on access to fecal microbiota transplantation for recurrent Clostridium difficile infection in the United States: A geospatial analysis. Am J Gastroenterol. 2016;111 [Suppl 1]:S410.

Kassam Z, Mendolia G, Vo E, Boughari S, Njenga M, Warren K, et al. Microbial emulsion matrices: A novel method to produce stable, orally available capsules for fecal microbiota transplantation to treat Clostridium difficile. Am J Gastroenterol 2015;110 [Suppl 1]:S568–9.

Kato K, Sekizuka T, Sugiyama T, Ishii Y, Kuroda M, Ohkusa T. Characterization of gut microbiome associated with improvement of ulcerative colitis after antibiotic combination therapy using fecal metagenomic analysis. United European Gastroenterology Journal 2017;5 [Suppl 1]:A264-A5.

Kazerouni A, Burgess J, Burns LJ, Wein LM. Optimal screening and donor management in a public stool bank. Microbiome 2015;3:75.

Kellermayer R, Balderas M, Nagy-Szakal D, Luna RA, Ihekweazu F, Queliza K, et al. Microbiome and metabolome responses to fecal microbiota transplantation for recurrent Clostridium difficile infection in pediatric patients. Gastroenterology 2017;152 [Suppl 1]:S152.

Kelly C, De Leon L, Kerstetter D, Okpara N. Barriers to greater utilization of fecal bacteriotherapy for chronic Clostridium difficile infection. Am J Gastroenterol 2010;105 [Suppl 1]:S135–6.

Kelly CR, Kunde SS, Khoruts A. Guidance on preparing an investigational new drug application for fecal microbiota transplantation studies. Clin Gastroenterol Hepatol 2014;12:283–8.

Kercsak A, Sullivan E, Sikand H. Implementation and outcomes of fecal microbiota transplantation in a four hospital system. Pharmacotherapy 2015;35:e274.

Khanna S, Hecht GA, Dubberke ER, Orenstein R, Lee C, Gerding DN. Alterations in microbial diversity are associated with treatment success with RBX2660, a microbiota-based drug for the prevention of recurrent Clostridium difficile infection: Results from punch CD 2, a randomized doubleblind placebo-controlled trial. Gastroenterology 2017;152 [Suppl 1]:S46-S7.

Khanna S, Shin A, Kelly CP. Management of Clostridium difficile Infection in Inflammatory Bowel Disease: Expert Review from the Clinical Practice Updates Committee of the AGA Institute. Clin Gastroenterol Hepatol 2017;15:166-74.

Khanna S, Vazquez-Baeza Y, Gonzalez A, Weiss S, Schmidt B, Muniz-Pedrogo DA, et al. Changes in microbial ecology after fecal microbiota transplantation for recurrent C. difficile infection affected by underlying inflammatory bowel disease. Microbiome 2017;5:55.

Khoruts A, Staley C, Vaughn BP, Graiziger C, Sadowsky MJ. Treatment of urinary tract infections without affecting the gut microbiota in patients with recurrent Clostridium difficile infection. Gastroenterology 2016 150 [Suppl 150]:S689.

Konijeti G, Sauk J, Shrime M, Ananthakrishnan A. Cost-effectiveness of competing strategies for recurrent Clostridium difficile infection acg/astrazeneca fellow award. Am J Gastroenterol 2013;108 [Suppl 1]:S473.

Konijeti GG, Sauk J, Shrime MG, Gupta M, Ananthakrishnan AN. Cost-effectiveness of competing strategies for management of recurrent Clostridium difficile infection: A decision analysis. Clin Infect Dis 2014;58:1507–14.

Konturek PC, Dieterich W, Neurath M, Zopf Y. Successful therapy of Clostridium difficile infection with fecal microbiota transplantation. Gastroenterology 2017;152 [Suppl 1]:S341.

Kroner PT, Jirapinyo P, Abougergi MS, Thompson CC. Clostridium difficile regional and divisional incidence variations across the United States: a 10-year nationwide analysis. Gastrointestinal Endoscopy. 2017; 5 [Suppl]:AB246-AB247.

Kucher MA, Goloschapov OV, Moiseev IS, Afanasyev BV. Fecal microbiota transplantation as a method to treat complications after hematopoietic stem cell transplantation. Cellular Therapy Transplant 2017;6:20-9.

Kump PK, Krause R, Steininger C, Grochenig HP, Moschen A, Madl C, et al. Recommendations for the use of faecal microbiota transplantation “stool transplantation”: consensus of the Austrian Society of Gastroenterology and Hepatology (OGGH) in cooperation with the Austrian Society of Infectious Diseases and Tropical Medicine. Z Gastroenterol 2014;52:1485–92.

Laffin M, Millan B, Madsen KL. Fecal microbial transplantation as a therapeutic option in patients colonized with antibiotic resistant organisms. Gut Microbes 2017;8:221-4.

Lagier JC, Aubry C, Delord M, Michelet P, Tissot-Dupont H, Million M, et al. From expert protocols to standardized management of infectious diseases. Clin Infect Dis 2017;65:S12-S9.

Landy J, Perry-woodford ZL, Clark SK, Hart A. Patients’ perspectives of faecal transplantation for pouchitis. J Crohn’s Colitis 2012;6:S143.

Lapointe-Shaw L, Tran KL, Coyte PC, Hancock-Howard RL, Powis J, Poutanen SM, et al. Cost-effectiveness analysis of six strategies to treat recurrent clostridium difficile infection. PLoS One 2016;11:e0149521.

Leber A, Hontecillas R, Abedi V, Tubau-Juni N, Zoccoli-Rodriguez V, Stewart C, et al. Modeling new immunoregulatory therapeutics as antimicrobial alternatives for treating Clostridium difficile infection. Artif Intell Med 2017;78:1-13.

Leber A, Viladomiu M, Hontecillas R, Abedi V, Philipson C, Hoops S, et al. Systems modeling of interactions between mucosal immunity and the gut microbiome during Clostridium difficile infection. PLoS One 2015;10:e0134849.

Lee C, Kim PT, Smith E. Outcome of fecal microbiota transplantation for recurrent Clostridium difficile infection on quality of life. Gastroenterology. 2017;152 [Suppl 1]:S949.

Lee JC, Lee HY, Kim TK, Kim MS, Park YM, Kim J, et al. Obesogenic diet-induced gut barrier dysfunction and pathobiont expansion aggravate experimental colitis. PLoS ONE 2017;12:e0187515.

Lee STM, Kahn SA, Delmont TO, Shaiber A, Esen OC, Hubert NA, et al. Tracking microbial colonization in fecal microbiota transplantation experiments via genome-resolved metagenomics. Microbiome 2017;5:50.

Leigh DA, Simmons K. Effect of clindamycin and lincomycin therapy on faecal flora. J Clin Pathol 1978;31:439–43.

Lenhart A, Mittal C, Zierle-Ghosh A, Alangaden G. Is colonization with non-toxigenic Clostridium difficile organism protective against toxigenic strains? Gastroenterology 2015;148 [Suppl 1]:S725.

Lewis BB, Pamer EG. Microbiota-Based Therapies for Clostridium difficile and antibiotic-resistant enteric infections. Ann Rev Microbiol 2017;71:157-78.

Lichtenstein GR. Fecal microbiota transplantation: An update. Gastroenterol Hepatol 2017;13:203.

Lubbert C, Mutters R. Gastrointestinal infections. Internist (Berl) 2017;58:149-69.

Lubbert C, Salzberger B, Mossner J. Fecal microbiota transplantation. Internist (Berl). 2017;58:456-68.

Luo Y, Yang N, Roediger R, Ungaro RC, Grinspan A. Outcomes of fecal microbiota transplantation for Clostridium difficile infections in inflammatory bowel disease patients. Gastroenterology 2017;152 [Suppl 1]:S342.

Luong Nguyen LB, Osman M, Chiang AL, Edelstein C, Fischer M, Ananthakrishnan AN, et al. The cost-effectiveness of competing strategies for treating severe-complicated Clostridium difficile infection: Comparing fecal microbiota transplantation with standard colectomy. Gastroenterology 2016; 150 [Suppl 1]:S543.

Ma GK, Brensinger CM, Wu Q, Lewis JD. Increasing incidence of multiply recurrent Clostridium difficile infection in the United States: A cohort study. Ann Intern Med 2017;167:152-8.

Ma GK, Brensinger CM, Wu Q, Lewis JD. Rising incidence of multiply-recurrent Clostridium difficile infection in the United States. Gastroenterology. 2017;152 [Suppl 1]:S340-S1

Makkawi S, Metz L. Case report: Fecal microbiota transplantation associated with 10 years of disease stability in a patient with secondary progressive multiple sclerosis. Multiple Sclerosis J 2017;23 [Suppl 1]:517.

Manthey CF, Eckmann L, Fuhrmann V. Therapy for Clostridium difficile infection - any news beyond metronidazole and vancomycin? Expert Rev Clin Pharmacol 2017;10:1239-50.

Marshall LL, Peasah S, Stevens GA. Clostridium difficile Infection in older adults: Systematic review of efforts to reduce occurrence and improve outcomes. Consult Pharm 2017;32:24-41.

Massachi S, Hay JW. Cost-effectiveness of various Clostridium difficile infection (CDI) treatments in patients with recurrent infections. Value Heal 2014;17:A273–4.

May T, Mackie RI, Fahey Jr GC, Cremin JC, Garleb KA. Effect of fiber source on short-chain fatty acid production and on the growth and toxin production by Clostridium difficile. Scand J Gastroenterol 1994;29:916–22.

Meinke KW, Hamedani F, Wu S, Balla A, Guzman G. Prototheca zopfii associated diverticulitis in an immunosuppressed host, a case presentation and literature review. Human Pathology: Case Reports 2017;10:43-5.

Merlo G, Graves N, Brain D, Connelly LB. Economic evaluation of fecal microbiota transplantation for the treatment of recurrent Clostridium difficile infection in Australia. J Gastroenterol Hepatol 2016;31:1927–32.

Merlo G, Graves N, Connelly L. Economic evaluation of fecal microbiota transplantation for the treatment of recurrent Clostridium difficile infection in Australia. Value Heal 2015;18:A628.

Mertz L. Omics tech, gut-on-a-chip, and bacterial engineering: New approaches for treating inflammatory bowel diseases. IEEE Pulse 2016;7:9–12.

Metan G, Ture Z, Kaynar L, Berk E, Gursoy S, Alp E, et al. Tigecycline for the treatment of Clostridium difficile infection refractory to metronidazole in haematopoietic stem cell transplant recipients. J Chemother 2015;27:354–7.

Millan B, Laffin M, Madsen K. Fecal microbiota transplantation: Beyond Clostridium difficile. Current Infectious Disease Reports 2017;19:31.

Mitchell DK, Van R, Mason EH, Norris DM, Pickering LK. Prospective study of toxigenic Clostridium difficile in children given amoxicillin/clavulanate for otitis media. Pediatr Infect Dis J 1996;15:514–9.

Mitchell I, Shropshire K, Ruel J. Clostridium difficile infection and fecal bacteriotherapy. Gastroenterol Nurs 2013;36:42–50.

Mitchell SW, DeZoysa P, Leis S, Jayewardene AF, Maistry P, Gadalla S, et al. Adverse effects of liquid vs. encapsulated lyophilized fullspectrum microbiota for the treatment of Clostridium difficile infection. Gastroenterology 2017;152 [Suppl 1]:S346-S7.

Mittal C, Hassan S, Abrencillo R, Bajjoka I, Abouljoud M, Patel A, et al. Changing trends of Clostridium difficile associated diarrhea (CDAD) in liver transplant recipients (LTR) over 15 years. Transplantation 2012;94:549.

Monaghan T, Negm O, MacKenzie B, Hamed M, Shone C, Humphreys DP, et al. High prevalence of subclass-specific binding and neutralising antibodies against Clostridium difficile toxins in adult cystic fibrosis sera: Possible mode of protection against symptomatic Clostridium difficile infection. Gastroenterology 2017;152 [Suppl 1]:S344.

Moossavi S, Bishehsari F, Ansari R, Vahedi H, Nasseri-Moghaddam S, Merat S, et al. Minimum requirements for reporting fecal microbiota transplant trial. Middle East J Dig Dis 2015;7:177–80.

Morgan D. New antibiotics: What do we need? Int J Infect Dis 2016;45:51.

Moss EL, Falconer SB, Tkachenko E, Wang M, Systrom H, Mahabamunuge J, et al. Long-term taxonomic and functional divergence from donor bacterial strains following fecal microbiota transplantation in immunocompromised patients. PLoS ONE 2017;12:e0182585.

Muenyi V, Kerman DH. Changes in the body mass index (BMI) of patients treated with fecal microbiota transplant (FMT) for recurrent C. difficile infection. Gastroenterology 2017;152 [Suppl 1]:S820-S1.

Mullish BH, McDonald JA, Kao DH, Allegretti JR, Petrof EO, Pechlivanis A, et al. Understanding the mechanisms of efficacy of fecal microbiota transplantation in the treatment of Clostridium difficile infection: The potential role of bilemetabolising enzymes. Gastroenterology 2017;152 [Suppl 1]:S47.

Mullish BH, McDonald JAK, Thursz MR, Marchesi JR. Fecal microbiota transplant from a rational stool donor improves hepatic encephalopathy: A randomized clinical trial. Hepatology 2017;66:1354-5.

Mussatto CC, Wang J, Koon HW. Orally active cathelicidin mimic ceragenin CSA13 modulates Clostridium difficile-associated colitis in mice via a modification of intestinal microbiome. Gastroenterology 2017;152 [Suppl 1]:S347-S8.

Nanayakkara D, Nanda N. Clostridium difficile infection in solid organ transplant recipients. Curr Opinion Organ Transplant 2017;22:314-9.

Narula N, Kassam Z, Yuan Y, Colombel JF, Ponsioen C, Reinisch W, et al. Systematic review and meta-analysis: fecal microbiota transplantation for treatment of active ulcerative colitis. Inflamm Bowel Dis 2017;23:1702-9.

Newman KM, Rank K, Vaughn BP, Khoruts A. Treatment of recurrent Clostridium difficile infection using fecal microbiota transplantation in patients with inflammatory bowel disease. Gastroenterology 2017;152 [Suppl 1]:S343.

Ng SCC, Wong SH, Lui RN, Cheung K, Ching JYL, Tang W, et al. Vancomycin followed by fecal microbiota transplantation versus vancomycin for initial Clostridium difficile infection: An open-label randomised controlled trial. United European Gastroenterology Journal 2017;5 [Suppl]:A314.

Niccum BA, Stein DJ, Behm BW, Hays RA. Zinc deficiency predicts fecal microbiota transplant failure in recurrent Cclostridium difficile infection. Gastroenterology. 2017;152 [Suppl 1]:S347.

Nicholson M, Alexander E, Bartlett M, Becker P, Davidovics Z, Doby E, et al. Young faculty clinical investigator award fecal microbiota transplantation in pediatric Clostridium difficile infection, a multi-center study. J Pediatr Gastroenterol Nutr 2017;65 [Suppl 2]:S219-S20.

Nozu R, Inoue T, Sato K, Hayashimoto N. Safety evaluation of fecal microbiota transplantation materials for Clostridium difficile infection in common marmosets. Experimental Animals 2017;66:S68.

Ong GK, Reidy TJ, Huk MD, Lane FR. Clostridium difficile colitis: A clinical review. Am J Surg 2017;213:565-71.

Oreiro MB, De La Guia AL, Nieto JB, De Paz R, Baltasar P, Hernandez D, et al. Fecal calprotectin in allogeneic stem cell trasplantation as surrogate marker of gastrointestinal graft versus host disease. Blood Conf 52nd Annu Meet Am Soc Hematol ASH. 2010;116:21.

Pamer EG. Microbiota-mediated defense against intestinal infection. Ann Hematol 2017;96:S43-S4.

Panchal P, Budree S, Tu E, Kahn SA, Allegretti JR, Fischer M, et al. Pediatric access to fecal microbiota transplantation for recurrent Clostridium difficile infection in the United States and the impact of stool banks: A geospatial analysis. Gastroenterology 2017;152 [Suppl 1]:S849-S50.

Paramsothy S, Borody TJ, Lin E, Finlayson S, Walsh AJ, Samuel D, et al. Donor recruitment for fecal microbiota transplantation. Inflamm Bowel Dis 2015;21:1600–6.

Paramsothy S, Walsh A, Borody T, Samuel D, Van Den Bogaerde J, Leong R, et al. Gastroenterologist perceptions of faecal microbiota transplantation. J Gastroenterol Hepatol 2015;30:21.

Paramsothy S, Walsh AJ, Borody T, Samuel D, Van Den Bogaerde J, Leong RWL, et al. Gastroenterologist perceptions of faecal microbiota transplantation. World J Gastroenterol 2015;21:10907–14.

Park HK, Millan B, Hotte N, Kao DH, Madsen K. Altered phage diversity and increased growth rate of escherichia coli are associated with fecal transplantation failure in patients with Clostridium difficile infection. Gastroenterology 2017;152 [Suppl 1]:S191.

Park L, Mone A, Price JC, Tzimas D, Hirsh J, Poles MA, et al. Perceptions of fecal microbiota transplantation for Clostridium difficile infection: Factors that predict acceptance. Ann Gastroenterol 2017;30:83–8.

Pechine S, Janoir C, Collignon A. Emerging monoclonal antibodies against Clostridium difficile infection. Expert Opin Biol Ther 2017;17:415-27.

Perez E, Lee CH, Petrof EO. A practical method for preparation of fecal microbiota transplantation. Methods Mol Biol 2016;1476:259–67.

Pestana L, Pardi D, Khanna S. Incidental colonoscopy findings during fecal microbiota transplantation for C. Difficile infection. Gastroenterology. 2016;150[Suppl 1]:S747–8.

Piceno YM, El-Nachef N, Kassam Z, Smith M, Fadrosh D, Lynch K, et al. Fecal microbiota transplantation differentially influences the gut microbiota of Clostridium difficile infection and ileal pouch anal anastomosis patients. Gastroenterology 2017;152 [Suppl 1]:S1006.

Pinn DM, Aroniadis OC, Brandt LJ. Is fecal microbiota transplantation (FMT) an effective treatment for patients with functional gastrointestinal disorders (FGID)? Neurogastroenterol Motil 2015;27:19–29.

Pinn DM, Aroniadis OC, Brandt LJ. Is fecal microbiota transplantation the answer for irritable bowel syndrome? A single-center experience. Am J Gastroenterol 2014;109:1831–2.

Plant BJ. Clostridium difficile and other gut infections in patients with pulmonary disease, including in cystic fibrosis. Pediatr Pulmonol 2015;50:113–5.

Prayitno N, Akhavan P, Khan M, Willey BM, Hota S, Sales V, et al. Determination of the optimal storage duration and conditions for faecal transplantation (FTX) samples. Can J Infect Dis Med Microbiol 2012;23:3B.

Prior AR, Kevans D, McDowell L, Cudmore S, Fitzpatrick F. Treatment of Clostridium difficile infection: a national survey of clinician recommendations and the use of faecal microbiota transplantation. J Hosp Infect 2017;95:438-41.

Quraishi MN, Segal J, Mullish B, McCune VL, Hawkey P, Colville A, et al. National survey of practice of faecal microbiota transplantation for Clostridium difficile infection in the UK. J Hosp Infect 2017;95:444-5.

Ray A, Jones CR, Shannon B, Carter S. Donors are universal in the fight against Clostridium difficile: Results from two trials investigating the safety and efficacy of RBX2660, a microbiota-based drug. Gastroenterology 2017;152 [Suppl 1]:S950.

Ren RR, Sun G, Yang YS, Peng LH, Wang SF, Shi XH, et al. Chinese physicians’ perceptions of fecal microbiota Transplantation. World J Gastroenterol 2016;22:4757–65.

Rice LB. The complex dynamics of antimicrobial activity in the human gastrointestinal tract. Trans Am Clin Climatol Assoc 2013;124:123–32.

Richardson C, Kim P, Lee C, Bersenas A, Weese JS. Comparison of Clostridium difficile isolates from individuals with recurrent and single episode of infection. Anaerobe 2015;33:105–8.

Saffouri G, Khanna S, Pardi D. Outcomes from rectal vancomycin therapy in patients with severe-complicated Clostridium difficile infection. Am J Gastroenterol 2013;108 [Suppl 1]:S175.

Saffouri G, Pardi D, Kashyap P, Khanna S. Body mass index changes after fecal microbiota transplant for recurrent Clostridium difficile infection. Am J Gastroenterol 2016;111 [Suppl 1]:S103.

Sammons JS, Gerber JS, Tamma PD, Sandora TJ, Beekmann SE, Polgreen PM, et al. Diagnosis and management of Clostridium difficile infection by pediatric infectious diseases physicians. J Pediatric Infect Dis Soc 2014;3:43–8.

Samuel BP, Crumb TL, Duba MM. What nurses need to know about fecal microbiota transplantation: education, assessment, and care for children and young adults. J Pediatr Nurs 2014;29:354–61.

Schvartz B, Leveque N. Asymptomatic carriage of gastro-intestinal pathogens in renaltransplant recipients : Epidemiology and risk factors. Nephrol Dial Transplant 2015;30:iii356-iii357.

Sears P, Crook DW, Louie TJ, Miller MA, Weiss K. Fidaxomicin attains high fecal concentrations with minimal plasma concentrations following oral administration in patients with Clostridium difficile infection. Clin Infect Dis 2012;55 [Suppl 2]:S116–20.

Seril DN, Shen B. Clostridium difficile infection in the postcolectomy patient. Inflamm Bowel Dis United States; 2014;20:2450–69.

Shaughnessy MK, Bobr A, Kuskowski MA, Johnston BD, Sadowsky MJ, Khoruts A, et al. Environmental contamination in households of patients with recurrent Clostridium difficile infection. Appl Environ Microbiol 2016;82:2686–92.

Sheehan D, Brown J, Flemer B, Zulquernain SA, Gahan CG, Joyce S, et al. Mechansims underpinning successful faecal microbiota transplantation (FMT) for recurrent Clostridium difficile infection. Gastroenterology. 2017;152 [Suppl 1]:S47-S8.

Shen NT, Gold SL, Schneider Y, Cohen-Mekelburg SA, Maw AM, Crawford CV. Probiotic sepsis in patients with inflammatory bowel disease; Is it something to worry about? Gastroenterology. 2017;152 [Suppl 1]:S817.

Sidhu M, van der Poorten D. The gut microbiome. Aust Fam Physician 2017;46:206-11.

Simmerlein R, Basta A, Gosch M. Clostridium difficile infections in geriatric patients. Z Gerontol Geriatr 2016;49:743–61.

Simojoki ST, Kirjavainen V, Rahiala J, Kanerva J. Surveillance cultures in pediatric allogeneic hematopoietic stem cell transplantation. Pediatr Transplant 2014;18:87–93.

Smith AD, Zhang IT, Schubert AM, Giordano NP, Hastie JE, Cowley SC, et al. MAIT cells: Shaping the microbiome, contributing to Clostridium difficile infection. J Immunol 2017;198 [Suppl 1]:216.3.

Smith JD, Roach B, Silva M, Louie T, Xu H, Kao DH. Donor body mass index (BMI) does not impact recipient BMI following fecal microbiota transplantation for recurrent Clostridium difficile infection. Gastroenterology 2017;152 [Suppl 1]:S1007.

Smith MB, Kassam Z, Burgess J, Perrotta AR, Burns LJ, Mendolia GM, et al. The international public stool bank: A scalable model for standardized screening and processing of donor stool for fecal microbiota transplantation. Gastroenterology 2015;148 [Suppl 1]:S211.

Smith MB, Kelly C, Alm EJ. Policy: How to regulate faecal transplants. Nature 2014;506:290–1.

Sofi A, Georgescu C, Sodeman T, Nawras A. Physician outlook towards fecal microbiota transplantation in the treatment of recurrent Clostridium difficile infection. Gastroenterology 2013;146 [Suppl 1]:S241.

Sofi A, Nawras A, Sodeman T, Garborg K, Silverman A. Fecal bacteriotherapy works for Clostridium difficile infection - A meta-analysis. Am J Gastroenterol 2011;106 [Suppl 1]:S161.

Sofi AA, Georgescu C, Sodeman T, Nawras A. Physician outlook toward fecal microbiota transplantation in the treatment of Clostridium difficile infection. Am J Gastroenterol 2013;108:1661–2.

Sofi AA, Silverman AL, Khuder S, Garborg K, Westerink JM, Nawras A. Relationship of symptom duration and fecal bacteriotherapy in Clostridium difficile infection-pooled data analysis and a systematic review. Scand J Gastroenterol 2013;48:266–73.

Solbach P, Dersch P, Bachmann O. Individualized treatment strategies for Clostridium difficile infections. Internist (Berl) 2017;58:675-81.

Song Y, Garg S, Girotra M, Maddox C, von Rosenvinge EC, Dutta A, et al. Microbiota dynamics in patients treated with fecal microbiota transplantation for recurrent Clostridium difficile infection.[Erratum appears in PLoS One. 2014;9:e104471]. PLoS ONE 2013;8:e81330.

Spalinger M, Gottier C, Hering L, Lang S, Rogler G, Scharl MM. Co-housing DSS treated mice with healthy mice results in faster normalization of the intestinal microbiota and promotes recovery. Gastroenterology 2017;152 [Suppl 1]:S987.

Spiceland CM, Saffouri G, Pardi D, Khanna S. Outcomes of fidaxomicin treatment of Clostridium difficile infection. Gastroenterology 2016;150:S744.

Srinivasan I, Tang SJ, Sones JQ. Fecal microbial transplantation. Gastrointestinal Endoscopy 2017;85:1107-8.

Staley C, Hamilton MJ, Vaughn BP, Graiziger C, Newman KM, Kabage A, et al. Successful resolution of recurrent Clostridium difficile infection using freeze-dried, encapsulated fecal microbiota. Gastroenterology 2017;152 [Suppl 1]:S343-S4.

Staley C, Kelly CR, Brandt LJ, Khoruts A, Sadowsky MJ. Complete microbiota engraftment is not essential for recovery from recurrent Clostridium difficile infection following fecal microbiota transplantation. MBio 2016;7:e01965-16.

Staley C, Khoruts A, Sadowsky MJ. Contemporary Applications of Fecal Microbiota Transplantation to Treat Intestinal Diseases in Humans. Arch Med Res 2017;48:766-73.

Staley C, Vaughn BP, Graiziger CT, Sadowsky MJ, Khoruts A. Gut-sparing treatment of urinary tract infection in patients at high risk of Clostridium difficile infection. J Antimicrob Chemother 2017;72(2):522-8.

Staley C, Vaughn BP, Graiziger CT, Singroy S, Hamilton MJ, Yao D, et al. Community dynamics drive punctuated engraftment of the fecal microbiome following transplantation using freeze-dried, encapsulated fecal microbiota. Gut Microbes 2017;8:276-88.

Steevens CD, Roto D, DeCross AJ. Obese stool donors in fecal microbiota transplantation: Not associated with recipient weight gain! Gastroenterology 2017;152 [Suppl 1]:S1007-S8.

Surawicz CM, Brandt LJ, Binion DG, Ananthakrishnan AN, Curry SR, Gilligan PH, et al. Guidelines for diagnosis, treatment, and prevention of Clostridium difficile infections. Am J Gastroenterol 2013;108:478–99.

Tan M, Smitasin N, Ong D, Lee AJ, Jureen R, Tambyah P, et al. Bacteraemia following faecal microbiota transplantation for recurrent clostridium difficile infection in an immunosuppressed patient. Antimicrob Resist Infect Control 2017;6 [Suppl 3]:52.

Tariq R, Khanna S. Clostridium difficile infection: Updates in management. Indian J Gastroenterol 2017;36:3-10.

Tariq R, Pardi DS, Weatherly RM, Kammer PP, Khanna S. Outcomes and management of patients with failed fecal microbiota transplantation for recurrent Clostridium difficile infection. Gastroenterology 2017;152 [Suppl 1]:S346.

Tariq R, Weatherly R, Kammer P, Pardi D, Khanna S. Donor screening experience for fecal microbiota transplantation for patients with recurrent C. Difficile infection. Am J Gastroenterol. 2016;111 [Suppl 1]:S458.

Tariq R, Weatherly R, Kammer P, Pardi DS, Khanna S. Donor screening experience for fecal microbiota transplantation in patients with recurrent C. difficile infection. J Clin Gastroenterol 2018;52:146-50.

Tariq R, Weatherly RM, Kammer PP, Walker RC, Razonable RR, Pardi DS, et al. Improved urinary tract infections with fecal microbiota transplantation for recurrent Clostridium difficile infection. Gastroenterology 2017;152 [Suppl 1]:S815.

Taur Y, Jenq RR, Perales MA, Littmann ER, Morjaria S, Ling L, et al. The effects of intestinal tract bacterial diversity on mortality following allogeneic hematopoietic stem cell transplantation. Blood 2014;124:1174–82.

Tauxe WM, Dhere T, Ward A, Racsa LD, Varkey JB, Kraft CS. Fecal microbiota transplant protocol for Clostridium difficile infection. Lab Med 2015;46:e19–23.

Taylor KN, McHale MT, Saenz CC, Plaxe SC. Diagnosis and treatment of Clostridium difficile (C. diff) colitis: Review of the literature and a perspective in gynecologic oncology. Gynecol Oncol 2017; 144:428-37

Thaiss CA, Elinav E. The remedy within: will the microbiome fulfill its therapeutic promise? J Mol Med 2017;95:1021-7.

Tissot F, Maillard MH. Clostridium difficile infections: update on new European recommendations. Rev Med Suisse 2014;10:913–916,918.

To KB, Napolitano LM. Clostridium difficile infection: Update on diagnosis, epidemiology, and treatment strategies. Surg Infect (Larchmt) 2014;15:490–502.

Trinh SA, Echenique IA, Penugonda S, Angarone MP. Optimal strategies for the diagnosis of community-onset diarrhea in solid organ transplant recipients: Less is more. Transpl Infect Dis 2017;19:e12673.

Tschudin-Sutter S, Widmer AF, Perl TM. Clostridium difficile: Novel insights on an incessantly challenging disease. Curr Opin Infect Dis 2012;25:405–11.

Ulmer L, Verma A, Brock J, Iyer R. Fecal microbiota transplant for C. difficile colitis from thawed frozen stool and "real world" experience in a community hospital over two years. Gastroenterology 2017;152 [Suppl 1]:S341.

Van den Abbeele P, Verstraete W, El Aidy S, Geirnaert A, Van de Wiele T. Prebiotics, faecal transplants and microbial network units to stimulate biodiversity of the human gut microbiome. Microb Biotechnol 2013;6:335–40.

Varier RU, Biltaji E, Smith KJ, Roberts MS, Jensen MK, LaFleur J, et al. Cost-effectiveness analysis of treatment strategies for initial Clostridium difficile infection. Clin Microbiol Infect 2014;20:1343–51.

Varier RU, Biltaji E, Smith KJ, Roberts MS, Jensen MK, LaFleur J, et al. Cost-effectiveness analysis of fecal microbiota transplantation for recurrent Clostridium difficile infection. Infect Control Hosp Epidemiol 2015;36:438–44.

Varier RU, Biltaji EO, Smith KJ, Roberts MS, LaFleur J, Nelson RE. Cost-effectiveness analysis of fecal microbiota transplantation versus vancomycin for recurrent Clostridium difficile infection. Gastroenterology. 2014;144 [Suppl 1]:S250–1.

Vaughn B, Kahn S, Rubin D, Moss A. Donor stool preparation for fecal transplantation in patients with IBD: Regulatory and financial aspects. Inflamm Bowel Dis 2013;19:S88.

Vemuri RC, Gundamaraju R, Shinde T, Eri R. Therapeutic interventions for gut dysbiosis and related disorders in the elderly: Antibiotics, probiotics or faecal microbiota transplantation? Beneficial Microbes 2017;8:179-92.

Verna EC, Macesic N, Annavajhala M, Giddins M, Stump S, Brown RS, et al. Dynamic adaptations of intestinal microbiota after liver transplantation. Hepatology 2017;66 [Suppl 1]:116A.

Vestermark CA, Singla MB, Rodriguez B, Armbruster SP. Salmonella-associated Clostridium difficile infection presenting as new onset ascites. Am J Gastroenterol 2016;111 [Suppl 1]:S617.

Vyas D, Aekka A, Vyas A. Fecal transplant policy and legislation. World J Gastroenterol 2015;21:6–11.

Waye A, Atkins K, Kao D. Cost averted with timely fecal microbiota transplantation in the management of recurrent Clostridium difficile infection in Alberta, Canada. J Clin Gastroenterol 2016;50:747–53.

Weil AA, Hohmann EL. Fecal microbiota transplant: Benefits and risks. Open Forum Infect Dis 2015;2:ofv005.

Weingarden AR, Vaughn BP. Intestinal microbiota, fecal microbiota transplantation, and inflammatory bowel disease. Gut Microbes 2017;8:238-52.

Wilson D, Rahni D, Kelly C. Safety outcomes after fecal microbiota transplantation (FMT) For C. difficile Infection (CDI). Am J Gastroenterol 2014;109 [Suppl 1]:S207.

Wilson M, Ritz N, Singh S, Lin HC. Successful fecal microbiota transplant depends on the gut microbial community of the recipient to be already perturbed. Gastroenterology 2017;152 [Suppl 1]:S1039.

Wolf-Meyer MJ. Normal, Regular, and Standard: Scaling the Body through Fecal Microbial Transplants. Med Anthropol Q. 2017;31:297-314.

Wurm P, Spindelboeck W, Krause R, Plank J, Fuchs G, Bashir M, et al. Antibiotic-associated apoptotic enterocolitis in the absence of a defined pathogen: The role of intestinal microbiota depletion. Crit Care Med. 2017;45:e600-e6.

Xi D, Michail S. Fecal microbiota transplantation in children does not significantly alter body mass index. Gastroenterology 2017;152 [Suppl 1]:S648.

Yakob L, Riley T V, Paterson DL, Marquess J, Clements AC. Assessing control bundles for Clostridium difficile: a review and mathematical model. Emerg Microbes Infect 2014;3:e43.

Yamazaki Y, Kawarai S, Morita H, Kikusui T, Iriki A. Faecal transplantation for the treatment of Clostridium difficile infection in a marmoset. BMC Vet Res 2017;13:150.

Yang Z, Wang X, Bu C. Fecal microbiota transplant for Crohn's disease: A prospective, randomized study in chinese population. United European Gastroenterology Journal. 2017;5 [Suppl 1]:A112-A3.

Yeh A, Morowitz MJ. Probiotics and fecal microbiota transplantation in surgical disorders. Seminars in Colon and Rectal Surgery 2018;29:37-43.

Young VB. Treatment with fecal microbiota transplantation: The need for complete methodological reporting for clinical trials. Ann Intern Med 2017;167:61-2.

Zeitz J, Bissig M, Barthel C, Biedermann L, Scharl S, Pohl D, et al. Patients’ views on fecal microbiota transplantation: an acceptable therapeutic option in inflammatory bowel disease? Eur J Gastroenterol Hepatol 2017;29:322-330

Zellmer C, De Wolfe TJ, Van Hoof S, Blakney R, Safdar N. Patient perspectives on fecal microbiota transplantation for Clostridium difficile infection. Infect Dis Ther 2016;5:155–64.

Zhang F, Luo W, Shi Y, Fan Z, Ji G. Should we standardize the 1,700-year-old fecal microbiota transplantation. Am J Gastroenterol 2012;107:1755.

Zhu YL, Guo XH, Zhang LF, Qin YM. A case of fecal microbiota transplantation for treatment of ulcerative colitis. World Chinese Journal of Digestology 2017;25:1321-6.

Zhu YM, Li L. New recognition of gut microbiota and related diseases. World Chinese Journal of Digestology 2017;25:2095-101.

Zipursky JS, Sidorsky TI, Freedman C, Sidorsky MN, Kirkland KB. Patient attitudes toward the use of fecal microbiota transplantation in the treatment of recurrent Clostridium difficile infection. Clin Infect Dis 2012;55:1652–8.

Zipursky JS, Sidorsky TI, Freedman CA, Sidorsky MN, Kirkland KB. Physician attitudes toward the use of fecal microbiota transplantation for the treatment of recurrent Clostridium difficile infection. Can J Gastroenterol Hepatol 2014;28:319–24.

Zowall H, Brewer C, Deutsch A. A model of Clostridium difficile infection: Dynamic transmission between hospitals , long-term care facilities and communities. Value Heal 2014;17:A280–1.

Zowall H, Brewer C, Deutsch A. Cost-effectiveness of fecal microbiota transplant in treating Clostridium difficile infection in Canada. Value Heal 2014;17:A676.

Zowall H, Brewer C, Deutsch A. Projected cost savings of introducing fecal microbiota transplant treatment for clostridium difficile infection in Canada. Value Heal 2015;18:A238.

Zucca M, Scutera S, Savoia D. Novel avenues for Clostridium difficile infection drug discovery. Expert Opin Drug Discov 2013;8:459–77.

Zuo T, Wong SH, Lam K, Lui R, Cheung K, Tang W, et al. Bacteriophage transfer during faecal microbiota transplantation in Clostridium difficile infection is associated with treatment outcome. Gut 2018;67:634-43.

**D.2. Non-CDI indications:**

**D.2.1. Abstracts not fulfilling selection criteria:**

Bajaj JS, Kassam Z, Fagan A, Gavis E, Liu EJ, Kheradman R, et al. Fecal microbiota transplant using a precision medicine approach is safe, associated with lower hospitalization risk and improved cognitive function in recurrent hepatic encephalopathy. Gastroenterology 2017;152 [Suppl 1]:S906.

El-Nachef N, Piceno YM, Kassam Z, Zydek M, Ablaza AJ, Leith T, et al. Fecal microbiota transplantation is safe and effective in chronic pouchitis patients. Gastroenterology 2017;152 [Suppl 1]:S1009.

Hefazi M, Patnaik MM, Hogan WJ, Litzow MR, Pardi DS, Khanna S. Safety and efficacy of fecal microbiota transplantation for recurrent Clostridium infection in patients with hematologic malignancies. Blood 2016;128:3599.

Ianiro G, Masucci L, Valerio L, Nagel D, D'Aversa F, Poto R, et al. Fecal microbiota transplantation for recurrent C. Difficile infection: Analysis of factors associated with the need for multiple fecal infusions. United European Gastroenterology Journal 2016;4 [Suppl 1]:A96-A7.

Karakan T, Ibis M, Cindoruk M, Sargin ZG, Alizadeh N. Faecal microbiota transplantation as a rescue therapy for steroid-dependent and/or nonresponsive patients with ulcerative colitis: A pilot study. J Crohn's Colitis 2016;10:S425-S6.

Masaoka T, Yamane T, Mizuno S, Mori K, Hirata K, Matsushita M, et al. Safety and efficacy of fecal microbiota transplantation on functional bowel disorders-a pilot study. Neurogastroenterol Motil 2016;28 [Suppl 1]:96.

Paramsothy S, Kaakoush N, Kamm MA, Faith J, Clemente J, Walsh A, et al. Faecal microbiota transplantation (FMT) in ulcerative colitis (UC) is associated with specific bacterial changes: Stool and colonic mucosa 16s microbiota analysis from the randomised controlled focus study. United European Gastroenterology Journal 2016;4 [Suppl 1]:A30-A1.

Paramsothy S, Kamm M, Walsh A, Van Den Bogaerde J, Samuel D, Leong R, et al. Multi-donor intense faecal microbiota transplantation is an effective treatment for resistant ulcerative colitis: A randomised placebo-controlled trial. J Crohn's Colitis 2016;10:S14.

Paramsothy S, Kamm MA, Walsh AJ, Van Den Bogaerde J, Samuel D, Leong RWL, et al. Multi donor intense faecal microbiota transplantation is an effective treatment for resistant ulcerative colitis: A randomised placebocontrolled trial and microbiota analysis. Journal of Gastroenterology and Hepatology (Australia). 2016;31:143.

Rossen N, Fuentes S, Van Der Spek M, Tijssen J, Hartman J, Duflou A, et al. Faecal microbiota transplantation in Ulcerative Colitis: A randomised controlled trial. Journal of Crohn's and Colitis. 2015;9:S2.

**D.2.2. Case series not fulfilling selection criteria:**

Cui B, Feng Q, Wang H, Wang M, Peng Z, Li P, et al. Fecal microbiota transplantation through mid-gut for refractory Crohn's disease: Safety, feasibility, and efficacy trial results. J Gastroenterol Hepatol (Australia) 2015;30:51-8.

Cui B, Li P, Xu L, Zhao Y, Wang H, Peng Z, et al. Step-up fecal microbiota transplantation strategy: A pilot study for steroid-dependent ulcerative colitis. J Transl Med 2015;13:298.

Davido B, Batista R, Michelon H, Lepainteur M, Bouchand F, Lepeule R, et al. Is faecal microbiota transplantation an option to eradicate highly drug-resistant enteric bacteria carriage? J Hosp Infect 2017;95:433-7.

Fang YH, Chen J, Yu JD, Luo YY, Lou JG. The preliminary investigation of faecal microbiota transplantation for paediatric recurrent chronic bowel diseases and literature review. Hong Kong J Paediatr 2017;22:199-203.

Grewal CS, Sood A, Mehta V, Mahajan R. Role of fecal microbiota transplantation in steroid dependant ulcerative colitis: A prospective observational study. Indian J Gastroenterol 2016;35 [Suppl]:A39.

Grewal CS, Sood A, Mehta V, Sood N, Midha V, Mahajan R, et al. Role of fecal microbiota transplantation in patients with steroid dependant ulcerative colitis. Am J Gastroenterol 2016;111 [Suppl 1]:S1252-S3.

Ishikawa D, Osada T, Haga K, Kodani T, Shibuya T, Watanabe S. Combination therapy of fresh faecal microbial transplantation and antibiotics for ulcerative colitis. J Crohn's Colitis 2016;10:S335-S6.

Jacob V, Crawford C, Cohen-Mekelburg S, Viladomiu M, Putzel GG, Schneider Y, et al. Single delivery of high-diversity fecal microbiota preparation by colonoscopy is safe and effective in increasing microbial diversity in active ulcerative colitis. Inflamm Bowel Dis 2017;23:903-11.

Karakan T, Ibis M, Gok Sargn Z. Faecal microbiota transplantation (FMT) as a rescue therapy for steroid-dependent and/or nonresponsive patients with ulcerative colitis (UC): A pilot study. United European Gastroenterology Journal 2016;4 [Suppl 1]:A268.

Kunde S, Pham A, Bonczyk S, Crumb T, Duba M, Conrad H, et al. Safety, tolerability, and clinical response after fecal transplantation in children and young adults with ulcerative colitis. J Pediatr Gastroenterol Nutr 2013;56:597-601.

Midha V, Singh A, Grewal CS, Mahajan R, Mehta V, Sood A. Efficacy and safety of fecal microbiota therapy in ulcerative colitis: Early experience. J Gastroenterol Hepatol 2017;32 [Suppl 3]:150-1.

Nishida A, Imaeda H, Ohno M, Inatomi O, Bamba S, Sugimoto M, et al. Efficacy and safety of single fecal microbiota transplantation for Japanese patients with mild to moderately active ulcerative colitis. J Gastroenterol 2017;52:476-82.

Suskind DL, Singh N, Nielson H, Wahbeh G. Fecal microbial transplant via nasogastric tube for active pediatric ulcerative colitis. J Pediatr Gastroenterol Nutr 2015;60:27-9.

Uygun A, Ozturk K, Demirci H, Oger C, Avci IY, Turker T, et al. Fecal microbiota transplantation is a rescue treatment modality for refractory ulcerative colitis. Medicine (United States) 2017;96:e6479.

Wei Y, Gong J, Zhu W, Tian H, Ding C, Gu L, et al. Pectin enhances the effect of fecal microbiota transplantation in ulcerative colitis by delaying the loss of diversity of gut flora. BMC Microbiol 2016;16:1-9.

Wei Y, Zhu W, Gong J, Guo D, Gu L, Li N, et al. Fecal microbiota transplantation improves the quality of life in patients with inflammatory bowel disease. Gastroenterol Research Practice 2015;2015:517597.

**D.2.3. Narrative reviews:**

Biehl L. Fecal microbiota transfer. Transfusion Medicine and Hemotherapy 2017;44 [Suppl 1]:22.

Borody TJ, Warren EF, Leis SM, Surace R, Ashman O, Siarakas S. Bacteriotherapy using fecal flora: Toying with human motions. J Clin Gastroenterol 2004;38:475-83.

Colman RJ, Rubin DT. Fecal microbiota transplantation as therapy for inflammatory bowel disease: A systematic review and meta-analysis. J Crohn's Colitis 2014;8:1569-81.

**D.2.4. Miscellaneous, not relevant:**

Aarbiou J, Leeming DJ, Cruwys S, Gudmann NS, Brockbank S, Young A, et al. A comparison of compounds with claimed anti-fibrotic activity in a novel human fibroblast to myofibroblast transition assay using IPF derived patient material. Am J Resp Crit Care Med 2017;195:A2407.

Abbas SH, Abdulridha MK, Najeb AA. Potential benefit of curcumin adjuvant therapy to the standard Helicobacter pylori eradication therapy in patients with peptic ulcer disease. Asian J Pharm Clin Res 2017;10:313-7.

Adachi JA, DuPont HL. Rifaximin: A novel nonabsorbed rifamycin for gastrointestinal disorders. Clinical Infect Dis 2006;42:541-7.

Adam B, Koldehoff M, Ditschkowski M, Gromke T, Hlinka M, Trenschel R, et al. Endoscopic and histological findings are predicted by fecal calprotectin in acute intestinal graft-versus-host-disease. Dig Dis Sci 2016;61:2019-26.

Agachan F, Pfeifer J, Joo JS, Nogueras JJ, Weiss EG, Wexner SD. Results of perineal procedures for the treatment of rectal prolapse. American Surgeon 1997;63:9-12.

Ahmed AR, Watanabe H, Aoki J, Shinozaki T, Takagishi K. Schwannoma of the extremities: The role of PET in preoperative planning. Eur J Nuclear Med 2001;28:1541-51.

Al-Bayati I, Saadi M, Elhanafi S, McCallum RW. Effectiveness of bulking agent (solesta) therapy in fecal incontinence in patients refractory to conventional therapies. Am J Med Sci 2017;354:476-9.

Almeida AG, Mesquita Gabriel H, Coutinho CA, Sargento L, David C, Oliveira J, et al. Myocardial perfusion and angioplasty. Comparison of myocardial contrast echocardiography and scintigraphy. Revista Portuguesa de Cardiologia 2002;21:859-68.

Amini M, Khedmat H, Yari F. Eradication rate of Helicobacter pylori in dyspeptic patients. Medical Science Monitor 2005;11:CR193-5.

Amini-Bavil-Olyaee S, Trautwein C, Tacke F. Hepatitis E vaccine: Current status and future prospects. Future Virology 2009;4:143-54.

Andersen ML, Fallentin E, Lauridsen CA, Kjaer MS, Clemmesen O, Larsen FS, et al. Evaluation of blood perfusion in liver cirrhosis by dynamic contrast enhanced computed tomography. Hepatology 2017;66 [Suppl 1]:343A.

Arguedas MR, Fallon MB. Hepatitis A. Current Treatment Options in Gastroenterology 2004;7:443-50.

Arnow PM, Carandang GC, Zabner R, Irwin ME. Randomized controlled trial of selective bowel decontamination for prevention of infections following liver transplantation. Clin Infect Dis 1996;22:997-1003.

Asari SO, Nakajima T, Kojima K, Miyauchi A, Saitou JI, Saga Y, et al. FMT-PET analysis in gene therapy for AADC deficiency. Clin Neurol 2016;56:S268.

Ashraf W, Park F, Lof J, Quigley EM. Effects of psyllium therapy on stool characteristics, colon transit and anorectal function in chronic idiopathic constipation. Aliment Pharmacol Ther 1995;9:639-47.

Badin RA, Binley K, Van Camp N, Jan C, Gourlay J, Stewart H, et al. Advancing a state of the art gene therapy for parkinson's disease. Molecular Therapy 2015;23:S79-S80.

Bajaj JS, Kassam Z, Fagan A, Gavis EA, John B, Fuchs M, et al. Fecal microbiota transplantation from a rationally selected donor is safe in patients with recurrent hepatic encephalopathy: Preliminary data from a randomized trial. Hepatology 2016;64 [Suppl 1]:717A.

Bajaj JS, Sikaroodi M, White M, Fagan A, Gilles HC, Heuman DM, et al. Liver transplant significantly improves gut microbial dysbiosis and microbial diversity in cirrhotic patients. Hepatology 2016;64 [Suppl 1]:492A-3A.

Bariol C, Meagher AP, Vickers CR, Byrnes DJ, Edwards PD, Hing M, et al. Thalidomide for inflammatory bowel disease: Early studies on the safety and efficacy of thalidomide for symptomatic inflammatory bowel disease. J Gastroenterol Hepatol (Australia) 2002;17:135-9.

Bariol C, Meagher AP, Vickers CR, Byrnes DJ, Edwards PD, Hing M, et al. Early studies on the safety and efficacy of thalidomide for symptomatic inflammatory bowel disease. J Gastroenterol Hepatol 2002;17:135-9.

Barnes D, Park KT, Smith M, Kassam Z. Feasibility of a competitively selected universal donor fecal microbiota transplantation protocol and characterization of post-transplant microbiota modification. J Pediatr Gastroenterol Nutr. 2016;63:S142-S3.

Basu PP, Krishnaswamy N, Korapati R, Tammisetti S, Shah NJ, Hampole H, et al. A new ultra short regimen with dexlansoprazole, moxifloxacin, amoxicillin, nitazoxanide, and doxycycline (DeMAND) in eradication of Helicobacter pylori: An open-label randomized clinical trial. Int J Infect Dis. 2010;14:S52.

Beecher B, Glassner P, Malchau H, Kwon YM. A concise minimum eight year follow-up of proximally porous-coated tapered titanium femoral stem in primary total hip arthroplasty. International Orthopaedics 2012;36:1561-5.

Belin A, Prost PL, Mercadier G, Grollier G, Lablanche JM. Comparative study of verapamil LI 120 mg 3 times a day and verapamil LP 120 mg twice a day in stable exertion-induced angina. A multicenter study]. Ann Cardiol Angeiol (Paris) 1995;44:365-71.

Berg KJ, Lundby B, Reinton V, Nordal KP, Rootwelt K, Smith HJ. Gadodiamide in renal transplant patients: Effects on renal function and usefulness as a glomerular filtration rate marker. Nephron 1996;72:212-7.

Bharucha AE. Outcome Measures for Fecal Incontinence: Anorectal Structure and Function. Gastroenterology 2004;126:S90-S8.

Bhatnagar S, Bahl R, Sharma PK, Kumar GT, Saxena SK, Bhan MK. Zinc with oral rehydration therapy reduces stool output and duration of diarrhea in hospitalized children: A randomized controlled trial. J Pediatr Gastroenterol Nutr 2004;38:34-40.

Bosi A, Fanci R, Pecile P, Guidi S, Saccardi R, Vannucchi AM, et al. Aztreonam versus colistin-neomycin for selective decontamination of the digestive tract in patients undergoing bone marrow transplantation: a randomized study. J Chemother 1992;4:30-4.

Bowden R, Murali K, Lambert K, Smyth M, Lonergan M. Chronic use of sodium polystyrene sulfonate (resonium) enables wider implementation of renin-angiotensinaldosterone inhibition in chronic kidney disease patients. Nephrology 2017;22:67.

Boyle BJ, Long WB, Balistreri WF, Widzer SJ, Huang N. Effect of cimetidine and pancreatic enzymes on serum and fecal bile acids and fat absorption in cystic fibrosis. Gastroenterology 1980;78:950-3.

Brenner D, Hiergeist A, Adis C, Gessner A, Ludolph A, Weishaupt J. The fecal microbiome ALS patients. Amyotrophic Lateral Sclerosis and Frontotemporal Degeneration 2017;18 [Suppl 2]:198.

Brittnacher MJ, Heltshe SL, Hayden HS, Radey MC, Weiss EJ, Damman CJ, et al. GUTSS: An alignment-free sequence comparison method for use in human intestinal microbiome and fecal microbiota transplantation analysis. PLoS ONE 2016;11:e0158897.

Burigo T, Fagundes RLM, Trindade EBSDM, Vasconcelos HCFF. Bifidogenic effect of fructooligosaccharides in the intestinal flora of patients with hematological neoplasia. Revista de Nutricao 2007;20:491-7.

Butcher KS, Parsons M, MacGregor L, Barber PA, Chalk J, Bladin C, et al. Refining the perfusion-diffusion mismatch hypothesis. Stroke 2005;36:1153-9.

Byrne TA, Persinger RL, Young LS, Ziegler TR, Wilmore DW. A new treatment for patients with short-bowel syndrome. Growth hormone, glutamine, and a modified diet. Ann Surg 1995;222:243-55.

Cai CJ, Li MR, Yi SH, Wang GS, Lu MQ, Chen GH. Application of somatostatin combined with oral vancomycin in the treatment of intestinal obstruction after liver transplantation. Zhonghua Wei Chang Wai Ke Za Zhi 2008;11:335-8.

Canullo L, Quaranta A, Teles RP. The microbiota associated with implants restored with platform switching: A preliminary report. J Periodontol 2010;81:403-11.

Cao Z, Li Z, Liu Y, Mo R, Ren P, Chen L, et al. The role of bacterial infection (BI) in decompensated cirrhosis patients with or without acute-on-chronic liver failure (ACLF). Hepatology International 2017;11 [Suppl 1]:S527-8.

Carter NJ, Keating GM. Micafungin: A review of its use in the prophylaxis and treatment of invasive Candida infections in pediatric patients. Pediatr Drugs 2009;11:271-91.

Carter R, Hemingway D, Cooke TG, Pickard R, Poon FW, McKillop JA, et al. A prospective study of six methods for detection of hepatic colorectal metastases. Ann R Coll Surg Engl 1996;78:27-30.

Cataldo PA, O'Brien S, Osler T. Transanal endoscopic microsurgery: A prospective evaluation of functional results. Diseases of the Colon and Rectum 2005;48:1366-71.

Cello JP, Grendell JH, Basuk P, Simon D, Weiss L, Wittner M, et al. Effect of octreotide on refractory AIDS-associated diarrhea. A prospective, multicenter clinical trial. Ann Intern Med 1991;115:705-10.

Ceran N, Mert D, Kocdogan FY, Erdem I, Adalati R, Ozyurek S, et al. A randomized comparative study of single-dose fosfomycin and 5-day ciprofloxacin in female patients with uncomplicated lower urinary tract infections. J Infect Chemother 2010;16:424-30.

Chakrabarti S, Collingham KE, Stevens RH, Pillay D, Fegan CD, Milligan DW. Isolation of viruses from stools in stem cell transplant recipients: A prospective surveillance study. Bone Marrow Transplantation 2000;25:277-82.

Cheetham M, Brazzelli M, Norton C, Glazener CM. Drug treatment for faecal incontinence in adults. Cochrane database of systematic reviews 2003:CD002116.

Chen YL, Cui XH, Li JL. A transposition of iliopsoas in replacement of pelvic floor for incontinence of urination and/or defecation in children. Zhonghua wai ke za zhi. 1994;32:724-6.

Chiaravalloti ND, Tulsky DS, Glosser G. Validation of the WMS-III Facial Memory subtest with the Graduate Hospital Facial Memory Test in a sample of right and left anterior temporal lobectomy patients. J Clin Exp Neuropsychol 2004;26:484-97.

Cho CS, Dayton MT, Thompson JS, Koltun WA, Heise CP, Harms BA. Proctocolectomy-ileal pouch-anal anastomosis for ulcerative colitis after liver transplantation for primary sclerosing cholangitis: A multi-institutional analysis. J Gastrointest Surg. 2008;12:1221-6.

Cho WS, Chae C. Expression of nitric oxide synthase 2 and cyclooxygenase-2 in swine experimentally infected with Actinobacillus pleuropneumoniae. Vet Pathol 2004;41:666-72.

Chouinard LE, Schoeller DA, Watras AC, Clark RR, Close RN, Buchholz AC. Bioelectrical impedance vs. four-compartment model to assess body fat change in overweight adults. Obesity 2007;15:85-92.

Christine CW, Starr PA, Larson PS, Eberling JL, Jagust WJ, Hawkins RA, et al. Safety and tolerability of putaminal AADC gene therapy for Parkinson disease. Neurology 2009;73:1662-9.

Cichowski SB, Dunivan GC, Rogers RG, Murrietta AM, Komesu YM. Standard compared with mnemonic counseling for fecal incontinence: A randomized controlled trial. Obstet Gynecol. 2015;125:1063-70.

Ciurea SO, Saliba RM, Hamerschlak N, Karduss Aurueta AJ, Bassett R, Fernandez-Vina M, et al. Fludarabine, melphalan, thiotepa and anti-thymocyte globulin conditioning for unrelated cord blood transplant. Leuk Lymphoma 2012;53:901-6.

Clerici C, Setchell KD, O'Connell N, Gentili G, Rusticali G, Aversa F, et al. Effect of ursodeoxycholic acid on hypertransaminasaemia and bile acid composition in patients undergoing bone marrow transplantation--a double-blind randomized control study. Ital J Gastroenterol 1996;28:191-8.

Cocchiara G, Calderone F, Luna E, Virzi C, Agrusa A, Romano G, et al. Endoscopic treatment of colorectal polyps in a digestive endoscopy outpatient department. Chirurgia Italiana 2004;56:669-73.

Cohen HS, Kimball KT. Usefulness of some current balance tests for identifying individuals with disequilibrium due to vestibular impairments. Journal of Vestibular Research: Equilibrium and Orientation 2008;18:295-303.

Collins MG, Teo E, Cole SR, Chan CY, McDonald SP, Russ GR, et al. Screening for colorectal cancer and advanced colorectal neoplasia in kidney transplant recipients: cross sectional prevalence and diagnostic accuracy study of faecal immunochemical testing for haemoglobin and colonoscopy. BMJ 2012;345:e4657.

Congilosi SM. The artificial anal sphincter. Perspectives in Colon and Rectal Surgery 2000;13:41-51.

Copelan EA, Bechtel TP, Klein JP, Klein JL, Tutschka P, Kapoor N, et al. Controlled trial of orally administered immunoglobulin following bone marrow transplantation. Bone Marrow Transplantation 1994;13:87-91.

Corpetti G, Rosignoli MT, Dionisio P. Comparative bioavailability study of two oral formulations of ibuprofen. Arzneimittel-Forschung/Drug Research 1998;48:392-5.

Cox GJ, Matsui SM, Lo RS, Hinds M, Bowden RA, Hackman RC, et al. Etiology and outcome of diarrhea after marrow transplantation: a prospective study. Gastroenterology 1994;107:1398-407.

Cranen K, Groothuis-Oudshoorn CG, Vollenbroek-Hutten MM, M.J IJ. Toward patient-centered telerehabilitation design: understanding chronic pain patients' preferences for web-based exercise telerehabilitation using a discrete choice experiment. J Medical Internet Research 2017;19:e26.

Culbert P, Gillett H, Ferguson A. Highly effective oral therapy (polyethylene glycol/electrolyte solution) for faecal impaction and severe constipation. Clinical Drug Investigation 1998;16:355-60.

Culbert P, Gillett H, Ferguson A. Highly effective new oral therapy for faecal impaction. Br J Gen Pract 1998;48:1599-600.

Culkin DJ, Ramsey CE. Urethrorectal fistula: Transanal, transsphincteric approach with locally based pedicle interposition flaps. J Urol 2003;169:2181-3.

Curran MP. Bimatoprost: A review of its use in open-angle glaucoma and ocular hypertension. Drugs and Aging 2009;26:1049-71.

Damman CJ, Brittnacher MJ, Westerhoff M, Hayden HS, Radey M, Hager KR, et al. Low level engraftment and improvement following a single colonoscopic administration of fecal microbiota to patients with ulcerative colitis. PLoS ONE 2015;10:e0133925.

Davis SC, Yadav JS, Barrow SD, Robertson BK. Gut microbiome diversity influenced more by the Westernized dietary regime than the body mass index as assessed using effect size statistic. Microbiology Open 2017;6:e00476.

De Caro G, Gaiani F, Duranti S, Fugazza A, Madia C, Milani C, et al. The role of bifidobacteria in ulcerative colitis: Preliminary results. Am J Gastroenterol 2016;111:S325-S6.

de Castro CG, Jr., Ganc AJ, Ganc RL, Petrolli MS, Hamerschlack N. Fecal microbiota transplant after hematopoietic SCT: report of a successful case. Bone Marrow Transplantation 2015;50:145.

De Groot PF, Kahn MT, Backhed F, Nieuwdorp M. Faecal microbiota transfer from donors post bariatric surgery does not improve insulin sensitivity in metabolic syndrome subjects. Diabetologia 2016;59 [Suppl 1]:S172-S3.

DeJesus OT. Positron-labeled DOPA analogs to image dopamine terminals. Drug Development Research 2003;59:249-60.

Demetriades D, Murray JA, Chan L, Ordonez C, Bowley D, Nagy KK, et al. Penetrating colon injuries requiring resection: Diversion or primary anastomosis? An AAST prospective multicenter study. J Trauma 2001;50:765-75.

Demetriades D, Murray JA, Chan LS, Ordonez C, Bowley D, Nagy KK, et al. Handsewn versus stapled anastomosis in penetrating colon injuries requiring resection: a multicenter study. J Trauma 2002;52:117-21.

Depauw S, Bosch G, Hesta M, Whitehouse-Tedd K, Hendriks WH, Kaandorp J, et al. Fermentation of animal components in strict carnivores: A comparative study with cheetah fecal inoculum. J Animal Sci 2012;90:2540-8.

Dessinioti C. Managing adverse reactions to HPI. JEur Acad Dermatol and Venereology. 2017;31:16.

Dhillon S. Argatroban: A review of its use in the management of heparin-induced thrombocytopenia. Am J Cardiovascular Drugs. 2009;9:261-82.

Di Giulio G, Lupo L, Tirelli A, Vinci R, Rotondo A, Angelelli G. Blood flow assessment with Doppler color ultrasonography in primary and secondary tumors of the liver. Radiol Med (Torino) 1997;93:225-9.

Dillon MT, Tubbs RS, Adunka MC, King ER, Hillman TA, Adunka OF, et al. Round window stimulation for conductive and mixed hearing loss. Otology & neurotology 2014;35:1601-8.

Ding T, Telesco S, Monast C, Brodmerkel C, Yatsunenko T, Das A, et al. The gut microbiome differentiates clinical phenotypes in moderate to severe crohn's disease: Results from the certifi study. Gastroenterology 2015;148 [Suppl 1]:S-713.

Ding T, Telesco S, Monast CS, Brodmerkel C, Yatsunenko T, Das A, et al. The gut microbiome differentiates clinical phenotypes in moderate to severe crohn's disease: Results from the CERTIFI study. United European Gastroenterology Journal 2015;2 [Suppl 1]:A133-A4.

Doering TM, Reaburn PR, Borges NR, Cox GR, Jenkins DG. The effect of higher than recommended protein feedings post-exercise on recovery following downhill running in masters triathletes. Int J Sport Nutr Exerc Metab 2017;27:76-82.

Doi K, Kanzaki S, Kumakawa K, Usami S, Iwasaki S, Yamanaka N, et al. Evaluation of the effectiveness and safety in a multi-center clinical trial of VIBRANT SOUNDBRIDGE in Japan. Nihon Jibiinkoka Gakkai kaiho 2015;118:1449-58.

Doki N, Suyama M, Sasajima S, Ota J, Igarashi A, Mimura I, et al. Clinical impact of pre-transplant gut microbial diversity on outcomes of allogeneic hematopoietic stem cell transplantation. Ann Hematol 2017;96:1517-23.

Downs IA, Brandt LJ, Oneto C, Feuerstadt P, Aroniadis OC. Perceptions of fecal microbiota transplantation for diarrhea predominant irritable bowel syndrome. Am J Gastroenterol 2016;111:S1250-S1.

Duman N, Utkutan S, Ozkan H, Ozdogan S. Are the stool characteristics of preterm infants affected by infant formulas? Turk J Pediatr 2000;42:138-44.

Dummer R, Migden M. Long-term effects of sonidegib on tumor burden: 30-month results from the phase 2 randomized bolt trial. Ann Oncol 2017;28 [Suppl 5]:v436.

Dutheil F, Lac G, Courteix D, Dore E, Chapier R, Roszyk L, et al. Treatment of metabolic syndrome by combination of physical activity and diet needs an optimal protein intake: A randomized controlled trial. Nutr J 2012;11:72.

Eberling JL, Jagust WJ, Christine CW, Starr P, Larson P, Bankiewicz KS, et al. Results from a phase I safety trial of hAADC gene therapy for Parkinson disease. Neurology 2008;70:1980-3.

Edenfield AL, Amundsen CL, Wu JM, Levin PJ, Siddiqui NY. Posterior tibial nerve stimulation for the treatment of fecal incontinence: A systematic review. Female Pelvic Medicine and Reconstructive Surgery. 2013;19:S29.

Eguchi S, Takatsuki M, Hidaka M, Soyama A, Ichikawa T, Kanematsu T. Perioperative synbiotic treatment to prevent infectious complications in patients after elective living donor liver transplantation: A prospective randomized study. Am J Surg 2011;201:498-502.

Ehrenpreis ED, Chang D, Eichenwald E. Pharmacotherapy for fecal incontinence: A review. Diseases of the Colon and Rectum 2007;50:641-9.

El-Nachef N, Kassam Z, Piceno YM, Ablaza AJ, Zydek M, Elliott RJ, et al. Does rifaximin prior to fecal microbiota transplantation improve clinical outcomes compared to microbiome restoration alone in ulcerative colitis? A cohort study evaluating the impact of non-absorbable antibiotic pretreatment. Gastroenterology 2017;152 [Suppl 1]:S1008-9.

El-Nachef N, Piceno YM, Kassam Z, Ablaza AJ, Zydek M, Fadrosh D, et al. The role of fecal microbiota transplantation in ulcerative colitis and crohn's disease: Results from a parallel inflammatory bowel disease cohort study. Gastroenterology 2017;152 [Suppl 1]:S1008.

Enck P, Daublin G, Lubke HJ, Strohmeyer G. Long-term efficacy of biofeedback training for fecal incontinence. Dis Colon Rectum 1994;37:997-1001.

Espigado I, Aguilar-Guisado M, Martin-Pena A, Gudiol C, Falantes J, Vazquez L, et al. Discontinuing antibacterial therapy after apyrexia and clinical stability regardless of neutrophil count in febrile neutropenia is safe and reduces exposition to antibiotics (howlong randomized trial). Haematologica 2017;102:330-1.

Evans RC, Shim Wong V, Morris AI, Rhodes JM. Treatment of corticosteroid-resistant ulcerative colitis with heparin - A report of 16 cases. Alimentary Pharmacology and Therapeutics 1997;11:1037-40.

Evans S, Daly A, Davies P, Macdonald A. Fibre content of enteral feeds for the older child. J Human Nutr Diet 2009;22:414-21.

Fachner J, Gold C, Erkkila J. Music therapy modulates fronto-temporal activity in rest-EEG in depressed clients. Brain Topogr 2013;26:338-54.

Ferrara G, Sancin L, Bibalo C, Tommasini A, Taddio A, Pastore S. Faecal calprotectin as screening tool to identify inflammatory bowel disease among juvenile idiopathic patients: Results from a monocentric Italian study. Pediatric Rheumatology 2017;15:118.

Ferrecchia CE, Hobbs TR. A technique for orally administered fecal bacteriotherapy to treat chronic diarrhea in rhesus macaques (Macaca mulatta). J Am Assoc Lab Animal Science. 2012;51:655.

Ferrecchia CE, Hobbs TR. Efficacy of oral fecal bacteriotherapy in rhesus macaques (Macaca mulatta) with chronic diarrhea. Comp Med 2013;63:71-5.

Ferrucci PF, Zucca E. Primary gastric lymphoma pathogenesis and treatment: What has changed over the past 10 years? Br J Haematol 2007;136:521-38.

Fineberg SE, Rathbun MJ, Hufferd S, Fineberg NS, Spradlin CT, Galloway JA, et al. Immunologic aspects of human proinsulin therapy. Diabetes 1988;37:276-80.

Fishpool SJ, Amato-Watkins A, Hayhurst C. Free middle turbinate mucosal graft reconstruction after primary endoscopic endonasal pituitary surgery. Eur Arch Otorhinolaryngol 2017;274:837-44.

Fong SS, Guo X, Cheng YT, Liu KP, Tsang WW, Yam TT, et al. A novel balance training program for children with developmental coordination disorder: a randomized controlled trial. Medicine 2016;95:e3492.

Fong SS, Guo X, Liu KP, Ki WY, Louie LH, Chung RC, et al. Task-specific balance training improves the sensory organisation of balance control in children with developmental coordination disorder: A randomised controlled trial. Scientific reports 2016;6:20945.

Ford CD, Reilly W, Wood J, Classen DC, Burke JP. Oral antimicrobial prophylaxis in bone marrow transplant recipients: Randomized trial of ciprofloxacin versus ciprofloxacin-vancomycin. Antimicrob Agents Chemother 1998;42:1402-5.

Franscini LC, Vazquez-Montes M, Buclin T, Perera R, Dunand M, Grouzmann E, et al. Pediatric reference intervals for plasma free and total metanephrines established with a parametric approach: relevance to the diagnosis of neuroblastoma. Pediatr Blood Cancer 2015;62:587-93.

Freedman SF, Holgado S, Enyedi LB, Toth CA. Management of ocular torsion and diplopia after macular translocation for age-related macular degeneration: Prospective clinical study. Am J Ophthalmol 2003;136:640-8.

Fritsch C, Lang K, Bolsen K, Lehmann P, Ruzicka T. Congenital erythropoietic porphyria. Skin Pharm Appl Skin Physiol 1998;11:347-57.

Garcia-Olmo D, Garcia-Arranz M, Herreros D. Expanded adipose-derived stem cells for the treatment of complex perianal fistula including Crohn's disease. Exp Opinion Biolog Ther 2008;8:1417-23.

Garcia-Plaza A, Arenas JI, Belda O, Diago A, Dominguez A, Fernandez C, et al. A multicenter clinical trial. Zinc acexamate versus famotidine in the treatment of acute duodenal ulcer. Study Group of Zinc acexamate (new UP doses). Revista Espanola de Enfermedades Digestivas 1996;88:757-62.

Gaughran F, Stahl D, Ismail K, Atakan Z, Lally J, Gardner-Sood P, et al. Improving physical health and reducing substance use in psychosis - randomised control trial (IMPACT RCT): Study protocol for a cluster randomised controlled trial. BMC Psychiatry 2013;13:263.

Gebhard DJ, Price J, Kennedy CE, Akcan-Arikan A. Staging of cardiorenal syndrome for outcome prediction in pediatric acute decompensated heart failure. Intensive Care Medicine Experimental 2016;4 [Suppl 1]:A96.

Gelisken F, Voelker M, Schwabe R, Besch D, Aisenbrey S, Szurman P, et al. Full macular translocation versus photodynamic therapy with verteporfin in the treatment of neovascular age-related macular degeneration: 1-year results of a prospective, controlled, randomised pilot trial (FMT-PDT). Graefe's Arch Clin Exper Ophthalmol 2007;245:1085-95.

Geller RB, Gilmore CE, Dix SP, Lin LS, Topping DL, Davidson TG, et al. Randomized trial of loperamide versus dose escalation of octreotide acetate for chemotherapy-induced diarrhea in bone marrow transplant and leukemia patients. Am J Hematol 1995;50:167-72.

Girgis NI, Butler T, Frenck RW, Sultan Y, Brown FM, Tribble D, et al. Azithromycin versus ciprofloxacin for treatment of uncomplicated typhoid fever in a randomized trial in Egypt that included patients with multidrug resistance. Antimicrob Agents Chemother 1999;43:1441-4.

Giuliano M, Pantosti A, Gentile G, Venditti M, Arcese W, Martino P. Effects on oral and intestinal microfloras of norfloxacin and pefloxacin for selective decontamination in bone marrow transplant patients. Antimicrob Agents Chemother 1989;33:1709-13.

Goel A, Aggarwal R. Prevention of hepatitis E: Another step forward. Future Microbiology 2011;6:23-7.

Goel H, Szczepanczyk K, Bindal P, Shukla P, Tendler B, Latif S. Pituitary germinoma in adult man masquerading as pituitary apoplexy: Perils of delayed diagnosis. Endocrine Reviews. 2017;38 [Suppl].

Gomollon F. Treatment of inflammatory bowel diseases. Gastroenterologia y Hepatologia 2015;38:13-9.

Gosselin KB, Feldman HA, Sonis AL, Bechard LJ, Kellogg MD, Gura K, et al. Serum citrulline as a biomarker of gastrointestinal function during hematopoietic cell transplantation in children. J Pediatric Gastroenterol Nutr 2014;58:709-14.

Goyal A, Chu A, Calabro K, Firek B, Bush B, Morowitz M. Safety and efficacy of fecal microbiota transplant in children with inflammatory bowel disease. J Pediatr Gastroenterol Nutr 2016;63:S212.

Goyal A, Kufen A, Jackson Z, Morowitz M. A study of fecal microbiota transplantation in pediatric patients with inflammatory bowel disease. Inflamm Bowel Dis 2016;22:S74.

Grandjean P, Acker M, Madoff R, Williams NS, Woloszko J, Kantor C. Dynamic myoplasty: Surgical transfer and stimulation of skeletal muscle for functional substitution or enhancement. J Rehab Res Dev 1996;33:133-44.

Gregory CR, Gourley IM, Cain GR, Patz JD, Imondi KA, Martin JA. Mizoribine serum levels associated with enterotoxicity in the dog. Transplantation 1991;51:877-81.

Gruss HJ. Macrogol 3350: Treatment of choice in severe cases of chronic constipation and faecal impactation. Coloproctology 1998;20:161-7.

Gu L, Ding C, Tian H, Yang B, Zhang X, Hua Y, et al. Serial frozen fecal microbiota transplantation in the treatment of chronic intestinal pseudo-obstruction: A preliminary study. J Neurogastroenterol Motil 2017;23:289-97.

Guay DRP. Drug forecast - The peptide deformylase inhibitors as antibacterial agents. Therapeutics and Clinical Risk Management 2007;3:513-25.

Guiot HF, Biemond J, Klasen E, Gratama JW, Kramps JA, Zwaan FE. Protein loss during acute graft-versus-host disease: diagnostic and clinical significance Eur J Haematol 1987;38:187-96.

Hadengue A, Spahr L. From bench to bedside: Is the road trickier in alcoholic liver disease? Alcoholism: Clinical and Experimental Research 2010;34:53A.

Hahn S, Kim Y, Garner P. Reduced osmolarity oral rehydration solution for treating dehydration due to diarrhoea in children: Systematic review. British Medical Journal. 2001;323(7304):81-5.

Hakkinen K, Pakarinen A, Hannonen P, Hakkinen A, Airaksinen O, Valkeinen H, et al. Effects of strength training on muscle strength, cross-sectional area, maximal electromyographic activity, and serum hormones in premenopausal women with fibromyalgia. J Rheumatol 2002;29:1287-95.

Halibasic E, Fuerst E, Heiden D, Japtok L, Diesner SC, Hillebrand P, et al. Significantly reduced plasma levels of the bioactive sphingolipid S1P in lung transplanted cystic fibrosis patients are associated with gastrointestinal symptoms. Eur J Allergy Clin Immunol 2017;72:195.

Hansson J, Hauschild A, Kunstfeld R, Jacques Grob J, Dreno B, Mortier L, et al. Vismodegib (VISMO), a hedgehog pathway inhibitor (HPI), in advanced basal cell carcinoma (aBCC): STEVIE study primary analysis in 1215 patients (pts). J Clin Oncol 2016 34:15 [Suppl]:9532-9532

Hasper D, Schefold JC, Baumgart DC. Management of severe abdominal infections. Recent Patents on Anti-Infective Drug Discovery. 2009;4:57-65.

Haveman LM, De Jager W, Van Loon AM, Claas ECJ, Prakken BJ, Bierings M. Different cytokine signatures in children with localized and invasive adenovirus infection after stem cell transplantation. Pediatric Transplantation 2010;14:520-8.

Hellinger WC, Yao JD, Alvarez S, Blair JE, Cawley JJ, Paya CV, et al. A randomized, prospective, double-blinded evaluation of selective bowel decontamination in liver transplantation. Transplantation 2002;73:1904-9.

Hemingway DM, Cooke TG, Warren H, Bessent RG, McKillop JH, McArdle CS. Dynamic hepatic scintigraphy in colorectal cancer. Nucl Med Commun 1995;16:867-9.

Hendrickson R, Ryan J, Dandridge L, Andrews W, Daniel J, Fischer R, et al. Conservative management of pneumatosis intestinalis after pediatric liver transplantation. Am J Transplant 2017;17:605.

Herms F, Haudebourg L, Bagot M, Dutriaux C, Grob JJ, Guillot B, et al. Follow-up of patients with complete remission of locally advanced basal cell carcinoma treated with vismodegib after treatment discontinuation: A retrospective multicentric French study. J Clin Oncol 2017; 35 [15\_suppl]:9535-9535

Hickman C, Wells D, Gwinnett D, Wilkinson T, Christiansen S, Oliana O, et al. Euploid rate sensitivity to laboratory culture environment: A blind, prospective, randomised, sibling study. Human Reproduction 2016;31:i216-i8.

Ho KS, Ho YH. Controlled, randomized trial of island flap anoplasty for treatment of trans-sphincteric fistula-in-ano: Early results. Techniques in Coloproctology 2005;9:166-8.

Holger Johnsen P, Mazzawi T, El-Salhy M, Hausken T, Goll R, Valle PC. Effect of faecal microbiota transplantation on the enteroendocrine cells of the colon in patients with Irritable Bowel Syndrome (IBS): Double blinded-placebo controlled study. Neurogastroenterology and Motility 2017;29:71.

Holster S, Brummer RJ, Repsilber D, Konig J. Fecal microbiota transplantation in irritable bowel syndrome and a randomized placebo-controlled trial. Gastroenterology. 2017;152 [Suppl 1]:S101-S2.

Holvoet T, Boelens J, Joossens M, Raes J, De Vos M, De Looze D. Fecal microbiota transplantation in irritable bowel syndrome with bloating: Results from a prospective pilot study. Gastroenterology. 2015;148 [Suppl 1]:S963-S4.

Hoppe B, Beck B, Gatter N, von Unruh G, Tischer A, Hesse A, et al. Oxalobacter formigenes: a potential tool for the treatment of primary hyperoxaluria type 1. Kidney Int 2006;70:1305-11.

Horrocks E, Bremner SA, Stevens N, Norton C, Eldridge S, Knowles CH. Double blind randomised controlled trial of Percutaneous Tibial Nerve Stimulation (PTNS) VS. sham electrical stimulation in the treatment of faecal incontinence. Gastroenterology 2015;148 [Suppl 1]:S177.

Horrocks E, Bremner SA, Stevens N, Norton C, O'Connell PR, Eldridge S, et al. Double blind randomised controlled trial of percutaneous tibial nerve stimulation for the treatment of faecal incontinence in adults. Gut 2015;64:A4.

Hoverstad T, Carlstedt-Duke B, Lingaas E, Norin E, Saxerholt H, Steinbakk M, et al. Influence of oral intake of seven different antibiotics on faecal short-chain fatty acid excretion in healthy subjects. Scand J Gastroenterol 1986;21:997-1003.

Hsu YF, Huang YZ, Lin YY, Tang CW, Liao KK, Lee PL, et al. Intermittent theta burst stimulation over ipsilesional primary motor cortex of subacute ischemic stroke patients: A pilot study. Brain Stimulation 2013;6:166-74.

Hu XY, Zhang Y, Chen G, Zhong S, Fan XJ. A prospective cohort study on the influence of high doses of herbs for clearing heat and resolving stasis on survival rates in patients with hepatitis B-related acute-on-chronic liver failure. Journal of Chinese Integrative Medicine 2012;10:176-85.

Huang W, Wan X. Update of critical care medicine 2013. Zhonghua Wei Zhong Bing Ji Jiu Yi Xue 2014;26:3-10.

Huang Z, Huang Y, Peng K, Li X, Cheng X, Zhao R, et al. The mutation of interleukin-10/interleukin-10 receptors and clinical characterization of Chinese children with very early onset inflammatory bowel disease: A survery of Chinese very early onset inflammatory bowel disease study group. J Pediatr Gastroenterol Nutr 2016;63:S376.

Hudson CO, Karp DR, Pratt T, Northington GM. Anticholinergic therapy and fecal incontinence symptoms in patients with dual incontinence: A pilot study. Female Pelvic Medicine and Reconstructive Surgery 2016;22 [Suppl 1]:S108.

Huijgens PC, Simoons-Smit AM, Van Loenen AC, Prooy E, Van Tinteren H, Ossenkoppele GJ, et al. Fluconazole versus itraconazole for the prevention of fungal infections in haemato-oncology. J Clin Pathol 1999;52:376-80.

Husain M, Khan RN, Rehmani B, Haris H. Omental patch technique for the ileal perforation secondary to typhoid fever. Saudi J Gastroenterol 2011;17:208-11.

Ibanez-Cervantes G, Bello-Lopez JM, Fernandez-Sanchez V, Dominguez-Mendoza CA, Acevedo-Alfaro LI. Prevalence of bacterial contamination in platelet concentrates at the National Center of Blood Transfusion (Mexico). Transfusion Clinique et Biologique 2017;24:56-61.

Inoue T, Koyama K, Oriuchi N, Alyafei S, Yuan Z, Suzuki H, et al. Detection of malignant tumors: Whole-body PET with fluorine 18 alpha-methyl tyrosine versus FDG - Preliminary study. Radiology 2001;220:54-62.

Inoue T, Shibasaki T, Oriuchi N, Aoyagi K, Tomiyoshi K, Amano S, et al. 18F alpha-methyl tyrosine PET studies in patients with brain tumors. Journal of Nuclear Medicine1999;40:399-405.

Ishihara S, Kaji T, Kawamura A, Rumi MA, Sato H, Okuyama T, et al. Diagnostic accuracy of a new non-invasive enzyme immunoassay for detecting Helicobacter pylori in stools after eradication therapy. Aliment Pharmacol Ther 2000;14:611-4.

Shikawa D, Sasaki T, Osada T, Kuwahara-Arai K, Haga K, Shibuya T, et al. Changes in intestinal microbiota following combination therapy with fecal microbial transplantation and antibiotics for ulcerative colitis. Inflamm Bowel Dis 2017;23:116-25.

Ivanyi JL, Plander M, Szendrei T, Toth C. Prevention and treatment of invasive fungal infections in patients with hematological malignancies-results from a single hematological centre. Haematologica 2016;101:765.

Jaafari A, Boukhriss B, Selmi K, Bencheikh M, Boussabah E, Benyoussef S. Echocardiography under perfusion with dobutamine. Experience of Tunisian cardiologic service. About 70 cases. Tunis Med 2004;82:373-6.

Jalanka J, Salonen A, Salojarvi J, Ritari J, Immonen O, Marciani L, et al. Effects of bowel cleansing on the intestinal microbiota. Gut 2015;64:1562-8.

Jaworski A, Mitchell SW, Wong C, Gadalla S, Borody TJ. Patient with relapsing C. difficile successfully treated with lyophilised encapsulated faecal microbiota transplant product. J Gastroenterol Hepatol (Australia) 2016;31:161.

Jian Z, Hatib F, Pinsky M. Prevalence of hypotension and prediction of hypotension in intensive care unit. Intensive Care Medicine Experimental 2016;4 [Suppl 1]:A181

Johnsen PH, Hilpusch F, Cavanagh JP, Sande Leikanger I, Kolstad C, Valle PC, et al. Fecal transplantation in Irritable Bowel Syndrome (IBS): An RCT. Neurogastroenterology and Motility 2017;29:135.

Jolly S, Lobo A. Neuraxial analgesia in the laboring parturient with arnold-chiari type i malformation-relief of pain in unchartered terrain? Regional Anesthesia and Pain Medicine 2016;41:5.

Jones C, Shannon B. Placebo responders in a randomised controlled trial of rbx2660 for recurrent c. difficile infection: Predictive value of 16 s rRNA microbiome analysis. United European Gastroenterology Journal 2016;4 [Suppl 1]:A652.

Jones MP, Talley NJ, Nuyts G, Dubois D. Lack of objective evidence of efficacy of laxatives in chronic constipation. Dig Dis Sci 2002;47:2222-30.

Joshi NM, Goodhand J, Alazawi W, Das S, Wilks M, Rampton D. Predicting treatment failure in C. difficile infection: A prospective observational cohort study. Gut 2016;65:A209.

Journois D, Safran D, Castelain MH, Chanu D, Drevillon C, Barrier G. Comparison of the antithrombotic effects of heparin, enoxaparin and prostacycline in continuous hemofiltration. Ann Fr Anesth Reanim 1990;9:331-7.

Joyce MR, Hull TL. Endoanal advancement flaps in the management of complex anorectal fistulas. Seminars in Colon and Rectal Surgery 2009;20:24-31.

Jung K, Kang BK, Kim JY, Shin KS, Lee CS, Song DS. Effects of epidermal growth factor on atrophic enteritis in piglets induced by experimental porcine epidemic diarrhoea virus. Vet J 2008;177:231-5.

Kaido T, Shimamura T, Sugawara Y, Sadamori H, Shirabe K, Yamamoto M, et al. Multicentre, randomised, placebo-controlled trial of extract of Japanese herbal medicine Daikenchuto to prevent bowel dysfunction after adult liver transplantation (DKB 14 Study). BMJ Open 2015;5:e008356.

Kajbafzadeh A. The dream of functional organ engineering and preclinical transplantation. Iranian Journal of Biotechnology 2017;15:43-5.

Kajbafzadeh AM. Tissue engineering in pediatric urology reconstruction. Int J Urol 2012;19:250.

Kakihana K, Fujioka Y, Suda W, Najima Y, Kuwata G, Sasajima S, et al. Fecal microbiota transplantation for patients with steroid-resistant acute graft-versus-host disease of the gut. Blood 2016;128:2083-8.

Kallarackal GU, Ansari EA, Amos N, Martin JC, Lane C, Camilleri JP. A comparative study to assess the clinical use of Fluorescein Meniscus Time (FMT) with Tear Break up Time (TBUT) and Schirmer's tests (ST) in the diagnosis of dry eyes. Eye 2002;16:594-600.

Kanauchi O, Suga T, Tochihara M, Hibi T, Naganuma M, Homma T, et al. Treatment of ulcerative colitis by feeding with germinated barley foodstuff: First report of a multicenter open control trial. J Gastroenterol 2002;37 [Suppl 14]:67-72.

Kang DW, Adams JB, Gregory AC, Borody T, Chittick L, Fasano A, et al. Microbiota Transfer Therapy alters gut ecosystem and improves gastrointestinal and autism symptoms: An open-label study. Microbiome 2017;5:10.

Kang SB, Lee TG. Muscle regeneration: Research for the treatment of fecal incontinence. J Kor Soc Coloproctol. 2010;26:1-7.

Kao SS, Wu DC, Tsay FWT, Tsai KW, Hsu PI. A randomized controlled study comparing 14-day reverse hybrid and bismuth quadruple therapies for helicobacter pylori infection and impacts on clarithromycin resistance of gut microbiota. Gastroenterology 2017;152 [Suppl]:S183.

Kato K, Sekizuka T, Sugiyama T, Ishii Y, Kuroda M, Ohkusa T. Characterization of gut microbiome associated with improvement of ulcerative colitis after antibiotic combination therapy using fecal metagenomic analysis. United European Gastroenterology Journal 2017;5 [Suppl 1]:A264-A5.

Kaufmann S, Horger T, Oelker A, Kloth C, Nikolaou K, Schulze M, et al. Characterization of hepatocellular carcinoma (HCC) lesions using a novel CT-based volume perfusion (VPCT) technique. Eur J Radiol 2015;84:1029-35.

Kawecki D, Chmura A, Pacholczyk M, Lagiewska B, Adadynski L, Wasiak D, et al. Bacterial infections in the early period after liver transplantation: Etiological agents and their susceptibility. Medical Science Monitor 2009;15:CR628-CR37.

Keshaw H, Foong KS, Forbes A, Day RM. Perianal fistulae in Crohn's disease: Current and future approaches to treatment. Inflamm Bowel Dis 2010;16:870-80.

Khoruts A. Implementation of colorectal cancer guidelines. Pediatric Pulmonology 2016;51:184.

Kim CH, Oh Y, Han K, Seo HW, Kim D, Kang I, et al. Expression of secreted mucins (MUC2, MUC5AC, MUC5B, and MUC6) and membrane-bound mucin (MUC4) in the lungs of pigs experimentally infected with Actinobacillus pleuropneumoniae. Res Vet Sci 2012;92:486-91.

Kirk KF, Kousgaard SJ, Nielsen HL, Nielsen H, Thorlacius-Ussing O. Faecal transplant for the treatment of chronic pouchitis-A randomised, placebo-controlled, clinical trial. Colorectal Disease 2017;19 [Suppl 2]:143.

Kisiel JB, Taylor WR, Allawi H, Yab TC, Simonson JA, Devens ME, et al. Detection of colorectal cancer and polyps in patients with inflammatory bowel disease by novel methylated stool DNA markers. Gastroenterology 2014;146 [Suppl 1]:S440-S1.

Knowles CH, Horrocks EJ, Bremner SA, Stevens N, Norton C, O'Connell PR, et al. Percutaneous tibial nerve stimulation versus sham electrical stimulation for the treatment of faecal incontinence in adults (CONFIDeNT): A double-blind, multicentre, pragmatic, parallel-group, randomised controlled trial. Lancet. 2015;386(10004):1640-8.

Ko CY, Tong J, Lehman RE, Shelton AA, Schrock TR, Welton ML. Biofeedback is effective therapy for fecal incontinence and constipation. Arch Surg 1997;132:829-33.

Komura T, Miura K, Shirasaka T, Ohnuma S, Shimada M, Kajiwara T, et al. Usefulness of alternate-day administration of S-1 and leucovorin in a xenograft mouse model of colorectal cancer: a shorter drug-free interval leads to more efficient antitumor effects. Int J Clin Oncol. 2015;20:117-25.

Komura T, Ohnuma S, Miura K, Shirasaka T, Kajiwara T, Kudoh K, et al. Usefulness of alternate-day administration of S-1 and leucovorin in a xenograft mouse model of colorectal cancer: A shorter drug-free interval leads to more efficient antitumor effects. Cancer Research 2014 74 [Suppl]:792.

Kovatcheva-Datchary P, Nilsson A, Akrami R, Lee YS, De Vadder F, Arora T, et al. Dietary Fiber-Induced Improvement in Glucose Metabolism Is Associated with Increased Abundance of Prevotella. Cell Metabolism 2015;22:971-82.

Koyama D, Murata M, Hanajiri R, Okuno S, Kamoshita S, Julamanee J, et al. REG3A polymorphism is associated with the incidence of extensive chronic Gvhd after allogeneic BMT. Blood 2016;128:3426.

Kramer P, Peters B, Schubert S, Photiadis J, Berger F, Ovroutski S. Treatment strategies for protein-losing enteropathy in Fontan patients. Cardiology in the Young 2016;26:S54.

Krammer HJ, Kamper H, Von Bunau R, Zieseniss E, Stange C, Schlieger F, et al. Probiotic drug therapy with E. coli strain Nissle 1917 (EcN): Results of a prospective study of the records of 3807 patients. Zeitschrift fur Gastroenterologie 2006;44:651-6.

Kumakawa K, Kanzaki S, Usami S, Iwasaki S, Yamanaka N, Doi K, et al. Multicenter Clinical Study of Vibrant Soundbridge in Japan: Analysis of Subjective Questionnaires. Nippon Jibiinkoka Gakkai Kaiho 2015;118:1309-18.

Kumar R, Maynard CL, Eipers P, Goldsmith KT, Ptacek T, Grubbs JA, et al. Colonization potential to reconstitute a microbe community in patients detected early after fecal microbe transplant for recurrent C. difficile. BMC Microbiology 2016;16:5.

Kushnir J, Sadeh A. Assessment of brief interventions for nighttime fears in preschool children. Eur J Pediatr 2012;171:67-75.

Lacima G, Pera M, Amador A, Escaramis G, Pique JM. Long-term results of biofeedback treatment for faecal incontinence: A comparative study with untreated controls. Colorectal Disease 2010;12:742-9.

Lad Y, Badin RA, Binley K, Van Camp N, Jan C, Gourlay J, et al. OXB-102: An enhanced gene therapy for Parkinson's disease. Human Gene Therapy 2015;26:A82.

Ladas EJ, Bhatia M, Chen L, Sandler E, Petrovic A, Berman DM, et al. The safety and feasibility of probiotics in children and adolescents undergoing hematopoietic cell transplantation. Bone Marrow Transplantation 2016;51:262-6.

Lamere B, Wendt ER, Kanwar B, Lynch SV. Investigating the microbiome in a phase 1B study of andecaliximab in ulcerative colitis. United European Gastroenterology Journal. 2017;5 [Suppl 1]:A263.

Lang PJ, Schlegel PG, Meisel R, Schulz AS, Greil J, Bader P, et al. TCR-alpha/beta and CD19 depleted haploidentical stem cell transplantation following reduced intensity conditioning in children: First results of a prospective multicenter phase I/II clinical trial. Blood 2016;128:389.

Lee K, Byun B, Kim B, Lim I, Choi C, Youn S, et al. Microdose study for amino acid imaging using D-[18F] FMT PET in human brains. Eur J Nuclear Med Mol Imaging 2017;44 [Suppl]:S527.

Lee KC, Byun BH, Kim BI, Lim I, Choi CW, Youn SM, et al. A phase 0 study for amino acid imaging using D-[18F] FMT PET in human brains. Journal of Labelled Compounds and Radiopharmaceuticals. 2017;60:S182.

Lee SH, Carey S, Dubey R, Matz R. Intervention program in college instrumental musicians, with kinematics analysis of cello and flute playing: a combined program of yogic breathing and muscle strengthening-flexibility exercises. Med Probl Perform Art 2012;27:85-94.

Lenisa L, Espin-Basany E, Rusconi A, Mascheroni L, Escoll-Rufino J, Lozoya-Trujillo R, et al. Anal fistula plug is a valid alternative option for the treatment of complex anal fistula in the long term. Int J Colorectal Dis 2010;25:1487-93.

Leong L, Choo J, Serisier D, Rogers G. Long-term erythromycin therapy affects microbiota composition and antibiotic resistance gene prevalence in the oropharynx of bronchiectasis patients. Respirology 2015;20:29.

Leung LY, Lim HK, Abell MW, Zimmerman JJ. Pharmacokinetics and metabolic disposition of sirolimus in healthy male volunteers after a single oral dose. Ther Drug Monit 2006;28:51-61.

Leuschner U, Guldutuna S, Imhof M, Hubner K, Benjaminov A, Leuschner M. Effects of ursodeoxycholic acid after 4 to 12 years of therapy in early and late stages of primary biliary cirrhosis. J Hepatol 1994;21:624-33.

Lewis JD, Reinisch W, Bressler B, Parikh A, Yang H, Rosario M, et al. Faecal calprotectin reductions in patients achieving mucosal healing with vedolizumab induction therapy in GEMINI 1. J Crohn's Colitis 2016;10:S206-S8.

Lim TY, Pavlidis P, Pirani T, Gulati S, Samaan M, Chung-Faye G, et al. Vedolizumab in primary and autoimmune sclerosing cholangitis associated inflammatory bowel disease pre and post liver transplantation: A case series. Gut 2016;65:A89.

Lin E, Jaworski A, Furnari V, Wong C, Bull M, Chapman B, et al. Twelve week storage trial of microbial viability in lyophilized and frozen fecal microbiota preparations. Gastroenterology 2015;148 [Suppl 1]: S962.

Lin WY, Wang SJ, Yeh SH. Hepatic perfusion index in evaluating treatment effect of transcatheter hepatic artery embolization in patients with hepatocellular carcinoma. Neoplasma 1995;42:89-92.

Lista F, Redondo C, Meilan E, Garcia-Tello A, Ramon de Fata F, Angulo JC. Efficacy and safety of fosfomycin-trometamol in the prophylaxis for transrectal prostate biopsy. Prospective randomized comparison with ciprofloxacin. Actas urologicas espanolas 2014;38:391-6.

Lorenz F, Marklund S, Werner M, Palmqvist R, Wahlin BE, Wahlin A. Fecal calprotectin as a biomarker of intestinal graft versus host disease after allogeneic hematopoietic stem cell transplantation. Scientific reports 2015;5:7920.

Luber RP, Kariyawasam VC, Dawson LP, Munari SC, Gibson PR, Sparrow MP, et al. Combination therapy with infliximab and a thiopurine vs. infliximab monotherapy in Crohn's disease. J Gastroenterol Hepatol (Australia) 2016;31:141-2.

Luke M, Ziemssen F, Bartz-Schmidt KU, Gelisken F. Quality of life in a prospective, randomised pilot-trial of photodynamic therapy versus full macular translocation in treatment of neovascular age-related macular degeneration - A report of 1 year result. Graefe's Arch Clin Exp Ophthalmol 2007;245:1831-6.

Luke M, Ziemssen F, Voker M, Altpeter E, Beutel J, Besch D, et al. Full macular translocation (FMT) versus photodynamic therapy (PDT) with verteporfin in the treatment of neovascular age-related macular degeneration: 2-year results of a prospective, controlled, randomised pilot trial (FMT-PDT). Graefe's Arch Clin Exp Ophthalmol 2009;247:745-54.

Madoff RD. Surgical Treatment Options for Fecal Incontinence. Gastroenterology 2004;126 [Suppl 1]:S48-S54.

Mady FM, Abou-Taleb AE, Khaled KA, Yamasaki K, Iohara D, Taguchi K, et al. Evaluation of carboxymethyl-beta-cyclodextrin with acid function: Improvement of chemical stability, oral bioavailability and bitter taste of famotidine. International Journal of Pharmaceutics 2010;397:1-8.

Makhlough A, Fakheri H, Hojati S, Hosseini V, Bari Z. A comparison between hybrid therapy and standard triple therapy for Helicobacter pylori eradication in patients with uremia: A randomized clinical trial. Middle East Journal of Digestive Diseases 2016;8:39-43.

Mann PA, McNicholas PM, Chau AS, Patel R, Mendrick C, Ullmann AJ, et al. Impact of antifungal prophylaxis on colonization and azole susceptibility of Candida species. Antimicrob Agents Chemother 2009;53:5026-34.

Mansour-Ghanaei F, Shafaghi A, Fallah M. The effect of metronidazole in treating human fascioliasis. Medical Science Monitor 2003;9:PI127-PI30.

Mariotti G, Quaranta A, Merli M, Paterno Holtzman L, Piemontese M. Chronic periodontitis and cardiovascular disease: A controlled clinical trial. European Journal of Inflammation 2013;11:459-67.

Marquez HP, Karalli A, Haubenreisser H, Mathew RP, Alkadhi H, Brismar TB, et al. Computed tomography perfusion imaging for monitoring transarterial chemoembolization of hepatocellular carcinoma. Eur J Radiol 2017;91:160-7.

Mathews V, Srivastava A, George B, Korula A, Perumalla S, Abubacker FN, et al. Multi-drug resistant organisms are common in fecal surveillance cultures and do not predict bacteremia but correlate with poorer outcomes in patients undergoing allogeneic stem cell transplants. Blood 2016;128:3406.

Maughan J, Parkin A, Smith AH, Barker MC, Robinson PJ, Finan P, et al. Hepatic perfusion index: a multicentre trial. Nucl Med Commun 1992;13:161-7.

Mazique DC. Anchors away: Anchoring bias, confirmation bias, and pulmonary emboli. J Gen Internal Med 2017;32 [Suppl 1]:S447.

McLauchlin J, Amar CFL, Pedraza-Diaz S, Mieli-Vergani G, Hadzic N, Davies EG. Polymerase chain reaction-based diagnosis of infection with Cryptosporidium in children with primary immunodeficiencies. Pediatr Infect Dis J 2003;22:329-34.

McNeil SA, Malani PN, Chenoweth CE, Fontana RJ, Magee JC, Punch JD, et al. Vancomycin-resistant enterococcal colonization and infection in liver transplant candidates and recipients: a prospective surveillance study. Clin Infect Dis 2006;42:195-203.

Metafuni E, Giammarco S, De Ritis D, Rossi M, Bacigalupo A, Sica S, et al. Comparison between serum and fecal calprotectin as marker of graft-versus-host disease. Haematologica 2016;101:868-9.

Michot F, Lefebure B, Bridoux V, Gourcerol G, Kianifard B, Leroi AM, et al. Artificial anal sphincter for severe fecal incontinence implanted by a transvaginal approach: Experience with 32 patients treated at one institution. Diseases of the Colon and Rectum 2010;53:1155-60.

Mielcarek M, Furlong T, Storer BE, Green ML, Carpenter PA, McDonald GB, et al. Efficacy and safety of lower-dose glucocorticoids for initial treatment of acute graft-versus-host disease: A randomized controlled trial. Blood 2013;122:703.

Migden M. Sonidegib's duration of response: Results from the pivotal phase 2 BOLT study over 30 months in patients with locally advanced basal cell carcinoma. J Eur Acad Dermatol Venereol 2017;31:39.

Miyazaki K, Collins DJ, Walker-Samuel S, Taylor JN, Padhani AR, Leach MO, et al. Quantitative mapping of hepatic perfusion index using MR imaging: A potential reproducible tool for assessing tumour response to treatment with the antiangiogenic compound BIBF 1120, a potent triple angiokinase inhibitor. European Radiology 2008;18:1414-21.

Mizukami K, Sonoda A, Okimoto T, Kodama M, Murakami K. An open-label prospective randomized multicentre study of daily granulocyte and monocyte adsorptive apheresis as compared with intensive treatment in patients with active ulcerative colitis. J Crohn's Colitis 2015;9:S352.

Modiba MCM, Koto Z, Lowan TA, Magano S, Segal I, Esser J, et al. Distal splenorenal shunt for non-cirrhotic variceal bleeding in black South Africans. South African Journal of Surgery 1994;32:87-90.

Moen MD, McKeage K, Plosker GL, Siddiqui MAA. Imatinib: A review of its use in chronic myeloid leukaemia. Drugs 2007;67:299-320.

Molina JM, Tourneur M, Sarfati C, Chevret S, De Gouvello A, Gobert JG, et al. Fumagillin treatment of intestinal microsporidiosis. N Eng J Med 2002;346:1963-9.

Moller A, Iwasaki K, Kawamura A, Teramura Y, Shiraga T, Hata T, et al. The disposition of 14C-labeled tacrolimus after intravenous and oral administration in healthy human subjects. Drug Metab Dispos 1999;27:633-6.

Montebugnoli L, Venturi M, Cervellati F, Servidio D, Vocale C, Pagan F, et al. Peri-Implant Response and Microflora in Organ Transplant Patients 1 Year after Prosthetic Loading: A Prospective Controlled Study. Clinical implant dentistry and related research 2015;17:972-82.

Mortimer K, Brown A, Feary J, Jagger C, Lewis S, Antoniak M, et al. Dose-ranging study for trials of therapeutic infection with necator Americanus in humans. Am J Trop Med Hyg 2006;75:914-20.

Muller T, Buttner T, Gholipour AF, Kuhn W. Coenzyme Q10 supplementation provides mild symptomatic benefit in patients with Parkinson's disease. Neuroscience Letters 2003;341:201-4.

Muraji T, Nishijima E, Higashimoto Y, Tsugawa C. Biliary atresia: current management and outcome. The Tohoku journal of experimental medicine 1997;181:155-60.

Muramatsu SI. A phase i study of aromatic l-amino acid decarboxylase gene therapy for parkinson’s disease. Journal of Gene Medicine 2014;16:218.

Muramatsu SI. In vivo imaging in cell and gene therapy for parkinson's disease. Journal of Gene Medicine 2014;16:214.

Muramatsu SI, Fujimoto KI, Kato S, Asari S, Mizukami H, Ikeguchi K, et al. Aadc gene therapy for parkinson's disease: Four years of follow-up. Journal of Gene Medicine 2014;16:220.

Muramatsu SI, Fujimoto KI, Kato S, Mizukami H, Asari S, Ikeguchi K, et al. A phase i study of aromatic l-amino acid decarboxylase gene therapy for parkinson's disease. Molecular Therapy 2010;18:1731-5.

Naeini AE, Sharifi M, Shahidi S, Taheri S, Seirafian S, Taheri D, et al. Intestinal fungal and parasitic infections in kidney transplant recipients: a multi-center study. Saudi journal of kidney diseases and transplantation 2012;23:677-83.

Nagappan V, Deresinski S. Posaconazole: A broad-spectrum triazole antifungal agent. Clin Infect Dis 2007;45:1610-7.

Nagel R, Cuttell L, Stensvold CR, Mills PC, Bielefeldt-Ohmann H, Traub RJ. Blastocystis subtypes in symptomatic and asymptomatic family members and pets and response to therapy. Internal Medicine Journal 2012;42:1187-95.

Nahmias C, Wahl L, Chirakal R, Firnau G, Garnett ES. A probe for intracerebral aromatic amino-acid decarboxylase activity: Distribution and kinetics of 18F 6-fluoro-L-m-tyrosine in the human brain. Movement Disorders 1995;10:298-304.

Nordgaard I, Hove H, Clausen MR, Mortensen PB. Colonic production of butyrate in patients with previous colonic cancer during long-term treatment with dietary fibre (Plantago ovata seeds). Scand J Gastroenterol 1996;31:1011-20.

Norton C, Chelvanayagam S, Wilson-Barnett J, Redfern S, Kamm MA. Randomized controlled trial of biofeedback for fecal incontinence. Gastroenterology 2003;125:1320-9.

Obradovic V, Artiko V, Radevic B, Dapcevic B, Petrovic N. Single injection hepatic radionuclide angiography and hepatobiliary scintigraphy in the evaluation of liver transplant function. Nucl Med Rev Cent East Eur 2004;7:21-5.

O'Connell MJ, Schutt AJ, Moertel CG, Rubin J, Hahn RG, Scott M. A randomized clinical trial of combination chemotherapy in advanced colorectal cancer. Am J Clin Oncol 1987;10:320-4.

Ogholikhan S, Franciscovich A, Mogul D. Poop MD. A mobile application to screen for biliary atresia, accurately identifies Acholic Stools in the Field. Hepatology 2016;64 [Suppl 1]:152A.

Oh Y, Ha Y, Han K, Seo HW, Kang I, Park C, et al. Expression of leucocyte function-associated antigen-1 and intercellular adhesion molecule-1 in the lungs of pigs infected with Actinobacillus pleuropneumoniae. Journal of Comparative Pathology 2013;148:259-65.

Orlowska E, Czubkowski P, Motyl I, Klewicka E, Libudzisz Z, Socha P. The clinical effect and changes of microflora under probiotic supplementation in children with biliary atresia-a randomized controlled trial. United European Gastroenterology Journal 2015;3 [Suppl]:A349.

Orr DW, Myint H, Murphy R. Probiotic supplementation after Very Low Calorie Diet does not aid improvement of the metabolic syndrome or maintenance of weight loss post Liver Transplant. A randomised double-blind placebo controlled trial. Hepatology 2016;64 [Suppl]:113A-4A.

Ortiz M, Schnabel K, Teut M, Rotter G, Binting S, Cree M, et al. Complementary and integrative medicine in nursing homes-results of a prospective, exploratory, comparative, two-armed cohort study from the residents' perspective. BMC Complementary and Alternative Medicine 2017;17 [Suppl 1].

Orvain C, Moles-Moreau MP, Francois S, Mercier M, Moal F, Hamel JF, et al. Miconazole mucoadhesive buccal tablet in high-dose therapy with autologous stem cell transplantation (HDT/ASCT)-induced mucositis. Supportive Care in Cancer 2015;23:359-64.

Palaoro LG, Araujo VP, Matos SL, Alves CLGF, Brito VN, Cunha FS, et al. Effects of long term testosterone administration and gonadectomy on gonadotropin secretion in female to male transsexuals. Endocrine Reviews 2015;36:SAT085.

Pallotta N, Rubinetto MP, Zaccaro C, Gizzi G, Villani V, Barbara L. Calcium polycarbophil in clinical practice. Treatment of constipation. Minerva Gastroenterologica e Dietologica 1993;39:175-8.

Palou J, Angulo JC, Ramon De Fata F, Garcia-Tello A, Gonzalez-Enguita C, Boada A, et al. Randomized comparative study for the assessment of a new therapeutic schedule of fosfomycin trometamol in postmenopausal women with uncomplicated lower urinary tract infection. Actas Urologicas Espanolas 2013;37:147-55.

Paramsothy S, Borody T, Lin E, Finlayson S, Walsh A, Samuel D, et al. Obstacles to donor recruitment for faecal microbiota transplantation: Experiences from the focus study. Am J Gastroenterol 2014;109:S188.

Paramsothy S, Borody T, Lin E, Finlayson S, Walsh A, Samuel D, et al. Obstacles to donor recruitment for faecal microbiota transplantation-Experiences from the FOCUS study. J Gastroenterol Hepatol (Australia) 2014;29:135.

Paramsothy S, Borody TJ, Lin E, Finlayson S, Walsh AJ, Samuel D, et al. Donor Recruitment for Fecal Microbiota Transplantation. Inflammatory Bowel Diseases 2015;21:1600-6.

Paramsothy S, Kaakoush NO, Kamm MA, Faith JJ, Clemente JC, Walsh AJ, et al. Faecal microbiota transplantation (FMT) in ulcerative colitis is associated with specific bacterial changes: Stool and colonic mucosa 16S microbiota analysis from the randomised controlled FOCUS study. J Gastroenterol Hepatol (Australia) 2016;31:125-6.

Park EJ, Kang J, Baik SH. Treatment of Faecal incontinence using allogeneic-adipose-derived mesenchymal stem cells: A study protocol for a pilot randomised controlled trial. BMJ Open 2016;6:e010450.

Parnetti L. Clinical pharmacokinetics of drugs for Alzheimer's disease. Clinical Pharmacokinetics 1995;29:110-29.

Paul D, Gokarn AG, Bhat V, Bonda A, Zanwar S, Mathew L, et al. Impact of surveillance stool culture guided selection of antibiotics in allogeneic hematopoietic stem cell transplant patients. Blood 2016;128:3389.

Pawlowska J, Klewicka E, Czubkowski P, Motyl I, Jankowska I, Libudzisz Z, et al. Effect of Lactobacillus casei DN-114001 application on the activity of fecal enzymes in children after liver transplantation. Transplantation Proceedings. 2007;39:3219-21.

Peng Z, Xiang J, He Z, Zhang T, Xu L, Cui B, et al. Colonic transendoscopic enteral tubing: A novel way of transplanting fecal microbiota. Endoscopy International Open 2016;4:E610-E3.

Perlick DA, Miklowitz DJ, Lopez N, Chou J, Kalvin C, Adzhiashvili V, et al. Family-focused treatment for caregivers of patients with bipolar disorder. Bipolar Disord 2010;12:627-37.

Persson GR, Samuelsson E, Lindahl C, Renvert S. Mechanical non-surgical treatment of peri-implantitis: A single-blinded randomized longitudinal clinical study. II. Microbiological results. Journal of Clinical Periodontology 2010;37:563-73.

Pertile G, Claes C. Macular translocation with 360 degree retinotomy for management of age-related macular degeneration with subfoveal choroidal neovascularization. Am J Ophthalmol 2002;134:560-5.

Pfundstein J, Roghmann MC, Schwalbe RS, Qaiyumi SQ, McCarter Jr RJ, Keay S, et al. A randomized trial of surgical antimicrobial prophylaxis with and without vancomycin in organ transplant patients. Clinical Transplantation 1999;13:245-52.

Pfundstein J, Roghmann MC, Schwalbe RS, Qaiyumi SQ, McCarter RJ, Jr., Keay S, et al. A randomized trial of surgical antimicrobial prophylaxis with and without vancomycin in organ transplant patients. Clinical Transplantation 1999;13:245-52.

Philips CA, Shasthry SM, Pande A, Jamwal KD, Chandel SS, Kumar G, et al. Fecal microbiota transplantation (FMT) improves outcome and survival in steroid ineligible severe alcoholic hepatitis-A randomized control trial (NCT 02458079). Hepatology 2016;64 [Suppl 1]:706A.

Philips CA, Shasthry SM, Pande A, Jamwal KD, Khillan V, Hussain MS, et al. Outcomes of fecal microbiota transplantation in steroid ineligible severe alcoholic hepatitis-Arandomized control trial (NCT02458079). Indian Journal of Gastroenterology 2016;35 [Suppl]:A68-A9.

Philpott-Howard JN, Wade JJ, Mufti GJ, Brammer KW, Ehninger G. Randomized comparison of oral fluconazole versus oral polyenes for the prevention of fungal infection in patients at risk of neutropenia. Multicentre study group. J Antimicrob Chemother. 1993;31:973-84.

Pipkin KM, Hagey JV, Rayburn MC, Chigerwe M. A randomized clinical trial evaluating metabolism of colostral and plasma derived immunoglobulin G in Jersey bull calves. J Vet Intern Med 2015;29:961-6.

Price CE, Cox S, Rode H. The use of diverting colostomies in paediatric peri-anal burns: Experience in 45 patients. South African Journal of Surgery 2013;51:102-5.

Pulungsih SP, Punjabi NH, Rafli K, Rifajati A, Kumala S, Simanjuntak CH, et al. Standard WHO-ORS versus reduced-osmolarity ORS in the management of cholera patients. J Health, Population Nutr 2006;24:107-12.

Qian C, Decot V, Wang Y, Cai HL, Venard V, Jeulin H, et al. Adoptive immunotherapy of refractory systemic adenovirus infections after allogeneic umbilical cord blood (UCB) or peripheral blood stem cell transplantation. Bone Marrow Transplantation 2015;50:S120.

Queenan KM, Stewart ML, Smith KN, Thomas W, Fulcher RG, Slavin JL. Concentrated oat beta-glucan, a fermentable fiber, lowers serum cholesterol in hypercholesterolemic adults in a randomized controlled trial. Nutr J 2007;6:6.

Quirke P. Simplicity and complexity-improving outcomes in bowel cancer. J Pathol 2013;231:S6.

Quraishi N, McMillan M, Widlak M, Nell L, Quraishi K, Pathmakanthan S, et al. Patient perception towards faecal microbiota transplantation for treatment of inflammatory bowel disease. United European Gastroenterology Journal 2014;2 [Suppl 1]:A383.

Quraishi N, McMillan M, Widlak M, Nell L, Quraishi K, Pathmakanthan S, et al. Patient perception towards faecal microbiota transplantation for treatment of Inflammatory Bowel Disease. J Crohn's Colitis. 2015;9:S252.

Rams TE, Degener JE, van Winkelhoff AJ. Antibiotic resistance in human peri-implantitis microbiota. Clinical Oral Implants Research 2014;25:82-90.

Ranganathan N, Friedman EA, Tam P, Rao V, Ranganathan P, Dheer R. Probiotic dietary supplementation in patients with stage 3 and 4 chronic kidney disease: A 6-month pilot scale trial in Canada. Current Medical Research and Opinion 2009;25:1919-30.

Rathmann N, Kara K, Budjan J, Henzler T, Smakic A, Schoenberg SO, et al. Parenchymal liver blood volume and dynamic volume perfusion CT measurements of hepatocellular carcinoma in patients undergoing transarterial chemoembolization. Anticancer Research 2017;37:5681-5.

Ratto C, Buntzen S, Aigner F, Altomare DF, Heydari A, Donisi L, et al. Multicentre observational study of the gatekeeper for faecal incontinence. Br J Surg 2016;103:290-9.

Rayes A, Morrow AL, Payton LR, Lake KE, Lane A, Davies SM. A genetic modifier of the gut microbiome influences the risk of graft-versus-host disease and bacteremia after hematopoietic stem cell transplantation. Biol Blood Marrow Transplant 2016;22:418-22.

Rebello D, Yen E, Lio P, Kelly CR. Unexpected benefits: Hair growth in two alopecia patients after fecal microbiota transplant. Am J Gastroenterol 2016;111:S623-S4.

Reinhardt K, Foell D, Vogl T, Mezger M, Wittkowski H, Fend F, et al. Monocyte-induced development of Th17 cells and the release of S100 proteins are involved in the pathogenesis of graft-versus-host disease. J Immunol 2014;193:3355-65.

Reinshagen M, Stallmach A. Multidonor intensive faecal microbiota transplantation for active ulcerative colitis: A randomised placebo-controlled trial. Zeitschrift fur Gastroenterologie 2017;55:779-80.

Reintgen D, Pendas S, Jakub J, Swor G, Giuliano R, Bauer J, et al. National trials involving lymphatic mapping for melanoma: The multicenter selective lymphadenectomy trial, the sunBelt melanoma trial, and the Florida melanoma trial. Seminars in Oncology2004;31:363-73.

Renvert S, Lindahl C, Renvert H, Persson GR. Clinical and microbiological analysis of subjects treated with Branemark or AstraTech implants: A 7-year follow-up study. Clinical Oral Implants Research 2008;19:342-7.

Riko K, Pichora-Fuller MK, Alberti PW. Clinical evaluation of a two-channel amplitude compression hearing aid. Laryngoscope 1986;96:1226-30.

Riley DK, Pavia AT, Beatty PG, Denton D, Carroll KC. Surveillance cultures in bone marrow transplant recipients: Worthwhile or wasteful? Bone Marrow Transplantation 1995;15:469-73.

Robaeys G, Cassiman D, Verslype C, Monbaliu D, Aerts R, Pirenne J, et al. Successful conversion from mycophenolate mofetil to enteric-coated mycophenolate sodium (Myfortic) in liver transplant patients with gastrointestinal side effects. Transplantation Proceedings 2009;41:610-3.

Rodrigues JFV, Rayo J, Vicente J, Carolino E, Figueiredo S, Vieira L. Influence of the geometry and positioning of the regions of interest in the transplanted renogram. Eur J Nucl Med Mol Imaging 2017;44 [Suppl 1]:S896-S7.

Rohrenbach J, Matthess A, Maier R, Von Bunau R. Treatment of children with E. coli strain Nissle 1917. Results of a prospective data collection with 668 patients. Padiatrische Praxis 2009;73:645-52.

Romaniszyn M, Rozwadowska N, Malcher A, Kolanowski T, Walega P, Kurpisz M. Implantation of autologous muscle-derived stem cells in treatment of fecal incontinence: results of an experimental pilot study. Techniques in Coloproctology 2015;19:685-96.

Romano G, Cocchiara G, Calderone F, Luna E, Virzi C, Agrusa A, et al. Endoscopic treatment of colorectal polyps in a digestive endoscopy outpatient department. Chirurgia Italiana 2004;56:669-73.

Rongen MJ, Adang EM, van der Hoop AG, Baeten CG. One-step vs two-step procedure in dynamic graciloplasty. Colorectal Disease 2001;3:51-7.

Rossen N, Bart A, Verhaar N, Van Nood E, Kootte R, De Groot P, et al. Low prevalence of blastocystis SP in active ulcerative colitis patients. Gastroenterology 2014;146 [Suppl 1]:S-371.

Rossen N, Bart A, Verhaar N, Van Nood E, Kootte R, De Groot P, et al. Low prevalence of Blastocystis sp. in active ulcerative colitis patients. J Crohn's Colitis 2014;8:S349.

Roth B, Birkhauser FD, Zehnder P, Burkhard FC, Thalmann GN, Studer UE. Readaptation of the peritoneum following extended pelvic lymphadenectomy and cystectomy has a significant beneficial impact on early postoperative recovery and complications: Results of a prospective randomized trial. Eur Urol 2011;59:204-10.

Rump JA, Arndt R, Arnold A, Bendick C, Dichtelmuller H, Franke M, et al. Treatment of diarrhoea in human immunodeficiency virus-infected patients with immunoglobulins from bovine colostrum. Clin Investig. 1992;70(7):588-94.

Runde V, Ross S, Trenschel R, Lagemann E, Basu O, Renzing-Kohler K, et al. Adenoviral infection after allogeneic stem cell transplantation (SCT): report on 130 patients from a single SCT unit involved in a prospective multi center surveillance study. Bone Marrow Transplantation 2001;28:51-7.

Rzepecki P, Barzal J, Oborska S. Blood and marrow transplantation and nutritional support. Supportive Care in Cancer 2010;18 [Suppl 2]:S57-S65.

Sabharwal S, Abraham JM, Grand R, Mascarenhas M. "Ins and outs" of constipation and DIOS. Pediatric Pulmonology 2016;51:147.

Samy E, Wu Y, Higginbotham G, Grenningloh R, Xu D. The αV integrin inhibitor abituzumab inhibits myofibroblast differentiation. Arthritis Rheumatol 2017;69 [Suppl 10].

Santini B, Antonelli M, Battistini A, Bertasi S, Collura M, Esposito I, et al. Comparison of two enteric coated microsphere preparations in the treatment of pancreatic exocrine insufficiency caused by cystic fibrosis. Digest Liver Dis 2000;32:406-11.

Santos JL, Carvalho E, Bezerra JA. Advances in biliary atresia: From patient care to research. Braz J Med Biolog Res 2010;43:522-7.

Santosham M, Burns BA, Reid R, Letson GW, Duncan B, Powlesland JA, et al. Glycine-based oral rehydration solution: reassessment of safety and efficacy. J Pediatr 1986;109:795-801.

Sanz Y, Santacruz A, Gauffin P. Gut microbiota in obesity and metabolic disorders. Proc Nutr Soc 2010;69:434-41.

Sarveazad A, Newstead GL, Mirzaei R, Joghataei MT, Bakhtiari M, Babahajian A, et al. A new method for treating fecal incontinence by implanting stem cells derived from human adipose tissue: preliminary findings of a randomized double-blind clinical trial. Stem Cell Research and Therapy 2017;8:40.

Sasaki M, Shimozato A, Ogasawara N, Funaki Y, Ebi M, Hijikata Y, et al. Transglucosidase improves the bowel movements in type 2 diabetes mellitus patients: A randomized double-blind, placebo-controlled study. Gastroenterology. 2017;152 [Suppl 1]:S1012-S3.

Scales SJ, de Sauvage FJ. Mechanisms of Hedgehog pathway activation in cancer and implications for therapy. Trends in Pharmacological Sciences 2009;30:303-12.

Schneider HJ, Pickel J, Stalla GK. Typical female 2nd-4th finger length (2D:4D) ratios in male-to-female transsexuals-possible implications for prenatal androgen exposure. Psychoneuroendocrinology 2006;31:265-9.

Seekatz AM, Aas J, Gessert CE, Rubin TA, Saman DM, Bakken JS, et al. Recovery of the gut microbiome following fecal microbiota transplantation. mBio 2014;5:e00893-14.

Seo Y, Hawkins R, Christine C, Larson P, Bankiewicz K. In vivo quantitative PET/MR imaging of gene expression in Parkinson's Disease. J Nuclear Med 2015;56.

Shah K, Jacobs A, Breakefield XO, Weissleder R. Molecular imaging of gene therapy for cancer. Gene Therapy 2004;11:1175-87.

Shimoyama T, Sawaya M, Ishiguro A, Hanabata N, Yoshimura T, Fukuda S. Applicability of a rapid stool antigen test, using monoclonal antibody to catalase, for the management of Helicobacter pylori infection. J Gastroenterol. 2011;46:487-91.

Shiogai T, Koshimura M, Uebo C, Makino M, Mizuno T, Nakajima K. Acetazolamide vasoreactivity in persistent vegetative state and vascular dementia evaluated by transcranial harmonic perfusion imaging and Doppler sonography. Acta neurochirurgica. 2003; 87 [Suppl]:63-9.

Shiogai T, Morisaka A, Takayasu N, Yoshikawa K, Mizuno T, Nakagawa M, et al. Quantitative evaluation of cerebrovascular reactivity in brain tissue by a refill kinetic method of transcranial ultrasonic perfusion imaging: a comparison with Doppler sonography. Acta neurochirurgica 2005;95 [Suppl]:183-90.

Shukla A. Those spots on his penis: It is bannayan riley ruvalcaba syndrome!! Pediatric Dermatology 2017;34:S141-S2.

Sidhu SS, Goyal O, Kishore H, Sidhu S. New paradigms in management of alcoholic hepatitis: A review. Hepatol Int 2017;11:255-67.

Simonetti F, Fortunato S, Rousseau M, Tascini C, Menichetti F, Stefanelli A, et al. Oral gentamicin therapy for carbapenem-resistent Klebsiella pneumoniae infections in hematologic patients: A single center experience. Haematologica 2016;101:485.

Siproudhis L, Morcet J, Laine F. Elastomer implants in faecal incontinence: A blind, randomized placebo-controlled study. Alimentary Pharmacology and Therapeutics 2007;25:1125-32.

Smith RC, Lindenmayer JP, Hu Q, Kelly E, Viviano TF, Cornwell J, et al. Effects of olanzapine and risperidone on lipid metabolism in chronic schizophrenic patients with long-term antipsychotic treatment: A randomized five month study. Schizophrenia Research 2010;120:204-9.

Smith SD, Jackson RJ, Hannakan CJ, Wadowsky RM, Tzakis AG, Rowe MI. Selective decontamination in pediatric liver transplants. A randomized prospective study. Transplantation 1993;55:1306-9.

Somsouk M, Vujkovic-Cvijin I, Pao M, Hunt P, McCune M. Safety of fecal microbial transplantation during treated HIV infection. Am J Gastroenterol 2015;110:S578-9.

Spence C, Verleden S, Einarsson G, Yserbyt J, Lee AJ, Van Herck A, et al. Impact of azithromycin on the post-lung transplant microbiota. Thorax 2017;72 [Suppl 3]:A15.

Staikuniene N, Valantinas J, Pukalskas A, Simoliuniene R, Karciauskaite D. The effect of synbiotic and prokinetic on intestinal permeability, endotoxemia and childpugh score in patients with liver cirrhosis: A prospective cohort study. United European Gastroenterology Journal 2016;4 [Suppl 1]:A536-A7.

Staley C, Kelly CR, Brandt LJ, Khoruts A, Sadowsky MJ. Characterization of fecal microbiota in response to heterologous versus autologous (placebo) fecal microbial transplantation: Results from a dualcenter, randomized, placebo-controlled trial. Gastroenterology 2016;150 [Suppl 1]:S542.

Stockfleth E. Sonidegib tolerability across 30-months: Results from the phase 2 randomized BOLT trial. Journal of Investigative Dermatology 2017;137 [Suppl 2]:S285.

Stockfleth E. Sonidegib duration of response across 30 months: Results from the randomized phase 2 BOLT trial. Journal of Investigative Dermatology 2017;137 [Suppl 2]:S284.

Stojkovic M, Stojkovic M, Artiko V, Zuvela M, Lekic N, Petrovic M, et al. Is identification of malignant lesions of the liver and of hemangiomas possible by doppler ultrasonography and radionuclide angiography? Hellenic J Nucl Med 2011;14:38-42.

Storey RF, Bliden KP, Ecob R, Karunakaran A, Butler K, Wei C, et al. Earlier recovery of platelet function after discontinuation of treatment with ticagrelor compared with clopidogrel in patients with high antiplatelet responses. J Thromb Haemost 2011;9:1730-7.

Stratigos AJ. Update on systemic treatment of basal cell carcinoma. J Eur Acad Dermatol Venereol 2017;31:16.

Strik AS, Brandse JF, Koelink P, Wildenberg M, De Vries A, Van Den Brink G, et al. Underestimation of fecal loss of infliximab due to proteolysis. Gastroenterology 2017;152 [Suppl 1]:S388-S9.

Subramaniam K, Watthayalage R, Neeman T, Pavli P. Is anti-TNF therapeutic drug monitoring of value in IBD patients in clinical remission? J Gastroenterol Hepatol (Australia) 2016;31:149.

Subramanian S, Huq S, Yatsunenko T, Haque R, Mahfuz M, Alam MA, et al. Persistent gut microbiota immaturity in malnourished Bangladeshi children. Nature 2014;510:417-21.

Sudan D. Small bowel transplantation: Current status and new developments in allograft monitoring. Current Opinion in Organ Transplantation 2005;10:124-7.

Sulkowski JP, Nacion KM, Deans KJ, Minneci PC, Levitt MA, Mousa HM, et al. Sacral nerve stimulation: a promising therapy for fecal and urinary incontinence and constipation in children. J Pediatr Surg 2015;50:1644-7.

Sunshine A, Mulhern SA, Olson N, Elkind A, Almas M, Sikes C. Comparative sensitivity of stopwatch methodology and conventional pain assessment measures for detecting early response to triptans in migraine: Results of a randomized, open-label pilot study. Clinical Therapeutics 2006;28:1107-15.

Suskind DL, Brittnacher MJ, Wahbeh G, Shaffer ML, Hayden HS, Qin X, et al. Fecal microbial transplant effect on clinical outcomes and fecal microbiome in active Crohn's disease. Inflamm Bowel Dis 2015;21:556-63.

Suzuki H, Watanabe H, Shinozaki T, Yanagawa T, Suzuki R, Takagishi K. Positron emission tomography imaging of musculoskeletal tumors in the shoulder girdle. J Should Elbow Surg 2004;13:635-47.

Suzuki R, Watanabe H, Yanagawa T, Sato J, Shinozaki T, Suzuki H, et al. PET evaluation of fatty tumors in the extremity: possibility of using the standardized uptake value (SUV) to differentiate benign tumors from liposarcoma. Ann Nucl Med 2005;19:661-70.

Sylvester FA, Turner D, Draghi A, 2nd, Uuosoe K, McLernon R, Koproske K, et al. Fecal osteoprotegerin may guide the introduction of second-line therapy in hospitalized children with ulcerative colitis. Inflamm Bowel Dis 2011;17:1726-30.

Tamandl D, Waneck F, Sieghart W, Unterhumer S, Kolblinger C, Baltzer P, et al. Early response evaluation using CT-perfusion one day after transarterial chemoembolization for HCC predicts treatment response and long-term disease control. Eur J Radiol 2017;90:73-80.

Tan JJY, Chan M, Tjandra JJ. Evolving therapy for fecal incontinence. Diseases of the Colon and Rectum 2007;50:1950-67.

Tanpowpong P, Prachasitthisak N, Treepongkaruna S, Lertudomphonwanit C, Boonsathorn S, Angkathunyakul N, et al. Stool cytomegalovirus polymerase chain reaction for the diagnosis of cytomegalovirus causing gastrointestinal disease in immunocompromised children. J Pediatr Gastroenterol Nutr 2016;63:S13.

Thin NN, Taylor SJ, Bremner SA, Emmanuel AV, Hounsome N, Williams NS, et al. Randomized clinical trial of sacral versus percutaneous tibial nerve stimulation in patients with faecal incontinence. Br J Surg 2015;102:349-58.

Tischer S, Schultze-Florey R, Heim A, Picksak G, Mynarek M, Sauer M, et al. Monitoring of adenovirus-specific T cells after HSCT in children: Equal detection of hexon and penton-specific T cells. Transfusion Medicine and Hemotherapy 2016;43:62.

Tjellstrom A, Luetje CM, Hough JV, Arthur B, Hertzmann P, Katz B, et al. Acute human trial of the floating mass transducer Ear Nose Throat J 1997;76:204-6.

Tornatore L, Acton G, Adams N, Campbell EA, Kelly J, Szydlo RM, et al. Cancer-selective targeting of the NF-kappab survival pathway in multiple myeloma with the GADD45beta/MKK7 inhibitor, DTP3. Blood 2015;126:868.

Totman JJ, O'Gorman R L, Kane PA, Karani JB. Comparison of the hepatic perfusion index measured with gadolinium-enhanced volumetric MRI in controls and in patients with colorectal cancer. Br J Radiol 2005;78:105-9.

Tsai F, Coyle WJ. The microbiome and obesity: Is obesity linked to our gut flora? Current Gastroenterology Reports 2009;11:307-13.

Tsunashima D, Kawamura A, Murakami M, Sawamoto T, Undre N, Brown M, et al. Assessment of tacrolimus absorption from the human intestinal tract: Open-label, randomized, 4-way crossover study. Clin Therapeutics 2014;36:748-59.

Turki AT, Basu O, Ditschkowski M, Trenschel R, Beelen DW, Steckel NK. Ileostomy as feasible treatment option for patients with severe refractory graft versus host disease of the gastrointestinal tract after allogeneic stem cell transplantation. Oncology Research and Treatment 2016;39:167.

Valkeinen H, Hakkinen K, Pakarinen A, Hannonen P, Hakkinen A, Airaksinen O, et al. Muscle hypertrophy, strength development, and serum hormones during strength training in elderly women with fibromyalgia. Scand J Rheumatol 2005;34:309-14.

Van Beurden YH, Budding AE, Terveer EM, Keller JJ, Kuijper EJ, Vandenbroucke-Grauls CMJE, et al. Fecal microbiota transplantation for patients with post-infectious or antibiotic-induced irritable bowel syndrome: Results from a prospective pilot study. United European Gastroenterology Journal 2017;5 [Suppl 1]:A566.

van Kraaij MG, Dekker AW, Verdonck LF, van Loon AM, Vinje J, Koopmans MP, et al. Infectious gastro-enteritis: an uncommon cause of diarrhoea in adult allogeneic and autologous stem cell transplant recipients. Bone Marrow Transplantation 2000;26:299-303.

Varsano I, Eidlitz-Marcus T, Nussinovitch M, Elian I. Comparative efficacy of ceftriaxone and ampicillin for treatment of severe shigellosis in children. J Pediatr 1991;118:627-32.

Vaughn BP, Vatanen T, Allegretti JR, Bai A, Xavier RJ, Korzenik J, et al. Increased Intestinal Microbial Diversity Following Fecal Microbiota Transplant for Active Crohn's Disease. Inflamm Bowel Dis 2016;22:2182-90.

Vlaspolder F, de Zeeuw G, Rozenberg-Arska M, Egyedi P, Verhoef J. The influence of flucloxacillin and amoxicillin with clavulanic acid on the aerobic flora of the alimentary tract. Infection 1987;15:241-4.

Vrieze A, Holleman F, Serlie MJ, Ackermans MT, Dallinga-Thie GM, Groen AK, et al. Metabolic effects of transplanting gut microbiota from lean donors to subjects with metabolic syndrome. Diabetologia 2010;53:S44.

Vrieze A, Out C, Fuentes S, Jonker L, Reuling I, Kootte RS, et al. Impact of oral vancomycin on gut microbiota, bile acid metabolism, and insulin sensitivity. Journal of Hepatology 2014;60:824-31.

Wagner B. Azathioprine and allopurinol-a deadly combination. Pharmacotherapy 2016;36:e293.

Wahl LM, Chen JJ, Thompson M, Chirakal R, Nahmias C. The time course of metabolites in human plasma after 6-[(18)F]fluoro-L-m-tyrosine administration. Eur J Nucl Med 1999;26:1407-12.

Wang B, Feng Q, Ye X, Zeng S. The experience and technique in laparoscopic portoenterostomy for biliary atresia. J Laparoendosc Adv Surg Tech A 2014;24:350-3.

Wasserman EI, Hidalgo M, Hornedo J, Cortes-Funes H. Octreotide (SMS 201-995) for hematopoietic support-dependent high-dose chemotherapy (HSD-HDC)-related diarrhoea: Dose finding study and evaluation of efficacy. Bone Marrow Transplantation 1997;20:711-4.

Watanabe H, Inoue T, Shinozaki T, Yanagawa T, Ahmed AR, Tomiyoshi K, et al. PET imaging of musculoskeletel tumours with fluorine-18 alpha-methyltyrosine: Comparison with fluorine-18 fluorodeoxyglucose PET. Eur J Nucl Med 2000;27:1509-17.

Waugh J, Keating GM, Plosker GL, Easthope S, Robinson DM. Pioglitazone: A review of its use in type 2 diabetes mellitus. Drugs 2006;66:85-109.

Weber E, Doppelmayr M. Kinesthetic motor imagery training modulates frontal midline theta during imagination of a dart throw. International Journal of Psychophysiology. 2016;110:137-45.

Wei Y, Gong J, Zhu W, Guo D, Gu L, Li N, et al. Fecal microbiota transplantation restores dysbiosis in patients with methicillin resistant Staphylococcus aureus enterocolitis. BMC Infect Dis 2015;15:265.

Wilk CM, Weber I, Rachmuhl C, Seidl K, Burgel AH, Muller AMS, et al. Prevalence and eradication of colonizing Staphylococcus aureus in patients undergoing allogeneic hematopoietic cell transplantation. Blood 2016;128:3413.

Wu H, Esteve E, Tremaroli V, Khan MT, Caesar R, Manneras-Holm L, et al. Metformin alters the gut microbiome of individuals with treatment-naive type 2 diabetes, contributing to the therapeutic effects of the drug. Nat Med 2017;23:850-8.

Xi D, Michail S. Fecal microbiota transplantation in children does not significantly alter body mass index. J Pediatr Gastroenterol Nutr 2017;65 [Suppl 2]:S73-S4.

Yahyaoui R, Esteva I, Haro-Mora JJ, Almaraz MC, Morcillo S, Rojo-Martinez G, et al. Effect of long-term administration of cross-sex hormone therapy on serum and urinary uric acid in transsexual persons. J Clin Endocrinol Metab 2008;93:2230-3.

Yang Z, Wang X, Bu C. Fecal microbiota transplant for Crohn's disease: A prospective, randomized study in Chinese population. United European Gastroenterol J 2017;5 [Suppl 1]:A112-A3.

Yao Q, Huang Q, Cao Y, Qian P, Chen H. Porcine interferon-gamma protects swine from foot-and-mouth disease virus (FMDV). Vet Immunol Immunopathol 2008;122:309-11.

Ye X, Van JN, Munoz FM, Revell PA, Kozinetz CA, Krance RA, et al. Noroviruses as a cause of diarrhea in immunocompromised pediatric hematopoietic stem cell and solid organ transplant recipients. Am J Transplant 2015;15:1874-81.

Young VB. Treatment with fecal microbiota transplantation: The need for complete methodological reporting for clinical trials. Ann Intern Med 2017;167:61-2.

Yu C, Benhammou JN, Goyal D, Oh D, Wang L, Jacobs J, et al. High protein dietary intervention improves body mass index (BMI) and reduces the NAFLD fibrosis score (NFS) in veterans with obesity. Am J Gastroenterol 2016;111 [Suppl 1]:S349.

Zaza G, Dalla Gassa A, Granata S, Felis G, Lupo A. Impact of the maintenance immunosuppressive therapy on the fecal microbiome of renal transplant recipients: Comparison between an everolimus-versus a standard tacrolimus-based regimen. Nephrology Dialysis Transplantation 2017;32 [Suppl 3]:iii408.

Zhang C, Yin A, Li H, Wang R, Wu G, Shen J, et al. Dietary modulation of gut microbiota contributes to alleviation of both genetic and simple obesity in children. EBioMedicine 2015;2:968-84.

Zhang FM, Wang HG, Wang M, Cui BT, Fan ZN, Ji GZ. Fecal microbiota transplantation for severe enterocolonic fistulizing Crohn's disease. World J Gastroenterol 2013;19:7213-6.

Zhang T, Xiang J, Cui B, He Z, Li P, Chen H, et al. Cost-effectiveness analysis of fecal microbiota transplantation for inflammatory bowel disease. Oncotarget 2017;8:88894-903.

Zheng Y, Lee J, Masand A, Dadhania D, Thangamani M, Suthanthiran M. Tacrolimus precision medicine: Antibiotics increase intra-patient variability in tacrolimus trough concentrations in kidney transplant recipients. American Journal of Transplantation 2016;16:776.

Zhu J, Zhang F, Zhou J, Li H. Assessment of therapeutic response in Crohn's disease using quantitative dynamic contrast enhanced MRI (DCE-MRI) parameters. Medicine 2017;96: e7759.

Ziemssen F, Luke M, Bartz-Schmidt KU, Gelisken F. Time-dependent effects on contrast sensitivity, near and distance acuity: Difference in functional parameters? (Prospective, randomized pilot trial of photodynamic therapy versus full macular translocation). Graefe's Arch Clin Exp Ophthalmol 2008;246:653-9.

**Appendix E. Peer review**

**Healthcare Infection Society**

**Consultation – The use of faecal microbiota transplant as treatment for recurrent or refractory *Clostridium difficile* infection and other potential indications: joint British Society of Gastroenterology (BSG) and Healthcare Infection Society (HIS) guidelines.**

**Closing date: 5pm on 18 January 2018**

|  |  |
| --- | --- |
| Organisation | **Royal College of General Practitioners** |
| Title (e.g. Dr, Mr, Ms, Prof) | **Drs** |
| Name | Clinical Adviser: Kevin Barrett  Medical Director: Matthew Hoghton |
| Job title or role | As above |
| Address and post code | 30 Euston square, London, Nw1 2FB |
| Telephone number | 0203 188 7688 |
| Email address | clinicaladvisers@rcgp.org.uk |
| **Please note**: comments will only be accepted electronically on this proforma. | |

Please provide comments on the draft guideline on the form below, putting each new comment in a new row. When feeding back, please note the section you are commenting on (for example, section 1 Introduction and line number). If your comment relates to the guideline as a whole then please put ‘general’. Add extra rows if required.

| Section | Comments | Working group response |
| --- | --- | --- |
| A | This is an important consultation of an important treatment for recurrent or refractory CDI.  The recommendations are sensible and will help produce a universal service to patients across the UK. | Thank you for your comment. |
| B | Hudson et al doi: 10.1128/CMR.00049-16Clin. Microbiol. Rev. January 2017 vol. 30 no. 1 191-2311 January 2017 review suggests that faecal microbiotca transplant in the United States is used not only in refractory or recurrent Clostridium Difficile (CDI) but also in initial CDI and Ulcerative colitis | We cannot find mention of FMT use as treatment for initial CDI in this review. Updated searches have identified a small RCT evaluating the use of FMT as treatment for first CDI (Camacho-Ortiz *et al,* 2017), and this is now evaluated by the working group within the guideline (**Section 8.1.1.3**). All published RCTs evaluating the use of the FMT as treatment for ulcerative colitis have been reviewed by the working group within the guideline (**Section 8.6.2**). |
| C | There is a lack of GP representation on the working group (5.6) and this is reflected in the consultation with a lack of a suggested referral pathway for community based patients | We agree that the implications of this guideline for primary care were not well-described, and we have strengthened this within the guideline. In particular, we have more strongly highlighted the responsibility of microbiology staff in clinical laboratories to liaise proactively with primary care teams regarding the possibility of FMT when recurrent positive stool samples are received from the community on a particular patient (**Section 8.7.1**). |
| D | There has also been a reported case of the development of obesity following FMT from an overweight donor but this has not been substantiated in other studies. The BMI restriction on donors (8.3.2) may restrict donors. | The recruitment of suitable donors is relatively restrictive by necessity since FMT is an unlicensed and poorly-studied medicinal product. There is a growing literature base demonstrating an association between a high or low BMI and perturbation of the structure and/or function of the gut microbiota and subclinical chronic inflammation. The implications of this for the safety and efficacy of FMT are not well-defined. The suggested BMI range does not make it prohibitively difficult to find suitable donors. As such, the working group believes that their existing recommendation is reasonable. |
| E | It would be useful to have a standard UK pre and post questionnaire for patients to standardise recording (8.1.2.3) | We agree that the introduction of standardised questionnaires would have clear potential advantages for clinical care and/ or research. We now discuss this further in **Section 10**, ‘further research’. |
| F | It may useful to consider measuring the micriobiol strains of donors to monitor the impact of combinations of specific microbial strains to understand the undefined nature of faecal preparations | We agree of the importance of this, and this is now discussed in more detail in **Section 10**, ‘further research’. |
| G | The lack of universal definitions of cures (8.1.2.4) is likely to hamper future studies | We agree with this comment. **Section 10**, ‘further research’ has been amended accordingly. Furthermore, we expect that the attention generated by this guideline will highlight this inadequacy. |
| H | With the introduction of the clinical term SNOMECT across primary care in 2018 and secondary care in 2020 it is important to record faecal microbiota transplant so that long term sequaelae can be measured and patients can be potentially contacted in the future. | We agree that there should be specific procedure codes for FMT (according to route of administration), so that this can be accurately recorded in the patient’s medical record. This would also lay the foundation for a future HRG code and tariff for the procedure which is not currently funded by CCGs. Members of the working group are in discussion with NHS England about this. |

**Closing date:** Please forward this electronically by 5pm on January 2018 at the very latest to [consultations@his.org.uk](mailto:consultations@his.org.uk)

**Healthcare Infection Society**

**Consultation – The use of faecal microbiota transplant as treatment for recurrent or refractory *Clostridium difficile* infection and other potential indications: joint British Society of Gastroenterology (BSG) and Healthcare Infection Society (HIS) guidelines.**

**Closing date: 5pm on January 2018**

|  |  |
| --- | --- |
| Organisation | **NHS Highland** |
| Title (e.g. Dr, Mr, Ms, Prof) | **Dr** |
| Name | Alex Cochrane |
| Job title or role | Consultant Microbiology and Infectious Diseases |
| Address and post code | Raigmore Hospital, Perth Road, Inverness IV2 3UJ |
| Telephone number | 01463 704000 |
| Email address | Alexandra.cochrane@nhs.net |
| **Please note**: comments will only be accepted electronically on this proforma. | |

Please provide comments on the draft guideline on the form below, putting each new comment in a new row. When feeding back, please note the section you are commenting on (for example, section 1 Introduction and line number). If your comment relates to the guideline as a whole then please put ‘general’. Add extra rows if required.

| Section | Comments | Working group response |
| --- | --- | --- |
| 8.1.1.1 | I dont think you should limit FMT for first recurrence to those with specific risk factors. If clinicians wish to use FMT rather than fidaxomicin for the first recurrence on cost effectiveness grounds then that is reasonable. Suggest that you recommend FMT may be offered for the first or second or subsequent recurrences. | As FMT is currently an unlicensed medicinal product with poorly-studied long term sequelae, the working group considered that it should generally be reserved for patients who have had more than three episodes of infection. There are no studies directly comparing its effectiveness with some of the newer agents such as fidaxomicin or bezlotoxumab, hence this recommendation is made on the basis of safety. However, the working group felt that it may be reasonable in certain patient groups (with ongoing risk factors for further recurrence) to offer FMT after the second episode. Cost effectiveness analysis was outside the remit of the working group. |
| 8.1.1.3 (ii) | I disagree that patients should have previously been treated with extended/pulsed vancomicin or fidaxomicin before being offered FMT. You dont present any evidence to show that these antibiotic treatment is superior to FMT. Where FMT is the preferred treatment for the first recurrence it is quite likely that the patient will not have had a prolonged or tapered course, and this should not be a barrier to giving FMT which as you say is highly efficacious. | As above, there are no studies comparing FMT to fidaxomicin or bezlotoxumab, and only one study comparing a vancomycin taper to FMT (Hota *et al,* 2017). The safety profile of these medications is well-established from large randomised controlled trials, whilst randomised studies involving FMT have tended to be smaller, and have more variable patient follow-up. As such, on the balance of safety, the working group agreed that antimicrobial/antitioxin therapy associated with reduced CDI recurrence should be considered prior to FMT. Reflecting the uncertainties in this area within the reviewed literature, the relevant recommendation is ‘conditional’ rather than ‘strong’. |
| 8.1.1.3 (iii) | You dont cite any evidence that fidaxomicin or bezlotoxumab have better cure rates than FMT. My practice has been not to use fidaxomicin in life threatening C. difficile due to lack of evidence of efficacy in this setting, though I may be out of date with this. | Pre-planned subgroup analysis of patients with severe CDI in a randomised trial demonstrated a significantly lower recurrence rate when treated with fidaxomicin (13.0%, *n*=12/92) than when treated with vancomycin (26.6%, *n*=29/209) (Louie *et al,* 2011); this finding was replicated in another randomised controlled trial, with 8.3% (n=4/48) and 32.6% (n=14/43) experiencing a recurrence respectively (Cornely *et al,* 2012). In a further randomised trial, bezlotoxumab (together with standard of care antibiotics) was shown to reduce recurrence of severe CDI compared to standard of care antibiotics alone (10.9% (*n*=6/55) vs 20% (*n*=13/65) respectively) (Wilcox *et al,* 2017).  The working group noted that there are no studies comparing FMT to fidaxomicin or bezlotoxumab, and only one study comparing a vancomycin taper to FMT (Hota *et al,* 2017). The working group agreed that in the absence of this evidence, on the balance of safety and potential risks, consideration should be given to using antimicrobial/ antitoxin therapy associated with reduced CDI recurrence prior to considering the use of FMT. |
| 8.5.1.1 (iii) | Is there adequate published material or experience to ensure the safety of loperamide? It is usually avoided in C. difficile disease due  To increased risk of complications. | We agree that loperamide should not be used expressly for the treatment of CDI diarrhoea. However, a number of studies (references within the guideline) have used a single dose of loperamide after lower GI FMT to retention, and no potential safety issues associated with this use have been identified. |

**Closing date:** Please forward this electronically by 5pm on January 2018 at the very latest to [consultations@his.org.uk](mailto:consultations@his.org.uk)

**Healthcare Infection Society**

**Consultation – The use of faecal microbiota transplant as treatment for recurrent or refractory *Clostridium difficile* infection and other potential indications: joint British Society of Gastroenterology (BSG) and Healthcare Infection Society (HIS) guidelines.**

**Closing date: 5pm on January 2018**

|  |  |
| --- | --- |
| Organisation | **NHS Lothian** |
| Title (e.g. Dr, Mr, Ms, Prof) | **Dr** |
| Name | Ewan Olson |
| Job title or role | Consultant Microbiologist |
| Address and post code | Royal Infirmary of Edinburgh  51 Little France Crescent  Edinburgh EH16 4SA |
| Telephone number | O131 2326048 |
| Email address | ewan.olson@luht.scot.nhs.uk |
| **Please note**: comments will only be accepted electronically on this proforma. | |

Please provide comments on the draft guideline on the form below, putting each new comment in a new row. When feeding back, please note the section you are commenting on (for example, section 1 Introduction and line number). If your comment relates to the guideline as a whole then please put ‘general’. Add extra rows if required.

| Section | Comments | Working group response |
| --- | --- | --- |
| 8.3.4. | Laboratory Screening of donors  “Whilst vancomycin-resistant *Enterococci* (VRE) carriage is relatively common in the community, they are of low pathogenicity, and screening for them was not felt to be justified.”  VRE can cause life threatening infections that are difficult to treat. Any patient who is VRE positive requires isolation in a sideroom with ensuite facilities.  I would suggest that donors should be screened for VRE before accepting stool for donation. If there is a shortage of donor patients should be offered VRE positive donations only with informed consent. | Whilst vancomycin-resistant *Enterococci* (VRE) carriage is relatively common in the community (probably related to food consumption) (Endtz *et al,* 1997), community strains of VRE are genetically distinct from (and generally of much lower pathogenicity than) those found nosocomially (Willems *et al,* 2005); as such, the working group felt that routine screening was not justified. However, the working group acknowledged that the potential infection risk from VRE (and MRSA) would vary regionally dependent upon local prevalence and pathogenicity, and as such recommended that a risk assessment was performed to assess whether screening for these organisms should be considered. |

**Closing date:** Please forward this electronically by 5pm on January 2018 at the very latest to [consultations@his.org.uk](mailto:consultations@his.org.uk)

**Healthcare Infection Society**

**Consultation – The use of faecal microbiota transplant as treatment for recurrent or refractory *Clostridium difficile* infection and other potential indications: joint British Society of Gastroenterology (BSG) and Healthcare Infection Society (HIS) guidelines.**

|  |  |
| --- | --- |
| Organisation | **On behalf of European Study Group for C*. dificile* (ESGCD), and the National Donor Feces Bank at Leiden University Medical Center (drs. E. Terveer, drs. E. Boeije-Koppenol, prof. Hein Verspaget, dr. Y van Beurden, drs. R Ooijevaar, dr. Josbert Keller) and Department of Infectious Diseases, University of Koln (dr. Maria Vehreschild).** |
| Title (e.g. Dr, Mr, Ms, Prof) | **Prof. Dr.** |
| Name | Ed Kuijper |
| Job title or role | Head of Experimental Bacteriology |
| Address and post code | LUMC, Albinusdreef2, 2333 ZA, Leiden |
| Telephone number | 31-71-5263574 |
| Email address | [e.j.kuijper@lumc.nl](mailto:e.j.kuijper@lumc.nl) |
| **Please note**: comments will only be accepted electronically on this proforma. | |

**Closing date: 5pm on January 2018**

Please provide comments on the draft guideline on the form below, putting each new comment in a new row. When feeding back, please note the section you are commenting on (for example, section 1 Introduction and line number). If your comment relates to the guideline as a whole then please put ‘general’. Add extra rows if required.

| Section | Comments | Working group response |
| --- | --- | --- |
| general | The literature was searched until April 2017, but please use the recently published document of E.M Terveer et al. entitled "How to: Establish and run a stool bank" and published in Clin Microbiol Infect. 2017 Dec;23(12):924-930. This document has considerable overlap with the proposed guideline, but also shows some important unresolved issues. | This reference has been added. Literature searches have been updated, to January 2018. |
| Lay summary, line 3 | Capsules may also be prepared by use of non-freeze dried microbiota. Also, the possibility of using frozen products in general may be mentioned in this sentence. | We agree that these changes are important, and these amendments have been accordingly. |
| 8.1.1.1 | The authors are correct that CDI due to Type 07 responds less to FMT compared with CDI due to other PCR ribotypes. We register all infections by PCR ribotype to obtain more insights in successes and failures associated with strain characteristics and think that this is relevant for future recommendations, such as repeated FMT treatments for specific PCR ribotypes. | We presume that this refers to ribotype 027, and agree that this is important, and further reference has been made to this in **Section 10**, further research. |
| recommendation | “FMT should be offered to patients with recurrent CDI who have had at least two recurrences, or those who have had one recurrence and have risk factors for further episodes, including severe CDI (strong).” Please elucidate how this risk assessment can be performed. | The working party noted that these risk factors are well-described in previous studies, and do not require further elucidation within the manuscript. |
| 8.1.1.2 | Refractory CDI is also considered as an indication for FMT. Can the authors please provide a recommendation on the number of FMTs that should be used? Are patients on Intensive Care Units with refractory CDI also eligible? in 8.2.1 IC admission can be considered as a contraindication, but there are sufficient publications supporting to apply it for patients with severe CDI at ICU. | In **Section 8.2.1**, the working group reviewed the literature on contraindications to receiving FMT, and noted that certain studies have made ‘admission to Intensive Care’ such a contraindication. However, the working group have not themselves at any point stated that this is a contraindication to receiving FMT.  As stated in **Section 8.1.1.2**, there are a relatively small number of cases reported in the reviewed literature of refractory CDI. As such, the working group are unable to give recommendations that patients with refractory CDI receiving FMT should be managed in any particular way differently to those with recurrent CDI. |
| 8.1.1.3 | Antibiotic treatment of rCDI. Though the literature search was until April 2017, please mention the recent trials of tapered doses of vancomycin and fidaxomicin (PMID 29273269, PMID: 28591789; PMID 29255732). | We agree that these trials are all relevant, and have updated the guideline accordingly. |
|  | Recommendation II is less clear. How have the authors interpreted the literature that a tapered dosage of vancomycin before FMT increases the success rate of FMT? Are these studies also available for fidaxomicin? | There are no studies comparing FMT to fidaxomicin or bezlotoxumab, and only one study comparing a vancomycin taper to FMT (Hota *et al,* 2017). The safety profile of these medications is well-established from large randomised controlled trials, whilst randomised studies involving FMT have tended to be smaller, and have more variable patient follow-up. Furthermore, FMT remains (in the UK) an unlicensed medicine. As such, on the balance of safety, the working group agreed that antimicrobial/ antitioxin therapy associated with reduced CDI recurrence should be considered prior to FMT. Reflecting the uncertainties in this area within the reviewed literature, the relevant recommendation is ‘conditional’ rather than ‘strong’. |
|  | Recommendation iii is difficult to understand; do the authors recommend to treat severe and complicated CDI not with vancomycin, but with fidaxomicin or vanco+bezlo? If a recurrence occurs, then followed by a FMT? | The wording of this recommendation has been amended, along with expansion of the explanatory text of **Section 8.1.1.4.** |
|  | A recommendation for FMT treatment in severe (refractory), complicated CDI is missing (e.g. multiple sequential FMTs); should this also be accompanied with anti-CDI antibiotics? See review v. Beurden, Ther Advances in Gast, 2017 and Fischer, Ali Pharm Ther 2015 | As stated in **Section 8.1.1.2**, there are a relatively small number of cases reported in the reviewed literature of refractory CDI. As such, the working group are unable to give recommendations that patients with refractory CDI receiving FMT should be managed in any particular way differently to those with recurrent CDI. |
| 8.1.2.1 | We suggest to differentiate between "non-responding" and "late failure". The latter can be defined as a relapse of CDI after an initial response to FMT. For instance, use of antibiotics in the first month after FMT may provoke a new episode of CDI. This new episode doesn’t need a FMT and can be treated with conventional anti-CDI treatment, preferably microbiota sparing such as fidaxomicin. | We agree that this distinction is useful, and have amended the guideline accordingly. |
| 8.1.2.2 | Should a psychological questionnaire routinely be taken from recipients (before and after FMT) and from donors (regularly)? A ten-week follow-up is too short to recognize long term side-effects of FMT. | The working group did not consider that this was a priority. |
| 8.1.2.3 | We consider swallowing disorders a contraindication for upper GI delivery; death of a patient due to aspiration pneumonia with upper GI delivery has been described (PMID: 29026601); this patient had a swallowing disorder following oropharyngeal radiation after surgical removal of a maxillary carcinoma. | We note that this patient received a very large volume (500ml) of nasoduodenal FMT. This guideline recommends a much lower maximum volume with the specific aim of minimising this problem. Nevertheless, we agree that this is an important consideration, and have amended **Section 8.1.2.3** and **Section 8.5.2.2** accordingly. |
| 8.2.1 | What is the advice of the committee for coeliac patients with recurrent CDI? | The working group did not have any specific advice regarding patients with coeliac disease. |
| 8.2.2 | FMT in immunocompromised patients: we think that the presence of neutropenia (<0.5 × 109/L) can be considered as a contraindiction for FMT, especially if hematological patients are treated with selective gut decontamination to prevent translocation and infections with aerobe Gram-negatives. Second, should donors and immunocompromised recipients be matched for the EBV and CMV status to prevent a herpesvirus infection? | The working group have recommended that FMT is offered ‘with caution’ to immunosuppressed patients, reflecting the careful individualised assessment required for each patient.  We agree with the comment regarding matching donors and immunosuppressed recipients for EBV and CMV status, and have updated **Section 8.2.2** and **Section 8.3.4** accordingly. |
| 8.2.3 | The effect of FMT on the IBD status for IBD patients with rCDI is under discussion. Is it possible that FMT will result in cure of CDI but an exacerbation of IBD. Should we differentiate UC from CD? Ref 71 suggests that IBD can worsen. The recommendation "strong" is debatable. Is the IBD group not a better candidate for vancomycin tapering, fidaxomicin (tapering) or bezlotoxumab before FMT is given? | We agree that there is evidence that FMT to treat CDI in patients with IBD may be associated with a flare of IBD activity (Qazi *et al,* 2017); we have updated the recommendation accordingly. |
| 8.3.2 | Age and BMI of the donor. We agree with the BMI of the donor but have some difficulties with the age, We consider an age above 50 as a contraindication, based on the risks to develop colon carcinoma and metabolic (diabetes) diseases. Additionally, older people seems to have a less stable gut microbiota. | We note from a recent paper that *Bacteroides: Firmicutes* ratio and microbial diversity were similar in donors > 60 years compared to younger donors, and donations from older donors had similar efficacy and no higher rate of adverse outcomes (Anand *et al,* 2017). As such, the working group agreed to uphold their prior recommendation. |
| 8.3.3. | Donor screening history. Donors should also undergo a long term follow-up to recognize microbiota related diseases, including colon malignancies, autoimmune diseases, metabolic diseases and psychiatric illnesses. | We agree with the principle of this statement, and allude to this in **Section 8.7.7.** |
|  | Please consider to add to the recommendation/evidence: Potential donors should be extensively screened by a questionnaire and a personal interview concerning risk factors for transmissible diseases and factors influencing the intestinal microbiota | We agree with this suggestion, and have amended **Section 8.3.3** accordingly. |
| 8.3.4 | Screening of the donor. Table 4. The Dutch guideline advises screening donors for multi-drug resistant bacteria (MDR), including VRE, MRSA, CPE and ESBL-producing Gram-negatives, and quinolone/aminoglycoside resistant Enterobacteriaceae. Most of the patients with rCDI have much comorbidity and are frequently hospitalized or encounter nosocomially acquired infections, such as UTI. Infections with MDR are more difficult to treat, mostly with intravenously administered antibiotics. If these patients become colonized with MDR they should be nursed with specific infection control precautions. We also apply a "window period"; donors stools samples are stored in quarantine for 2 months and only become available after a negative second screening.  We additionally screen for: *Yersinia enterocolitica, Yersinia pseudotuberculosis, Plesiomonas shigelloides*, shiga toxin producing *E. coli* (not only 0157 E.coli), Astrovirus, Sapovirus, Adenovirus, Enterovirus, Parechovirus, Hepatitis E, *Entamoeba histolytica*, *Microsporidium* species, *Blastocystis hominis, Dientamoeba fragilis*, and Strongyloides (if a travel history to Middle and South America, Africa, or Asia is present).  We advise to include carriership of *E. histolytica* and Strongyloides to the mandatory screening, because of the serious infections that occur in immunocompromised patients. We have detected unexpectedly a donor carrying *E. histolyica* (Terveer, CMI, 2017). | The working group reviewed their recommendation regarding screening for multi-drug resistant bacteria, and **Section 8.3.4** has been updated accordingly.  We agree with the principle of a ‘window period’/ quarantine prior to repeat donor screening in centres using frozen FMT; **Section 8.3.5** has been updated accordingly, and a new flow chart to illustrate the process (**Figure 1**) added.  The working group agreed that recommendations should be made to test for Shiga toxin-producing *Escherichia coli,* hepatitis E IgM, *Entamoeba histolytica* serology and *Strongyloides stercoralis* IgG (**Table 3**). However, the working group consensus was that screening with the other tests suggested is not justified. |
| 8.4.1 | Recommendation i. Please elucidate how donors should deliver their stools. We favour the use of specific device systems to prevent contamination with environmental microorganisms.  Recommendation ii. Processing within 6 hours is proven effective, consider changing ‘conditional’ to ‘strong’ recommendation  Recommendation iii. A meta-analysis concludes that lless than 50 gram of feces is related to a 4-fold increase in recurrence rates. The recommendation status should be changed to ‘strong’. | 1. We think that the text as it stands gives sufficient information about best practice in this area. 2. We agree with this suggestion, and have amended **Section 8.4.1** accordingly. 3. We agree with this suggestion, and have amended **Section 8.4.1** accordingly. |
| 8.4.2 | An important advantage of frozen FMT is the possibility to use a “window period” of, for example, two months. When donors are screened after this window period, the results determine if the stored FMTs can be used. | We have cross-referenced **Section 8.4.2** to **Section 8.3.5**, where the concept of a window period/ quarantine is discussed in more detail. |
| 8.4.3 | We think that there is not enough evidence to state that feces suspensions can only be used up to six months from preparation. There is no sufficient data that show a decreased efficacy with feces suspensions stored over 6 months. Additionally, multiple stool banks set the expiration date at 1 year after storage. | A trend towards decrease in the viability of certain gut bacterial groups was noted when faecal aliquots were frozen in 10% glycerol for six months (Costello *et al, Alimentary Pharm & Ther*, 2015), and as such, the working group agreed that six months was the acceptable limit for freezing of an FMT in glycerol. This rationale is now within the text. |
|  | Good practice point: Thawing overnight in a 4C refrigerator is also a good and much used alternative. | None of the working group had sufficient experience with this means of thawing FMT, and as such were unable to make this good practice point. |
| 8.5.1.1. | It is not clear, why the administration of a bowel lavage in upper GI administration, of PPI, of loperamide and of metroclopramide are recommended. There is no evidence to support their use, and all of them are drugs with known side effects. The only reason why they are used is that the first RCT used them. However, the RCT did not assess their importance, and there are many case series showing that FMT has a high success rate even without their use. | All of these interventions have a clear biological or practical rationale for their use. Significant side effects in association with a single dose of these medications are generally rare, and their use has not been associated with adverse outcomes in FMT studies. Our recommendations for their use are only conditional. As such, the working group uphold their recommendations. |
| 8.5.2.1. | Not all capsules necessarily contain lyophylized microbiota, frozen preparations have also been shown to be effective. | We agree with this comment, and have updated the guideline accordingly. |
| 8.5.2.2 | Are there studies indicating that 50 ml for upper gastrointestinal have comparable efficacy as 250 ml? If not, this should be more pronounced mentioned, also in the research session. We use at least 50 gram suspended in 200 ml and a slow infusion of 10cc/min. | As described in the text, the working group considered that mass of stool was a more important consideration than volume of diluent. They also noted that as low as 25ml of FMT has been demonstrated to be effective as upper GI FMT (Aas *et al, Clin Infect Dis,* 2003). However, the working group revised their decision, and now recommend 100ml as the threshold volume for upper GI FMT administration. |
| 8.5.2.4. | The recommendation not to use capsules seems rather strong. It is unlikely that concerning transmission of infection, the risk would differ in any way from other ways of administration. Also, no safety concerns based on endoscopic complications can possibly arise. We would therefore not pronounce a recommendation against use. | We agree with this statement. Of note, whilst the Kao *et al,* 2017 study (RCT of capsulised vs colonoscopic FMT) was not published at the time of initial searches, it has been identified by updated searches and has now been reviewed by the working group. As such, the guideline has been updated accordingly. |
| 8.6 | Consider to add that specific donor microbiota may have better outcomes (e.g. donor B in Moayyedi, gastroenterology, 2015)  FMT for other conditions than rCDI. Why have the authors not included the role of FMT to eradicate MDR from the intestinal tract? | Reference to Donor B in this paper has been added to **Section 8.6.2.2.**  In keeping with NICE methodology, for the consideration of FMT as treatment for non-CDI conditions, only RCTs could be considered. The working group are aware of case studies and case series using FMT to attempt gut decolonisation of multidrug resistant microorganisms. Members of the working party have themselves contributed to the literature in this field. But no RCTs currently exist. |
| 8.6.3. | Consider adding: characterisation of specific CU patient population that would potentially benefit from FMT. “However, recommendations for clinical use for this indication cannot be made until there is clearer evidence of the most appropriate **CU patient characteristics**, methodology for its preparation, route of delivery, and intensity of administration of FMT” | We agree with this comment, and have updated the guideline accordingly. |
| 8.7.2 and 8.7.4 | FMT is considered as a medicinal product under supervision of MHRA and licensing should follow the GMP guidelines. The activities should be performed in a dedicated containment level 2 laboratory with personal protective equipment and a quality assessment system. Does this indicate that FMTs should be prepared under GMP conditions at the Pharmacy Department and not within the Medical Microbiology? Or is this statement too strong? | No. MHRA guidance does not specify where the manufacture should take place. This could be pharmacy, the microbiology laboratory, or another place. |
| 8.7.6 | Please consider to add that aliquots of donor FMT materials (and original feces samples) used for patients treatment should be stored, enabling to use these samples when adverse effects after FMT developed. This should also been included in 6.3 (auditing). | We agree, and we have updated **Sections 6.3** and **8.7.6** accordingly. |
| Table 4 | PCRs are more sensitive than conventional microscopy and antigen tests for parasites. Second, can the authors please specify the parasites? There is some debate on the significance of Blastocystes spp. and Dientamoeba spp. Why is only E. coli 157 excluded and not other STEC pathogens? | **Table 4** has been updated to specify Shiga toxin-producing *Escherichia coli* screening by PCR. The working group did not consider that specific screening for *Blastocystis spp* or *Dientamoeba spp* was justified. |
| **Propose to add:** Eligibility of patients for FMT | At the NDFB, all requests by the treating physician are evaluated by at least two clinical members of our feces bank board to determine the eligibility of the patient. It is required that patients have a laboratory documented episode of recurrent CDI following at least one course of adequate CDI antibiotic therapy. Recurrent CDI is defined as the re-appearance of diarrhoea (≥ 3 unformed stools per 24 hours for two consecutive days; or ≥ 8 unformed stools per 48 hours) within eight weeks after cessation of antibiotic therapy in combination with a positive diagnostic test for *C. difficile*. We strongly recommend a two-stage testing algorithm, as recently advised by the *C. difficile* working group/ESCMID (ESGCD)*.* Using this algorithm, we reject approximately 20% of all requests for FMT. We would like to add our experience that of 79 candidate patients for FMT, only 75% were considered as suitable candidates for FMT treatment; most rejected requests were patients with underlying IBD who concomitantly carried *C. difficile.* | Thank you for this comment. Definitions of recurrent CDI are outside of the remit of this working group. Testing is discussed in **Section 8.1.1.,** where we refer to current ESCMID guidance. |
| **Need for antimicrobial stewardship after FMT (also for 8.5.1.3)** | After FMT, we advise that an infectious disease specialist or medical microbiologists should be involved for antibiotic treatment (or prophylaxis) of the patient during the first month after FMT, since 50% of our registered failures were patients who received antibiotics within one month after FMT. Interestingly, all patients responded to conventional anti-CDI treatment and did not need a second FMT. It can be considered to use microbiota sparing fidaxomicin after FMT. | We agree with this comment, and have updated **Section 8.5.1.3** accordingly. |

**Closing date:** Please forward this electronically by 5pm on January 2018 at the very latest to [consultations@his.org.uk](mailto:consultations@his.org.uk)

**Healthcare Infection Society**

**Consultation – The use of faecal microbiota transplant as treatment for recurrent or refractory *Clostridium difficile* infection and other potential indications: joint British Society of Gastroenterology (BSG) and Healthcare Infection Society (HIS) guidelines.**

**Closing date: 5pm on January 2018**

|  |  |
| --- | --- |
| Organisation | OpenBiome |
| Title (e.g. Dr, Mr, Ms, Prof) | Dr |
| Name | Majdi Osman |
| Job title or role | Clinical Program Director, OpenBiome; Visiting Assistant Professor, Harvard Medical School |
| Address and post code | 200 Inner Belt Road, Somerville, MA 02143 |
| Telephone number | +1 (617) 575-2201 |
| Email address | majdi@openbiome.org |
| **Please note**: comments will only be accepted electronically on this proforma. | |

Please provide comments on the draft guideline on the form below, putting each new comment in a new row. When feeding back, please note the section you are commenting on (for example, section 1 Introduction and line number). If your comment relates to the guideline as a whole then please put ‘general’. Add extra rows if required.

| Section | Comments | Working group response |
| --- | --- | --- |
| **8.1.1.1. Recurrent *Clostridium difficile* infection** | ***“FMT should be offered to patients with recurrent CDI who have had at least two recurrences, or those who have had one recurrence and have risk factors for further episodes, including severe CDI (strong).”***  We agree however for full clarity we would recommend re-wording to:  ***“FMT should be offered to patients with recurrent CDI who have had at least two recurrences, or those who have had one recurrence and have risk factors for further episodes, including severe and severe-complicated CDI (strong).”*** | We agree with this statement, and have updated the guideline accordingly. |
| **8.1.1.2. Refractory Clostridium difficile infection:** | ***“FMT should be considered in cases of refractory CDI (conditional).”***  We agree. | Thank you for this comment. |
| **8.1.1.3. Antimicrobial therapy prior to considering FMT for patients with CDI:** | 1. ***FMT for recurrent CDI should only be considered after failure of antimicrobial anti-C. difficile therapy which has been administered for a minimum of 10 days (conditional).*** 2. ***Recipients of FMT as treatment for recurrent CDI should have previously been treated with extended/ pulsed vancomycin and/or fidaxomicin (conditional).*** 3. ***For those with severe or complicated CDI, which appears to be associated with reduced cure rates, consideration should be given to offering patients treatment with medications which are associated with reduced risk of recurrence (e.g. fidaxomicin and bezlotoxumab), before offering FMT (conditional).***   We suggest rewording point *iii*, that recommends fidaxomicin or bezlotoxumab should be offered to patients with severe or complicated CDI before FMT. There is little evidence on the role of bezlotoxumab and fidaxomicin in severe or severe-complicated CDI. Although the evidence base is similarly lacking for FMT in severe or severe-complicated disease, there is a growing body of evidence from trials, multiple case series and reports indicating the potential for FMT in this population.  **Bezlotuxumab:** The performance of bezlotuxumab has not been evaluated in a severe or severe-complicated population. Results from MODIFY I and II suggest a modest 10% improvement in rates of sustained cure with bezlotoxumab. Importantly, only 15.6% were severe CDI. Based on the modest gains in efficacy and the few severe/severe-complicated patients in the MODIFY trials, we feel that further evidence is required before proposing bezlotuxumab be offered ahead of FMT in this patient population.  In comparison, across similar patient populations FMT has demonstrated in several randomized controlled trials reduced risk of recurrence. Based on the available evidence we therefore feel that the statement that bezlotuximab is “associated with reduced risk of recurrence” compared to FMT is not supported by the evidence.  **Fidaxomicin:** Similarly, there is a dearth of evidence on the role of fidaxomicin in the severe CDI population. We agree that it has demonstrated superior efficacy compared to vancomycin in the general CDI population. In an RCT comparing extended-pulsed fidaxomicin versus vancomycin for CDI, Guery et al (2017) observed increased recurrence in severe CDI compared to non-severe CDI with an odds ratio 0.57 (95% CI 0·36–0·91) p=0.019. We therefore recommend that fidaxomixin should be offered to patients with severe CDI. However, there is no evidence to suggest that the performance of fidaxomicin would be better than FMT. We acknowledge that access to fidaxomicin is likely to be more timely in settings where FMT is not readily available.  **The role of FMT in severe CDI:** In their recent review, Van Beurden et al (2017) reviewed the literature on FMT in severe CDI and found 23 reports (12 case reports; 11 case series) about FMT as treatment for severe or complicated CDI. The patients described (n=200) all had severe or complicated CDI, did not respond to conventional CDI antibiotic treatment and received FMT as last resort treatment. In all studies, patients were treated with (sequential) FMT, whether or not followed by additional antibiotic treatment for CDI. FMT, with or without additional antibiotic CDI treatment, appears to be a promising curative treatment option in patients with severe and complicated CDI who do not respond sufficiently to conventional antibiotic treatment. FMT has been proposed by Fischer et al (2015) as an option utilizing an endoscopic response-guided approach, which may be particularly useful in non-surgical candidates. In an open-label cohort study (n = 17), FMT was delivered by colonoscopy. If pseudomembranes were identified, patients reinitiated oral vancomycin 24 hour after FMT and continued for 5 days. A repeat FMT by colonoscopy was given on day 7. If pseudomembranes persisted, vancomycin was restarted the following day for a 5 days course and a third FMT was offered on day 13. If pseudomembranes were absent during any colonoscopy, no further therapy was initiated. The results were promising with a combined clinical cure rate of 88%.  In conclusion, we agree that there is a lack of evidence available to make a strong recommendation on the role of FMT in severe CDI. However, there is insufficient evidence to suggest that fidaxomicin or bezlotuximab would be superior to FMT in this population. On the contrary, the growing pool of experience in using FMT in severe and severe-complicated CDI patients demonstrates that it appears to be generally safe and effective (quality of evidence: 3).  We would therefore suggest re-wording point iii to:  ***iii. For those with severe or complicated CDI, which appears to be associated with reduced cure rates, consideration should be given to offering patients treatment with medications which are associated with reduced risk of recurrence (e.g. fidaxomicin or bezlotuxumab), or offering FMT (conditional).***  Fischer M, Sipe BW, Rogers NA, et al. Faecal microbiota transplantation plus selected use of vancomycin for severe-complicated Clostridium difficile infection: description of a protocol with high success rate. Aliment Pharmacol Ther. 2015;42(4):470-476. doi:10.1111/apt.13290.  Van Beurden YH, Nieuwdorp M, van de Berg PJEJ, Mulder CJJ, Goorhuis A. Current challenges in the treatment of severe Clostridium difficile infection: early treatment potential of fecal microbiota transplantation. Therapeutic Advances in Gastroenterology. 2017;10(4):373-381. doi:10.1177/1756283X17690480. | Pre-planned subgroup analysis of patients with severe CDI in a randomised trial demonstrated a significantly lower recurrence rate when treated with fidaxomicin (13.0%, *n*=12/92) than when treated with vancomycin (26.6%, *n*=29/209) (Louie *et al,* 2011); this finding was replicated in another randomised controlled trial, with 8.3% (n=4/48) and 32.6% (*n*=14/43) experiencing a recurrence respectively (Cornely *et al,* 2012). In a further randomised trial, bezlotoxumab (together with standard of care antibiotics) was shown to reduce recurrence of severe CDI compared to standard of care antibiotics alone (10.9% (*n*=6/55) vs 20% (*n*=13/65) respectively) (Wilcox *et al,* 2017).  The working group noted that there are no studies comparing FMT to fidaxomicin or bezlotoxumab, and only one study comparing a vancomycin taper to FMT (Hota *et al,* 2017). The working group agreed that in the absence of this evidence, on the balance of safety and potential risks, consideration should be given to using antimicrobial/ antitoxin therapy associated with reduced CDI recurrence prior to considering the use of FMT. |
| **8.1.2.1. Management of FMT failure:** | ***Further FMT should be offered after initial FMT failure (strong).***  We agree. | Thank you for this comment. |
| **8.1.2.2. General approach to follow-up post-FMT:** | ***All FMT recipients should routinely receive follow-up. Given the relative novelty of FMT and the potential for unexpected sequelae, clinicians should follow-up FMT recipients for long enough to fully establish efficacy/ adverse events, and at least ten weeks in total (strong).***  We agree. | Thank you for this comment. In light of other comments from the working group and stakeholders, this follow-up period has been adjusted to ‘at least eight weeks in total’. |
| **8.1.2.3. Management of the FMT recipient:** | 1. ***Immediate management after endoscopic administration of FMT should be as per endoscopy unit protocol (strong).*** 2. ***Patients should be warned about short term adverse events, in particular the possibility of self-limiting GI symptoms. They should be advised that serious adverse events are rare (strong).*** 3. ***After enteral tube administration, patients may have the tube removed and oral water given from 30 minutes post-administration (strong).***   We agree. | Thank you for this comment. |
| **8.1.2.4. Definition of cure post-FMT for CDI:** | ***A decision regarding cure/remission from CDI should be recorded during follow-up. However, this has no uniformly-agreed definition, and should be decided on a case-by-case basis (strong).***  We agree. | Thank you for this comment. |
| **8.1.2.5. Definition of treatment failure post-FMT for CDI:** | ***Treatment failure/recurrence should be defined on a case-by-case basis. Routine testing for C. difficile toxin after FMT is not recommended, but is appropriate to consider in the case of persistent CDI symptoms/suspected relapse (strong).***  When testing is to be performed, we would recommend clinicians follow the 2016 European Society of Clinical Microbiology and Infectious Diseases (ESCMID) guidelines for CDI testing, which state that no single commercial test can be used as a stand-alone test for diagnosing CDI, and recommend a 2-step approach (highly sensitive with reflex to highly specific test). These guidelines recommend performing an initial test with a high negative predicative value; therefore, if negative, no further testing needs to be done. Specifically, they suggest glutamate dehydrogenase (GDH) EIA or NAAT/PCR testing. Our recommendation is GDH EIA as it is less expensive and has a slightly superior NPV at higher CDI prevalence compared with NAAT/PCR (98 vs 96 at hypothetical CDI prevalence of 50%), and an NPV of 100% at lower CDI prevalence. The second test should be a test with a high positive predictive value, such as EIA for toxin A/B. Obtaining CDI testing at each suspected CDI recurrence and working with institutional laboratories to use an appropriate testing algorithm is a key component to ensuring appropriate patient selection for FMT.  As currently worded, the recommendations risk encouraging over testing in a context where patients may develop post-infectious IBS. This concept is highlighted by evidence suggesting that up to 25% of patients referred to an FMT center for “C difficile infection” were found to have an alternative diagnosis, with younger patients being more likely to have a non-CDI diagnosis (Jackson 2016).  Jackson M, Olefson S, Machan JT, Kelly CR. A high rate of alternative diagnoses in patients referred for presumed clostridium difficile infection. J Clin Gastroenterol. 2016 Oct;50(9):742-6. | We agree on the use of ESCMID guidelines in CDI testing, and refer to these clearly in **Section 8.1.1.1**. However, **Section 8.1.2.5** specifically refers to diagnosing failure post-FMT for CDI rather than initial diagnosis of CDI, and no good uniform definition exists for this. We think that the guidance given, to define treatment failure on a case-by-case basis, is the most fair summary of the current literature on this topic. |
| **8.2.1. General approach to co-morbidities and FMT:** | ***FMT should be offered with caution in patients with decompensated chronic liver disease and should be avoided in those with anaphylactic food allergy (strong).***  The authors may want to consider the approach recommended by Allegretti et al (2017). In patients with a severe food allergy, a potential option for FMT could be from a patient identified donor living with the patient (e.g. spouse) who avoids the same allergens.  Allegretti JR, Kassam Z, Osman M, Budree S, Fischer M, Kelly CR. The 5D framework: a clinical primer for fecal microbiota transplantation to treat <em>Clostridium difficile</em> infection. Gastrointest Endosc [Internet]. 2017 Jul 26; Available from: http://dx.doi.org/10.1016/j.gie.2017.05.036 | The working group thought it important to emphasise the ‘good practice point’ that in patients with true anaphylaxis, the risks of FMT administration were likely to outweigh the benefits. As such, this suggestion has not been incorporated. |
| **8.2.2. Immunosuppression and FMT:** | ***FMT should be offered with caution to immunosuppressed patients, in whom FMT appears efficacious without significant additional adverse effects (strong).***  We agree. | Thank you for this comment. |
| **8.2.3. Other co-morbidities and FMT:** | ***Recommendation:***   1. ***FMT should be offered to those with recurrent CDI and inflammatory bowel disease (strong).*** 2. ***FMT should be considered for appropriate patients with recurrent CDI regardless of other comorbidities (conditional).***   We agree. | Thank you for this comment. |
| **8.3.1. General approach to donor selection:** | ***Related or unrelated donors should both be considered acceptable. However, where possible, FMT is best sourced from a centralised stool bank, from a healthy unrelated donor (conditional).***  We agree. | Thank you for this comment. |
| **8.3.2. Age and BMI restrictions for potential donors:** | ***People should only be considered as potential FMT donors if they are ≥18 and ≤60 years old, and have a BMI of <30 kg/m2 (conditional).***  We agree. | Thank you for this comment. |
| **8.3.3. General approach to the donor screening assessment:** | ***A donor-screening history/ questionnaire is mandatory (Table 2) (strong).***   1. ***Receipt of antimicrobials within the past three months.*** 2. ***Known prior exposure to HIV and/ or viral hepatitis, and known previous or latent tuberculosis.*** 3. ***Risk factors for blood-borne viruses - including high risk sexual behaviours, use of illicit drugs, any tattoo/ body piercing/ needlestick injury/ blood transfusion/ acupuncture, all within previous six months.*** 4. ***Receipt of a live attenuated virus within the past six months.*** 5. ***Underlying gastrointestinal conditions (e.g. history of IBD, IBS, chronic diarrhoea, chronic constipation, coeliac disease, bowel resection or bariatric surgery).*** 6. ***Family history of any significant gastrointestinal conditions (e.g. family history of IBD, or colorectal cancer).*** 7. ***History of atopy (e.g. asthma, eosinophilic disorders).*** 8. ***Any systemic autoimmune conditions.*** 9. ***Any metabolic conditions, including diabetes and obesity.*** 10. ***Any neurological or psychiatric conditions, or known risk of prion disease.*** 11. ***History of chronic pain syndromes, including chronic fatigue syndrome and fibromyalgia.*** 12. ***History of any malignancy.*** 13. ***Taking particular regular medications, or such medications within the past three months, i.e. antimicrobials, proton pump inhibitors, immunosuppression, chemotherapy*** 14. ***History of receiving growth hormone, insulin from cows, or clotting factor concentrates.*** 15. ***History of receiving an experimental medicine or vaccine within the past six months.*** |  |
| **8.3.4. Laboratory screening of potential donors:** | ***Blood and stool screening of donors is mandatory (Tables 2 and 3) (strong).***  ***Table 3: Recommended blood screening for stool donors:***  ***Pathogen screening:***   * ***Hepatitis A IgM*** * ***Hepatitis B (HBsAg and HBcAb)*** * ***Hepatitis C antibody*** * ***Hepatitis E IgM*** * ***HIV -1 and -2 antibodies*** * ***HTLV-1 and -2 antibodies*** * ***Treponema pallidum antibodies (TPHA, VDRL)*** * ***Epstein-Barr virus IgM*** * ***Cytomegalovirus IgM*** * ***Strongyloides stercoralis IgG*** * ***Entamoeba histolytica serology***   ***General/ metabolic screening:***   * ***Full blood count with differential.*** * ***Creatinine and electrolytes*** * ***Liver enzymes (including albumin, bilirubin, aminotransferases, gamma-glutamyltransferase and alkaline phosphatase).*** * ***C-reactive protein***   ***Table 4: Recommended stool screening for stool donors:***   * ***Clostridium difficile PCR*** * ***Campylobacter, Salmonella, and Shigella by standard stool culture and/ or PCR*** * ***Escherichia coli 0157 H7 by culture and/or PCR*** * ***Multi-drug resistant bacteria, specifically carbapenemase-producing Enterobacteriaceae.*** * ***Stool ova, cysts and parasite analysis, including for Microsporidia.*** * ***Faecal antigen for Cryptosporidium and Giardia.*** * ***Acid fast stain for Cyclospora and Isospora.*** * ***Helicobacter pylori faecal antigen.*** * ***Norovirus and Rotavirus PCR.***   We recommend:  **CMV and EBV:** Given the high rates of carriage for both EBV and CMV in a healthy, adult population, excluding EBV or CMV positive donors would make it prohibitively difficult to identify suitable donors to provide access to care (Bate et al). Moreover, excluding EBV or CMV positive candidates is not expected to provide a significant benefit to the majority of the patients that would be served by a centralized stool bank, who are not severely immunocompromised.  Given the need to ensure a reliable supply of material for the vast majority of rCDI patients while protecting severely immunocompromised patients, until now OpenBiome has chosen not to test for EBV and CMV. Instead, we treat material as presumptively CMV and EBV positive and discourage use in severely immunocompromised patients who are seronegative for CMV or EBV.  We are sensitive to the fact that this leaves clinicians with an additional challenge for managing these already difficult cases (severely immunocompromised rCDI patients). Should FMT be indicated then we would suggest that **in the immunocompromised patient at risk of CMV or EBV infection either: 1) CMV and EBV testing of the recipient to confirm positive serology, in which case FMT may be considered after extensive discussion of the risks, benefits, and alternatives in the informed consent process; or 2) the use of a directed donor with matching serology.**  Bate SL, Dollard SC, Cannon MJ. Cytomegalovirus seroprevalence in the United States: the national health and nutrition examination surveys, 1988-2004. Clin Infect Dis. 2010;50:1439–1447.  **Adenovirus:** We recommend including adenovirus on stool in addition to norovirus and rotavirus.  **Vancomycin resistant enterococcus (VRE):** VRE should be specifically mentioned in “*Multi-drug resistant bacteria”.* VRE is a leading cause for donor exclusion despite prospective donors having no known risk factors for colonization. | We agree with the comment regarding matching donors and immunosuppressed recipients for EBV and CMV status, and have updated **Section 8.2.2** and **Section 8.3.4** accordingly.  The working group did not think that screening for adenovirus was justified.  Whilst vancomycin-resistant *Enterococci* (VRE) carriage is relatively common in the community (probably related to food consumption) (Endtz *et al,* 1997), the form of VRE in the community is genetically distinct from that found nosocomially, with much lower pathogenicity in community forms (Willems *et al,* 2005). As such, the working group strongly opined that routine screening was not justified. However, it was acknowledged that the potential infection risk from VRE (and MRSA) would vary regionally depending on local prevalence and pathogenicity, and as such a local risk assessment has been recommended to decide whether screening for these organisms should be considered. |
| **8.3.5. Final donor checks prior to donation:** | ***Further final screening should take place prior to collection of a stool sample for processing into FMT (strong).***  We agree. | Thank you for this comment. In light of this and other comments, the recommendation on repeat screening has been strengthended. |
| **8.4.1. General principles of FMT preparation:** | ***Recommendation:***   1. ***Donor stool collection should follow a standard protocol (strong).*** 2. ***Donor stool should be processed within 6 hours of defecation (conditional).*** 3. ***Both aerobically and anaerobically prepared FMT treatments should be considered suitable when preparing FMT for the treatment of recurrent CDI (strong).*** 4. ***Sterile 0.9% saline should be considered as an appropriate diluent for FMT production, and cryoprotectant such as glycerol should be added for frozen FMT (strong).*** 5. ***Consider ≥50g of stool for use in FMT preparation (conditional).***   ***Good practice points:***   1. ***Stool should be mixed 1:5 with diluent to make the initial faecal emulsion (conditional).*** 2. ***Homogenisation and filtration of FMT should be undertaken in a closed disposable system (conditional).***   We agree. | Thank you for this comment. |
| **8.4.2. Fresh vs frozen FMT:** | ***The use of banked frozen FMT material should be considered preferable to fresh preparations for CDI (strong).***  We agree. | Thank you for this comment. |
| **8.4.3. Use of frozen FMT:** | ***Recommendation:***  ***FMT material stored frozen at -80oC should be regarded as having a maximum shelf life of six months from preparation (strong).***  ***Good practice point:***  ***Consider thawing frozen FMT should at ambient temperature and using within six hours of thawing (conditional).***  We agree. | Thank you for this comment. |
| **8.5.1. Use of specific medications in the period around FMT administration:**  **8.5.1.1. General principles of FMT administration:** | ***Recommendation:***   1. ***Bowel lavage should be administered prior to FMT via the lower GI route, and bowel lavage should be considered prior to FMT via the upper GI route; polyethylene glycol preparation is preferred (conditional).*** 2. ***For upper GI FMT administration, a proton pump inhibitor should be considered, e.g. the evening before and morning of delivery (conditional).*** 3. ***Loperamide (or other anti-motility drugs) should be considered following lower GI FMT delivery (conditional).***   ***Good practice point:***   1. ***Prokinetics (such as metoclopramide) should be considered prior to FMT via the upper GI route (conditional).*** 2. ***Best practice for prevention of further transmission of CDI should be applied throughout when administering FMT to patients with CDI (nursing with enteric precautions, sporicidal treatment of endoscope, etc).***   We agree. | Thank you for this comment. |
| **8.5.1.2. Additional antibiotics pre-FMT:** | ***Consider further antimicrobial treatment for CDI for at least 72 hours prior to FMT (conditional).***  We agree. | Thank you for this comment. |
| **8.5.1.3. Washout period between antibiotic use and FMT:** | ***To minimise any deleterious effect of antimicrobials on the FMT material, there should be a minimum washout period of 24 hours between the last dose of antibiotic and treatment with FMT (strong).***  We agree. | Thank you for this comment. |
| **8.5.2.2. Upper gastrointestinal tract administration of FMT:** | ***Recommendation:***   1. ***Upper GI administration of FMT as treatment for recurrent or refractory CDI should be used where clinically appropriate (strong).*** 2. ***Where upper GI administration is considered most appropriate, FMT administration should be via nasogastric, nasoduodenal, or nasojejunal tube, or alternatively via upper GI endoscopy. Administration via a permanent feeding tube is also appropriate (strong).***   ***Good practice point:***  ***It is recommended that no more than 50ml of FMT is administered to the upper GI tract (conditional).***  We agree. | Thank you for this comment. In light of further discussion by the working group, the maximum volume of FMT recommended by upper GI administration is now 100ml. |
| **8.5.2.3. Lower gastrointestinal tract administration of FMT:** | ***Recommendation:***   1. ***Colonoscopic administration of FMT as treatment for recurrent or refractory CDI should be used where appropriate (strong).*** 2. ***Where colonoscopic administration is employed, consider preferential delivery to the caecum or terminal ileum, as this appears to give the highest efficacy rate (conditional).*** 3. ***FMT via enema should be used as a lower GI option when colonoscopic delivery is not possible (strong).***   We recommend rewording point *iii*. Although there is limited data, flexible sigmoidoscopy may be the preferred route of delivery where colonoscopic delivery is not possible. Several experts have advised less invasive modalities such sigmoidoscopy in high risk patients (Brandt 2013; Kelly 2014). This may provide a more effective method for delivering material as proximally as possible and improving retention. We therefore recommend re-wording point *iii* to:  ***FMT via enema should be used as a lower GI option when colonoscopic or flexible sigmoidoscopy delivery is not possible (strong).***  Brandt LJ, Aroniadis OC. An overview of fecal microbiota transplantation: Techniques, indications, and outcomes. Gastrointest Endosc. 2013 Aug;78(2):240-9.  Kelly CR, Ihunnah C, Fischer M, Khoruts A, Surawicz C, Afzali A, et al. Fecal microbiota transplant for treatment of clostridium difficile infection in immunocompromised patients. Am J Gastroenterol. 2014 Jul;109(7):1065-71. | We agree with this suggestion, and have updated the guideline accordingly. |
| **8.5.2.4. Capsulised FMT:** | ***Capsulised FMT holds promise as a treatment option for recurrent CDI, but further evidence regarding its safety and efficacy is awaited, and it should not be considered for use at present (conditional).***  There is a growing body of evidence on encapsulated FMT and the delivery modality presents a potential option in circumstances where it may be inappropriate, contraindicated, or contrary to patient preferences to deliver material via traditional routes of administration for CDI.  In terms of patient perceptions, Zipursky and colleagues report that more aesthetically appealing FMT formulations, such as capsules, would both eliminate potential barriers to treatment and reduce the necessity for healthcare resources and procedure time for clinicians. Capsules appear well tolerated. For example, the mean time of 30 capsule administration is approximately 20 minutes (range 10-30 minute) (Allegretti, unpublished data).  Although the optimal dose is still under investigation (as with other FMT delivery modalities), there have been several studies that have shown equivalent efficacy rates. Youngster and colleagues reported their experience with a capsule formulation that averaged 1.6 grams of stool per capsule in which they dosed 15 capsules on 2 consecutive days. They reported a 70% cure rate after an initial dose in a cohort of 140 patients. Those that failed to achieve cure were re-treated, bringing the cumulative cure rate up to 90%.  Similarly, Hirsch and colleagues demonstrated a clinical cure rate of 68% in the 19 participants, using capsules containing purified, concentrated, and cryopreserved fecal bacteria and this increased to 89% with retreatment.  Allegretti and colleagues conducted the first dose-finding study for FMT capsules (0.75 grams of stool per capsule with upper GI release) assessing 30 capsules once (low dose) versus 30 capsules on 2 consecutive days (high dose). Efficacy rates between the groups were similar on initial dose (70%) and there were no adverse events reported.  Lastly the largest randomized control trial to date of FMT used encapsulated FMT with good safety and efficacy outcomes equivalent to colonoscopy FMT. In Kao et al’s non-inferiority randomized clinical trial (cited in the guidelines) that included 116 adults with rCDI, the proportion without recurrence over 12 weeks was 96.2% after a single treatment in a group treated with oral capsules and in a group treated via colonoscopy. Given this 1+ level of evidence, in addition to multiple smaller studies of encapsulated FMT, we feel that there is a good body of evidence to support the short-term safety of encapsulated FMT. We agree that further evidence is needed on optimal dosing and formulation, however this applies to all delivery modalities.  We agree that capsule availability is very limited in the UK at present however this shouldn’t preclude guidelines recommending this as a potential FMT delivery option.  We therefore recommend rewording the 8.5.2.4 to:  ***Capsulised FMT holds promise as a treatment option for recurrent CDI and should be offered to patients as a potential treatment modality. Capsule preparations should follow a standard protocol. Further evidence regarding its optimal dosing and formulation is needed (conditional).***  Allegretti J\*, Fischer M\*, Papa E, Elliot R, Klank M, Mendolia G, et al. Fecal microbiota transplantation delivered via oral capsules achieves microbial engraftment similar to traditional delivery modalities: Safety, efficacy and engraftment results from a multi-center cluster randomized dose-finding study. Digestive Disease Week 2016.  Hirsch BE, Saraiya N, Poeth K, Schwartz RM, Epstein ME, Honig G. Effectiveness of fecal- derived microbiota transfer using orally administered capsules for recurrent clostridium difficile infection. BMC Infect Dis. 2015 Apr 17;15:191,015-0930-z.  Youngster I, Russell GH, Pindar C, Ziv-Baran T, Sauk J, Hohmann EL. Oral, capsulized, frozen fecal microbiota transplantation for relapsing clostridium difficile infection. JAMA. 2014 Nov 5;312(17):1772-8.  Zipursky JS, Sidorsky TI, Freedman CA, Sidorsky MN, Kirkland KB. Patient attitudes toward the use of fecal microbiota transplantation in the treatment of recurrent clostridium difficile infection. Clin Infect Dis. 2012 Dec;55(12):1652-8. | We largely agree with this comment. Whilst the Kao *et al,* 2017 study was not published at the time of initial searches, it has been identified by updated searches and has now been reviewed by the working group. The guideline has been updated accordingly. |
| **8.6. What is the clinical effectiveness of faecal microbiota transplant in treating conditions other than Clostridium difficile infection?** | ***FMT is not currently recommended as treatment for inflammatory bowel disease. There is insufficient evidence to recommend FMT for any other gastrointestinal or non-gastrointestinal disease (strong).***  We agree. | Thank you for this comment. |
| **8.7. Basic requirements for implementing a FMT service** | ***The development of FMT centres should be encouraged (strong).***  We agree. | Thank you for this comment. |
| **8.7.5. FMT manufacturing:** | ***Ensure traceability of supply (strong).***  We agree. | Thank you for this comment. |
| **FMT in patients with IBD** | We recommend emphasizing the importance of counselling patients with IBD on the risk of flare or worsening IBD activity post-FMT. | We agree with this comment, and have updated **Section 8.2.3.** accordingly. |
| **FMT in paediatric populations** | A recommendation on paediatric FMT should be include. The evidence base is limited but safety and efficacy appears comparable to adult FMT. Patients and caregivers should be counselled on the unknown long-term risks of FMT.  Recommendation:  ***i. FMT should be offered to paediatric patients with recurrent CDI.***  ***ii. Paediatric patients and caregivers should be counselled on the unknown short and long-term risks of FMT.*** | FMT in the paediatric setting is outside of the remit of this working group. We have updated **Section 5.4** to clarify this. |

**Closing date:** Please forward this electronically by 5pm on January 2018 at the very latest to [consultations@his.org.uk](mailto:consultations@his.org.uk)