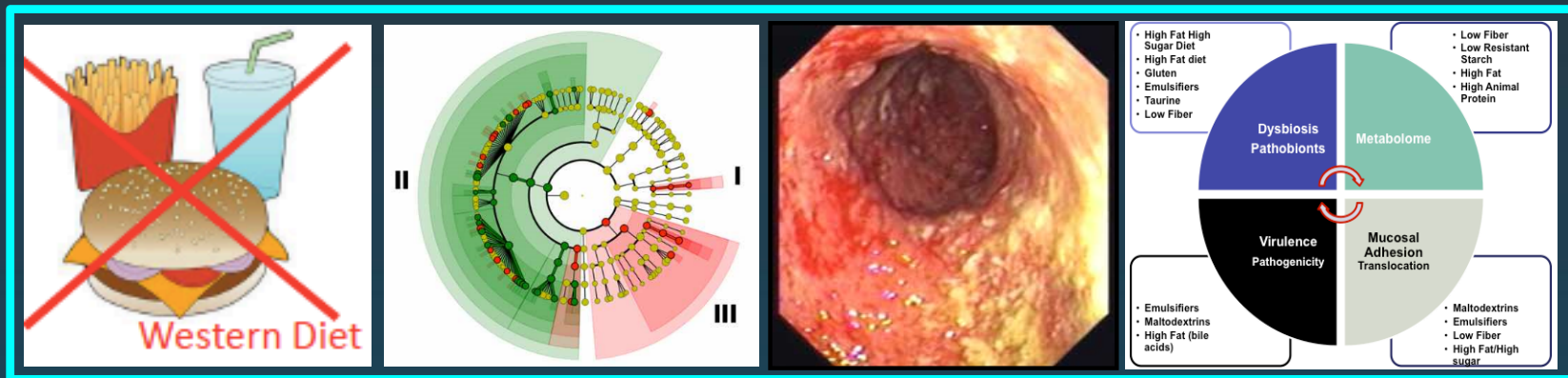


Nutrition Therapy in IBD: A Primer for Adult GI



Eytan Wine, MD, PhD, FRCPC

Associate Professor of Pediatrics and Physiology
University of Alberta
Edmonton, Alberta, Canada



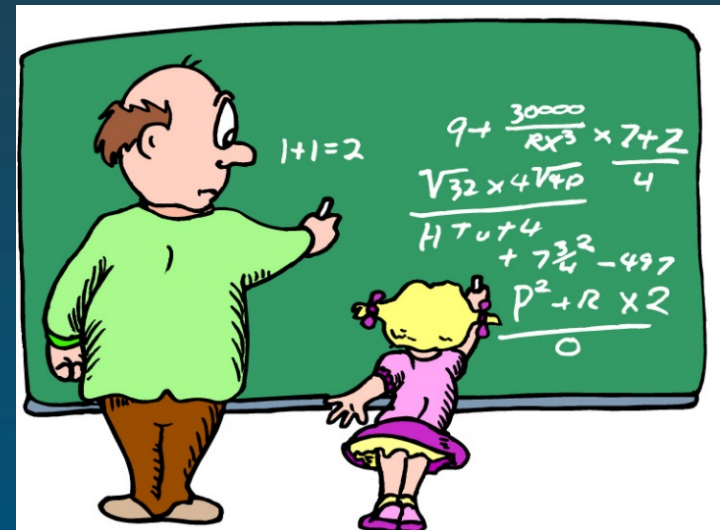
Edmonton
Pediatric
IBD
Clinic

Mentoring in IBD XX
Toronto, Ontario
Nov 15, 2019



Disclosures

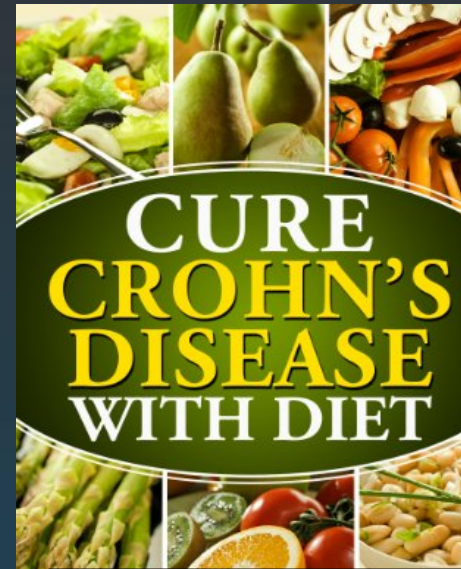
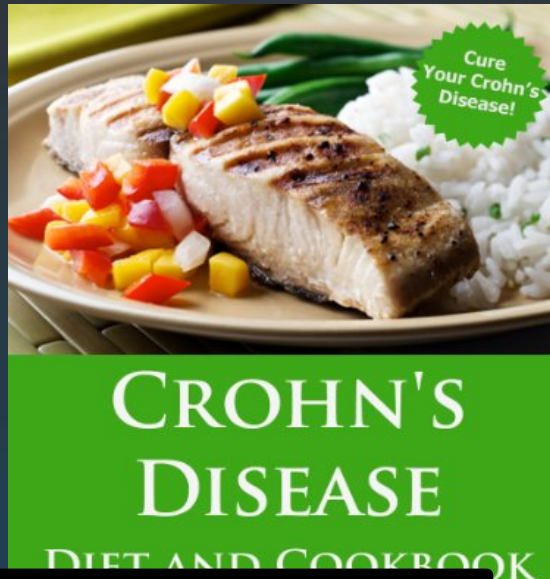
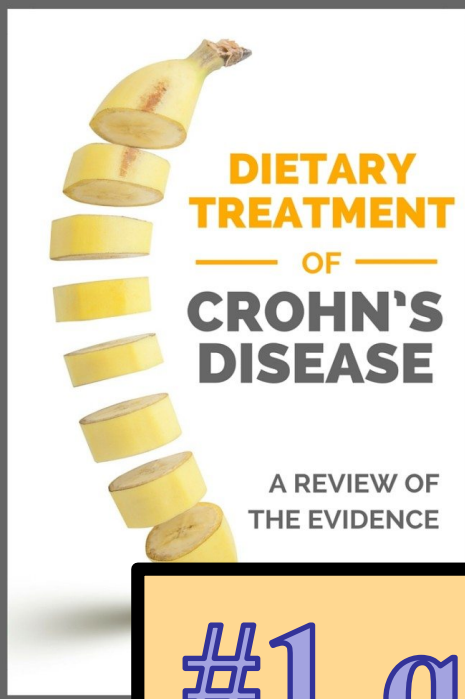
- I have received honoraria from:
 - Nestle (CDED funding; speaker fee)
 - Janssen (travel support)
 - AbbVie (advisory board)
- My laboratory is currently funded by:
 - Crohn's and Colitis Foundation (CCF)
 - Canadian Institutes of Health Research (CIHR)
 - Weston Foundation
 - IMAGINE SPOR Network
- An evolving field with limited primary data but lots of interest
- Stimulate discussion and research
- Kid teaching adults!



Session Objectives

- Differentiate nutrition as **primary therapy** for IBD versus **nutritional support** and replacement
- **Review proposed dietary therapies**, their components and their evidence
- Discuss **what we can tell the patient** who asks what diet to follow

Diet and IBD: Who Cares?



#1 question
I get

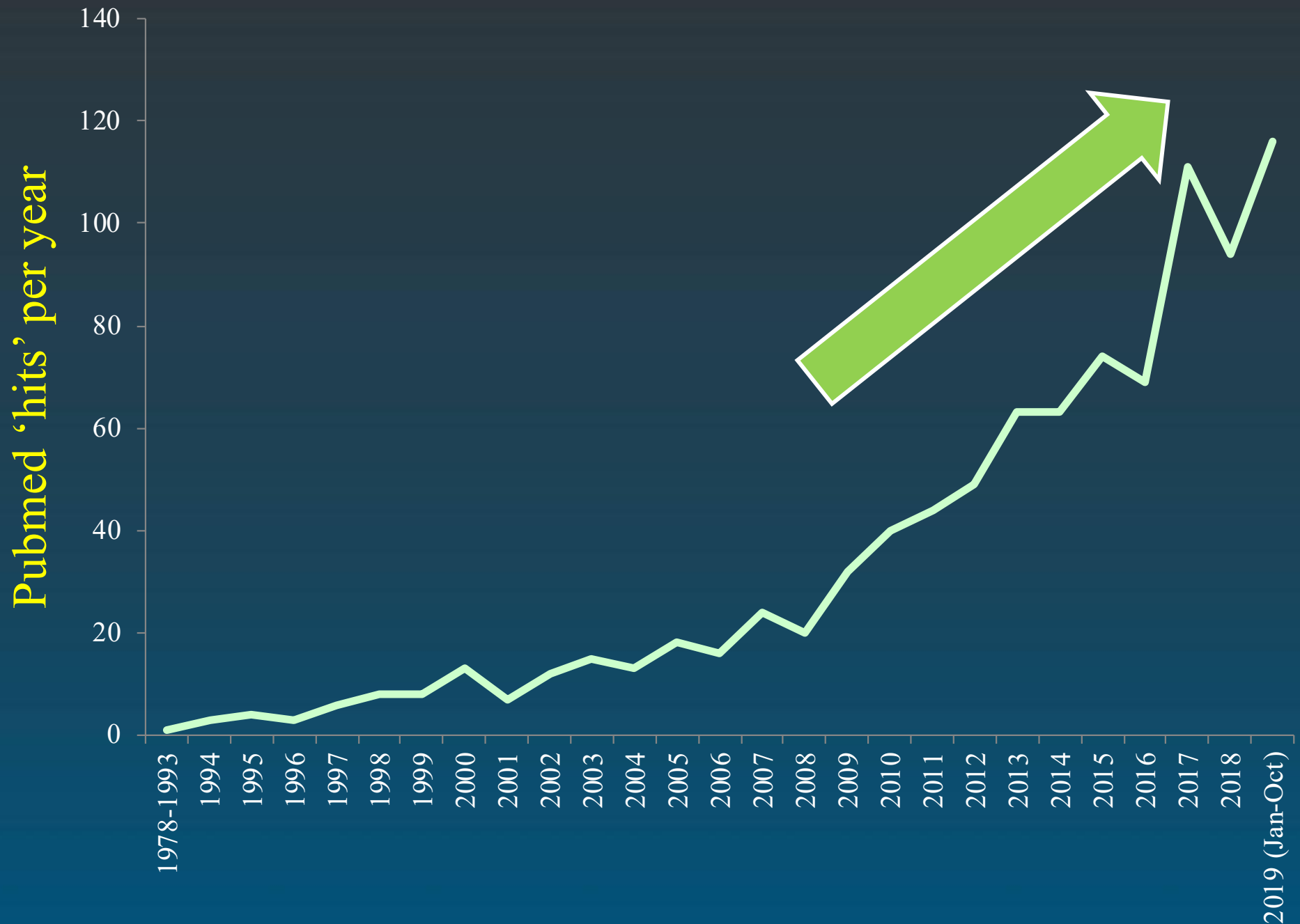
#3 research
priority

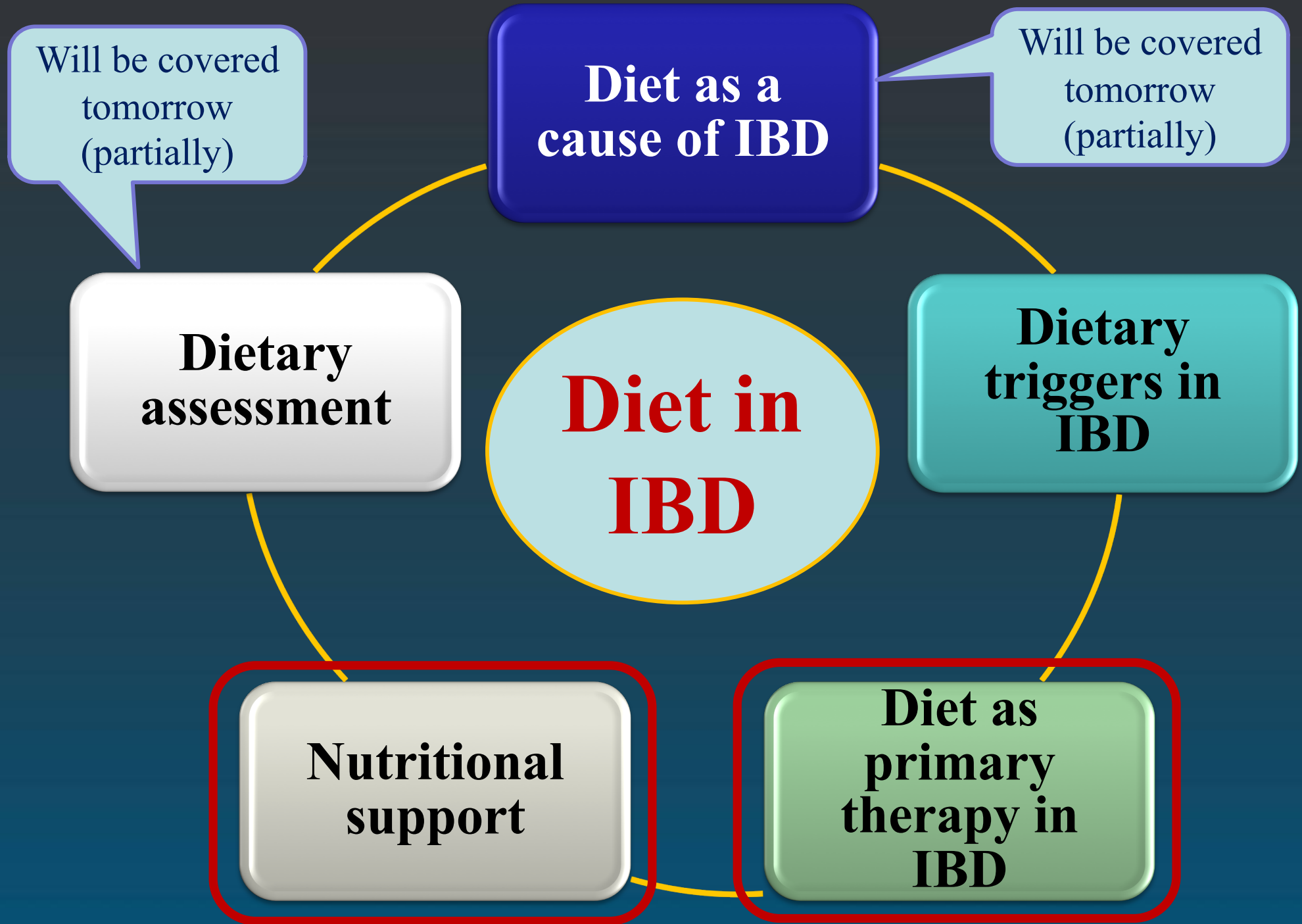


THE CANADIAN CHILDREN INFLAMMATORY BOWEL DISEASE NETWORK:
A JOINT PARTNERSHIP OF CIHR AND THE CH.I.L.D. FOUNDATION

Grant *et al.* JPGN 2019;69:317-23.

The Recent Buzz: Diet and IBD





Nutritional Support, Advice, and Supplementation

- IBD can present with weight loss and malabsorption
- Chronic inflammation → catabolism
- Importance of nutritional rehabilitation
- Diet supplements: important role
- ‘What diet should I be on’ ? Traditional answer:
 - No single diet has been shown to cause, treat, or prevent IBD
 - Avoid foods that make your symptoms worse
 - Follow the Canada Food Guide...

Diet as Primary Treatment for IBD

Dietary interventions for induction and maintenance of remission in inflammatory bowel disease (Review)

Limketkai BN, Iheozor-Ejiofor Z, Gjuladin-Hellon T, Parian A, Matarese LE, Bracewell K, MacDonald JK, Gordon M, Mullin GE



Cochrane
Library

Cochrane Database of Systematic Reviews

Limketkai *et al.*, Cochrane
Review, Feb, 2019

Authors' conclusions

The effects of dietary interventions on CD and UC are uncertain. Thus no firm conclusions regarding the benefits and harms of dietary interventions in CD and UC can be drawn. There is need for consensus on the composition of dietary interventions in IBD and more RCTs are required to evaluate these interventions. Currently, there are at least five ongoing studies (estimated enrollment of 498 participants). This review will be updated when the results of these studies are available.

Exclusive Enteral Nutrition (EEN)

- 6-8 weeks of liquid diet – no other food!
- Effective and very safe for Crohn disease
- Addresses malnutrition
- Usually by mouth (or NG)



ECCO/ESPGHAN- Guidelines

CONSENSUS/GUIDELINES

Consensus guidelines of ECCO/ESPGHAN on the medical management of pediatric Crohn's disease



European
Crohn's and Colitis
Organisation

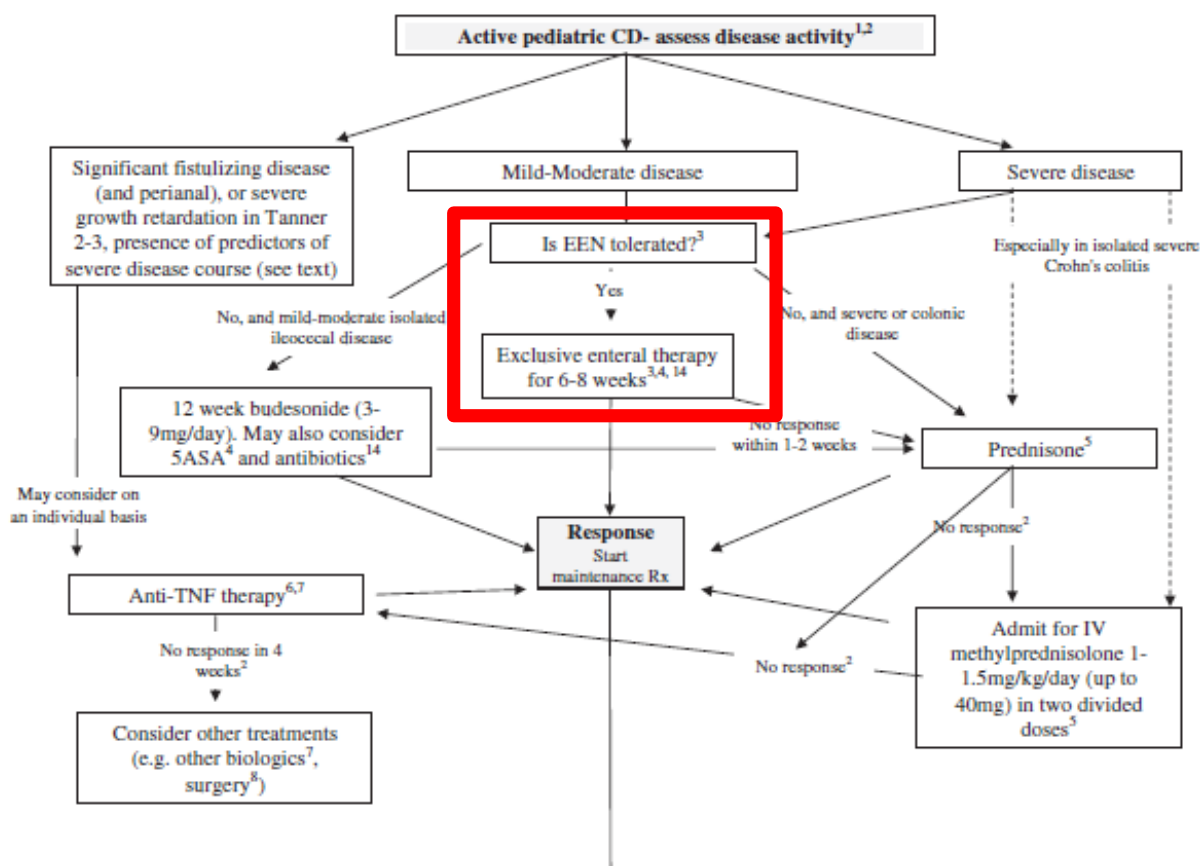


ESPGHAN

Statement 1

Exclusive Enteral Nutrition (EEN) is recommended as first line therapy to induce remission in children with active luminal CD [EL1] 96% agreement

Therapeutic paradigm for pediatric Crohn's disease (excluding perianal disease)



Breaking News - ECCO/ESPGHAN Guidelines 2020:
In children with active luminal Crohn's disease, dietary therapy with exclusive enteral nutrition is recommended as first line for induction of remission.

Ruemmele *et al.*
Journal of Crohn's and Colitis
2014;8:1179–207.

Meta-analysis: EEN vs. Steroids

Induction of remission:
equivalent; OR 1.26
(0.77, 2.05)
favouring EEN

SWAMINATH ET AL.

AP&T Alimentary Pharmacology and Therapeutics—WILEY 651

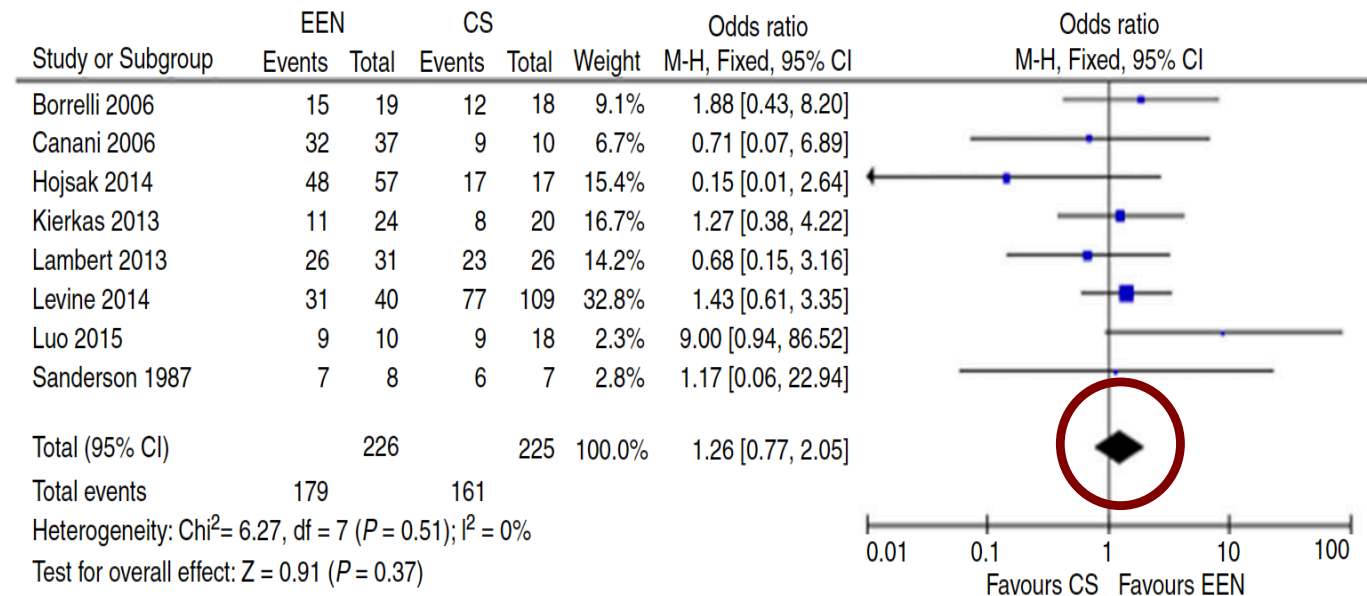
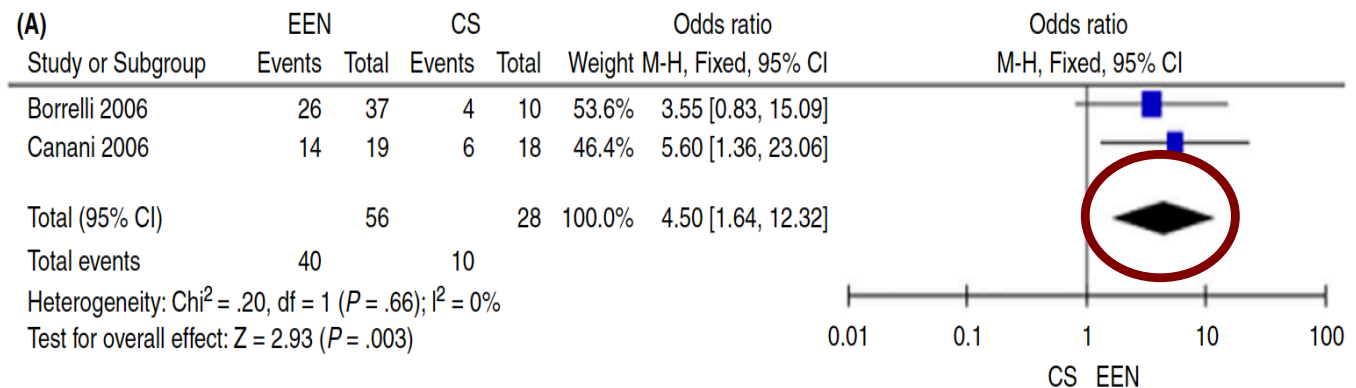


FIGURE 2 Comparison of remission induction for EEN vs CS

Mucosal Healing:
EEN is superior: OR
4.5 (1.46, 12.23)



Mucosal Healing with EEN in Children

Mucosal Healing and Bacterial Composition in Response to Enteral Nutrition Vs Steroid-based Induction Therapy—A Randomised Prospective Clinical Trial in Children With Crohn's Disease

Bénédicte Pigneur,^{a,b,○} Patricia Lepage,^c Stanislas Mondot,^c Jacques Schmitz,^a Olivier Goulet,^a Joël Doré,^{d,*} Frank M. Ruemmele^{a,b,*}

Table 2. Characteristics of the EEN and CS groups at Week 8.

		EEN group	CS group	p-Value
		[n = 13]	[n = 6]	
z-score BMI		-0.05 ± 0.9	0.35 ± 1.0	NS
Harvey-Bradshaw Index <5		13 [100%]	5 [83%]	<0.05
Haemoglobin [g/dL]		11.0 ± 1.1	11.9 ± 0.9	NS
	Median	10.7 [8.7–12.1]	12.2 [10–12.6]	
CRP [mg/L]		12.3 ± 19.3	42.8 ± 74.8	NS
	Median	6 [1–75]	14 [6–195]	
ESR [mm]		16.5 ± 24.5	21.2 ± 23.7	NS
	Median	8 [4–94]	12 [7–69]	
Albumin [g/L]		38.7 ± 5.8	37.6 ± 4.0	NS
Platelet count				
CDEIS				
	Median CDEIS	EEN (13) 1 (0-21)	Steroids (6) 7 (3-14)	p<0.05 [17%] <0.05

Diet as Primary Treatment for IBD

Dietary interventions for induction and maintenance of remission in inflammatory bowel disease (Review)



Cochrane
Library

Cochrane Database of Systematic Reviews

Limketkai BN, Iheozor-Ejiofor Z, Gjuladin-Hellon T, Parian A, Matarese LE, Bracewell K, MacDonald JK, Gordon M, Mullin GE

Limketkai *et al.*, Cochrane Review, Feb, 2019

Authors' conclusions

The effects of dietary interventions on CD and UC are uncertain. Thus no firm conclusions regarding the benefits and harms of dietary interventions in CD and UC can be drawn. There is need for consensus on the composition of dietary interventions in IBD and more RCTs are required to evaluate these interventions. Currently, there are at least five ongoing studies (estimated enrollment of 498 participants). This review will be updated when the results of these studies are available.

British Society of Gastroenterology consensus guidelines on the management of inflammatory bowel disease in adults

Statement 104. We suggest that a low FODMAP diet may be used to treat functional bowel symptoms in IBD patients (GRADE: weak recommendation, low-quality evidence. Agreement: 84.4%).

Statement 34. We suggest that Exclusive Enteral Nutrition (EEN) may be used to induce remission in mild to moderate Crohn's disease patients where avoidance of corticosteroid is desired, and in those who are motivated to adhere strictly to EEN for up to 8 weeks (GRADE: weak recommendation, very low-quality evidence. Agreement: 86.4%).

Lamb *et al.*, Gut, 2019, *in press*.

Yes, EEN is Used (and works) in Adults

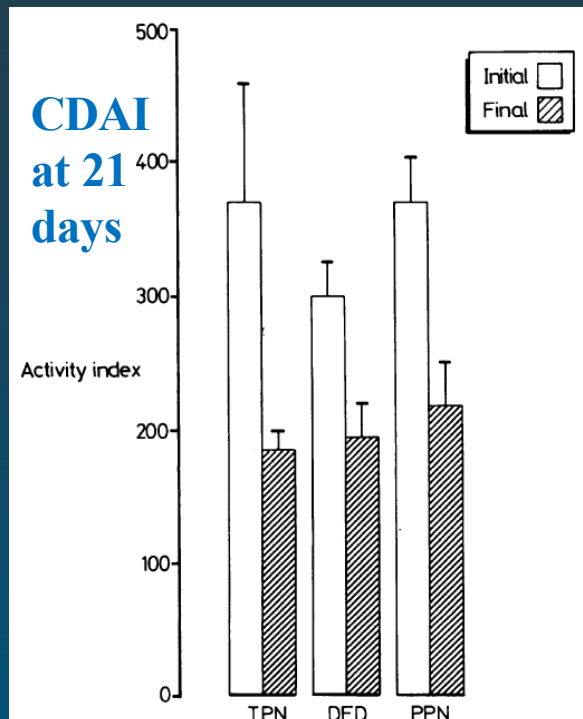
Controlled trial of bowel rest and nutritional support in the management of Crohn's disease

G R GREENBERG, C R FLEMING, K N JEEJEEBHOY, I H ROSENBERG, D SALES, AND W J TREMAINE

Table 3 Response of patients to nutritional therapy

21 days	TPN	DFD	PPN
Total on entry	17	19	15
Remission	12 (71%)	11 (58%)	9 (60%)
Failure			
Medical treatment	0	6 (32%)	3 (20%)
Surgery	5 (29%)	2 (10%)	3 (20%)

1 year remission (%): 42 55 56



Exclusive enteral nutrition provides an effective bridge to safer interval elective surgery for adults with Crohn's disease

N. Heerasing, B. Thompson, P. Hendy, G. A. Heap, G. Walker, R. Bethune, S. Mansfield, C. Calvert, N. A. Kennedy, T. Ahmad & J. R. Goodhand

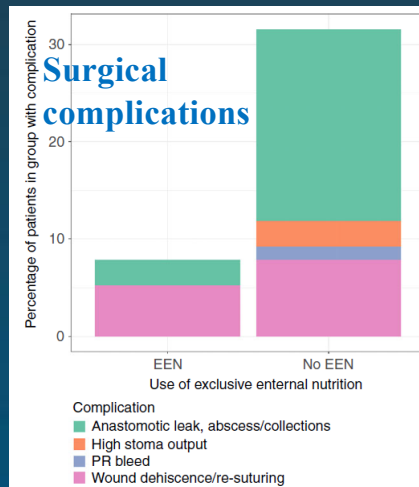
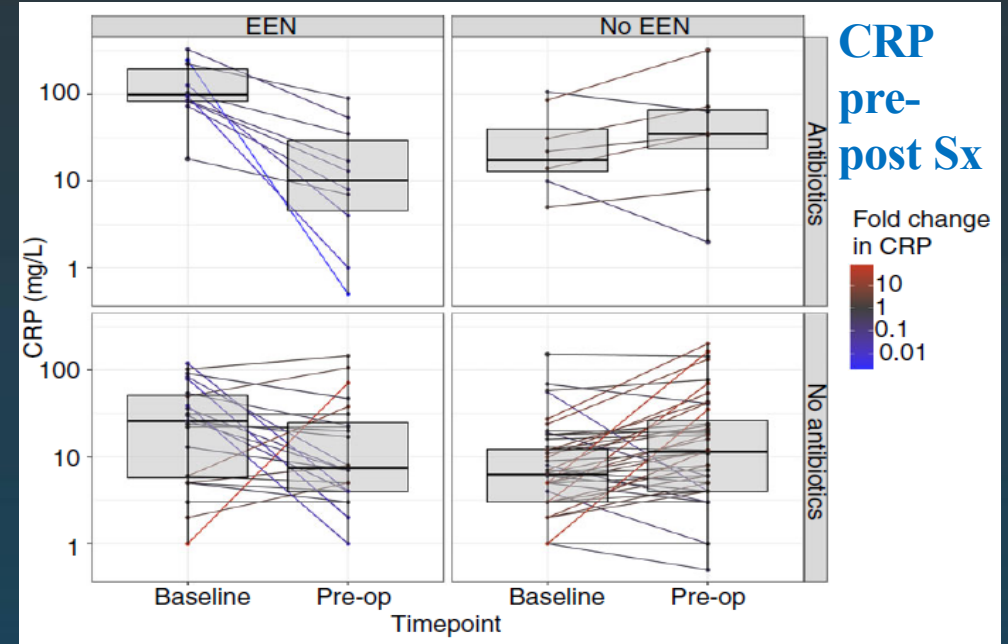
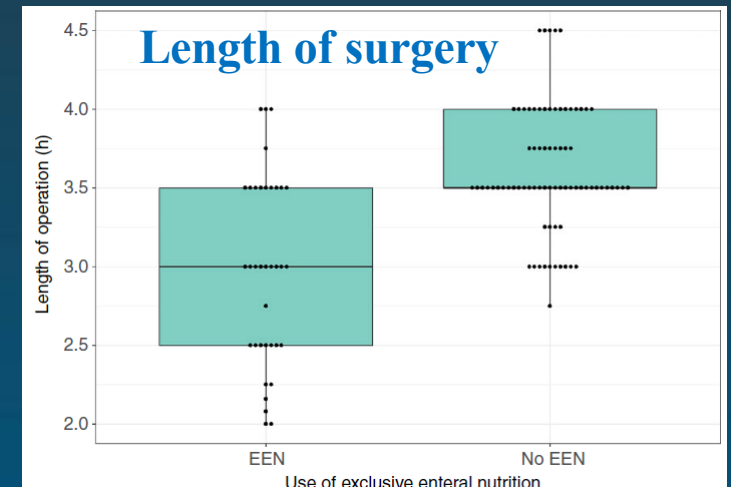


Figure 4 | Complications in the EEN and control group.



Heerasing *et al.*, AP&T 2017;45:660-9.

Greenberg *et al.*, Gut 1988;29:1309-15.

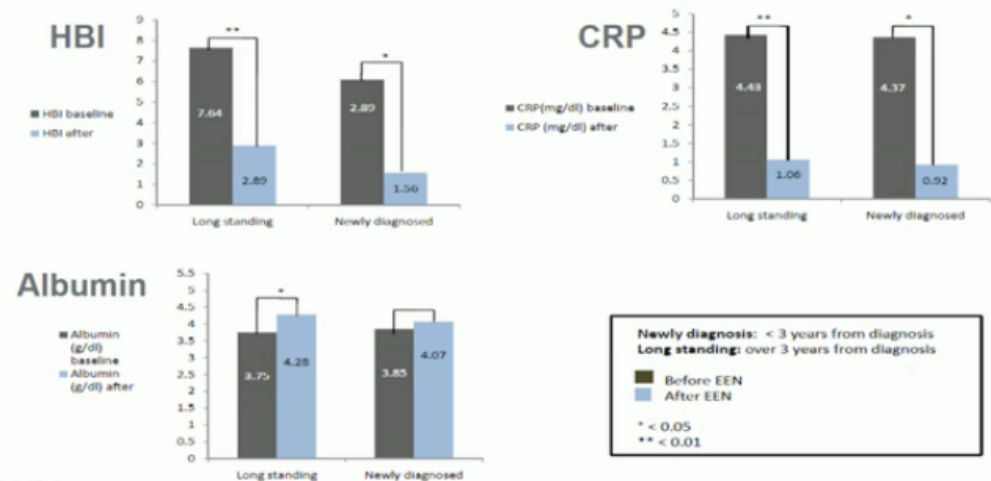
Experience with EEN in Adults

- Rabin Medical Center, Israel
- 50 consecutive adults with Crohn disease treated with EEN
- Usually added to maintenance with flare
- > 50% B2 or B3
- 74% adherence to oral EEN
- Clinical parameters improved
- No difference based on disease duration
- ➔ **EEN as a bridge therapy?**

Improvement in clinical and biochemical parameters:

	Before EEN	After EEN	p value
HBI (IQR)	7.17 ± 4.7 (4-8.75)	2.86 ± 2.98 (1-4)	<0.001
PGA (IQR)	2.17 ± 0.6 (2-3)	0.5 ± 0.6 (0-1)	<0.001
CRP (mg/dl)	4.4 ± 5.2 (IQR 1.23-5.2)	1.01 ± 1.4 (IQR 0.39-1.01)	<0.001
WBC (k/μl)	9.73 ± 4.07	7.9 ± 3.07	0.047
Hb (g/dl)	12.76 ± 2.02	13.17 ± 1.36	0.157
MCV	82.93 ± 6.23	86.6 ± 4.9	0.014
Lymph count (k/μl)	2.2 ± 1.13	2.13 ± 1.6	0.33
Albumin (g/dl)	3.78 ± 0.6	4.24 ± 0.45	0.002
Weight (kg)	61.4 ± 12.7	62.08 ± 12.8	0.31
BMI	21.1 ± 5.7	21.12 ± 3.18	0.33

EEN improved clinical and biochemical outcomes irrespective of disease duration



Pfeffer-Gik T, UEGW 2018

Exclusive Enteral Nutrition: 6-8 weeks



- + At least as effective as steroids**
- + Improves nutritional status**
- + Improves Bone**
- + Associated Mucosal Healing**
- + No Side Effects**

- Difficult for patients**
- Difficult for Parents**
- Difficult for Physician**
- Demands Resources & Dedication**
- Limited long-term benefit**

Global Variation in Use of Enteral Nutrition for Pediatric Crohn Disease

Morgan Lawley, Jessica W Wu, Victor M Navas-López, Hien Q Huynh, Matthew W Carroll, Min Chen, Pavel Medvedev, Andrew S Day, Séamus Hussey, Rotem Sigall-Boneh, Arie Levine, Eytan Wine

Major Barriers	Overall	CAN	US	UK	SPN	E-O
Don't think it's as effective	3%	0%	11%	0%	5%	3%
Poor adherence due to palatability	42%	29%	63%	18%	30%	62%
Poor adherence due to monotony	58%	57%	84%	18%	55%	62%
Too much effort/easier to write a prescription	11%	14%	5%	0%	10%	16%
Lack of dietitian/nurse support	21%	29%	11%	0%	33%	14%
Too costly to my practice	1%	0%	5%	0%	0%	3%
Too costly to my patients***	19%	48%	58%	0%	0%	14%
Other	8%	24%	5%	27%	3%	5%
No barriers*	18%	5%	5%	55%	23%	14%

Alternatives to EEN

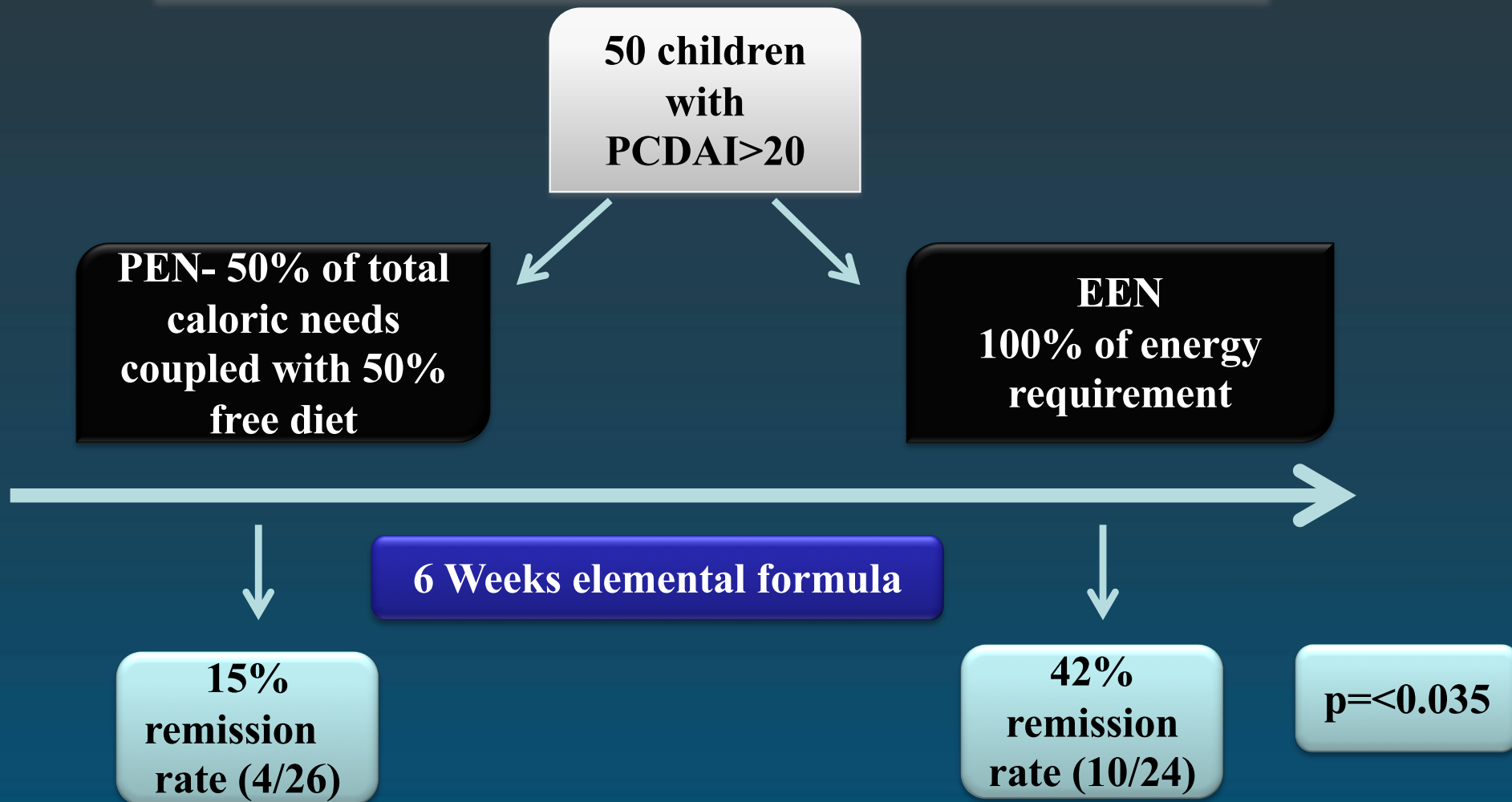
- Partial enteral nutrition
- Trigger-based diet
- Specific carbohydrate diet
- CD-TREAT
- Personalized diets (microbe driven?)
- Mediterranean Diet
- IBD anti-inflammatory DIET (IBD-AID)
- Crohn disease exclusion diet (CDED)

**** Common principle: exclusion! ****

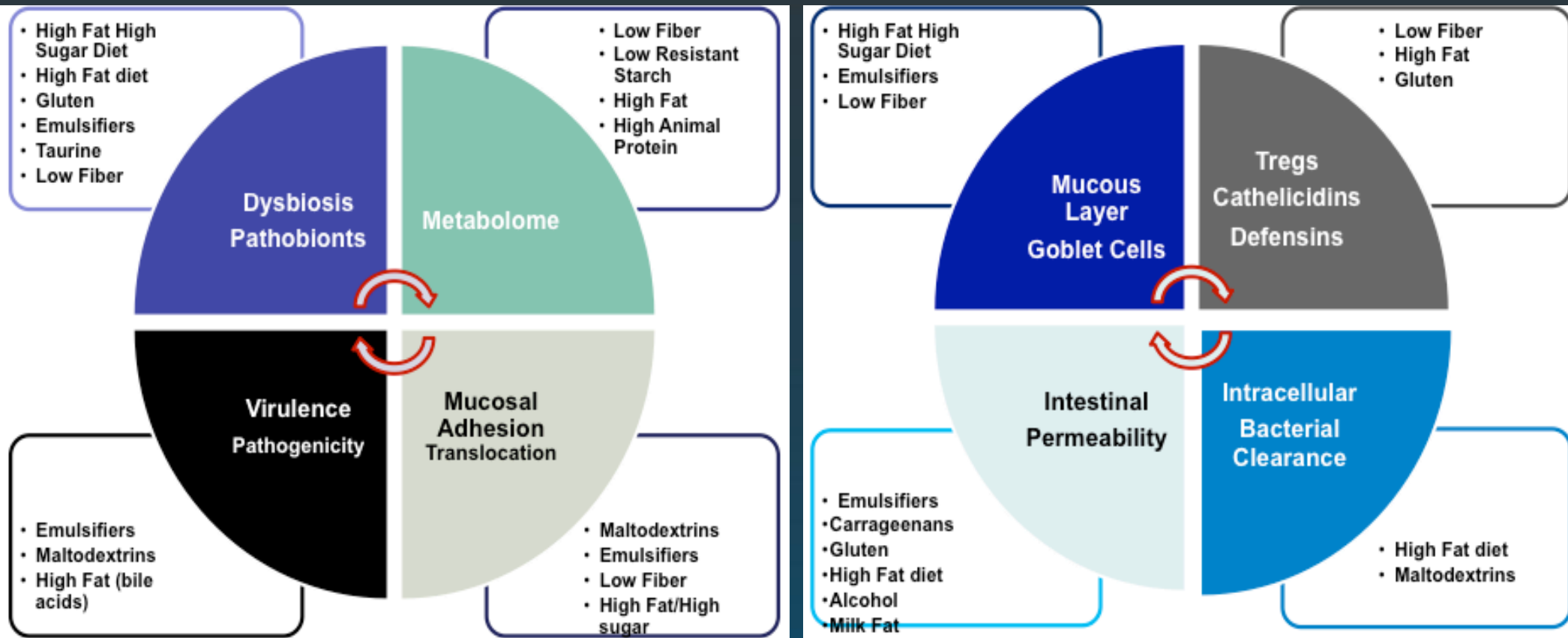
PEN-Partial Enteral Nutrition

**ECCO/
ESPGHAN:**

Statement 2
Partial Enteral Nutrition should not be used for induction of remission [EL2] 100% agreement



Effects of Dietary Factors on Microbiota, Host Barrier, and Immunity Leading to IBD



- Specific foods have damaging effects, especially during active disease
- EEN works mostly through exclusion of harmful dietary factors
- Eliminating 'offending foods' could be helpful

SCD Leads to Clinical and Laboratory Improvement in Pediatric IBD

TABLE 1. Specific carbohydrate diet instructions

Foods that may be eaten

Fresh/frozen vegetables and legumes

Fresh/raw/dried fruits, unsweetened juices (not from concentrate)

Navy beans, lentils, peas, split peas, most nuts (unroasted preferably nuts coming directly from shells so that nothing is added), natural peanut butter (with no sugar), lima beans, string beans

Fresh/frozen meats, poultry, fish, eggs

Some (natural/hard) cheeses (cheddar, Colby, Swiss, Havarti), homemade yogurt fermented >24 hours (no sugar added), dry curd cottage cheese

Honey

Tea, coffee, mustard, vinegar, most oils

Foods to avoid

Canned vegetables

Canned fruits, unless packed in own juices

All grains, including flours

Potatoes, yams, parsnips

Chickpeas, bean sprouts, soybeans, mung beans, fava beans, and garbanzo beans

Seaweed and byproducts, including agar and carageenan

Processed, canned, breaded, smoked meats/fish

All milk, buttermilk, commercially prepared yogurt and sour cream, heavy cream, soy/rice/potato/oat/hemp milk

Instant tea or coffee, coffee substitutes, beer

Canola oil, mayonnaise (due to additives), cornstarch, chocolate or carob, bouillon cubes or instant soup bases, all products made with refined sugar, sugar substitutes, Stevia, pectin, ketchup, ice cream, molasses, corn or maple syrup, baking powder, medication containing sugar, all seeds, balsamic vinegar, fructo-oligo saccharides

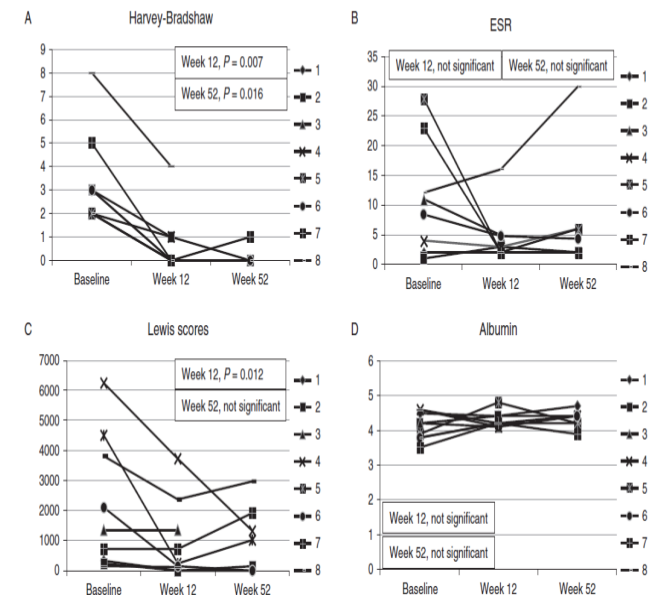
10 Children/young adults with CD
SCD for 12 weeks, 6/10 remission, 5/10 weight loss,
3 normal capsule endoscopy week 12

TABLE 4. Results of measured parameters

Parameter	Week 0		Week 12		Week 52	
	Mean	SE	Mean	SE	Mean	SE
Weight	48.3	4.3	47.4	3.7	48.3	4.1
BMI, %	30.0	28.9	29.3	28.7	14.7	13.0
kcal/kg	48	9.9	55	7.5		
Hgb	12.4	1.4	13.3	1.0	13.5	1.2
WBC	7.5	1.6	6.2	1.6	6.4	1.6
ESR	9.7	9.9	4.1	1.5	7.1	10.3
Albumin	4.1	0.4	4.3	0.2	3.9	1.1
PCDAI	21.1	5.9	7.8	7.1	5.4	5.5
HB	3.3	2.0	0.6	1.3	0.1	0.4
LS	2153	732	960	433	1046	372

- Popular in the USA.
- Improves symptoms.
- No mucosal healing.
- No controlled study.
- Not well balanced diet.

Cohen et al. JPGN • Volume 59, Number 4, October 2014

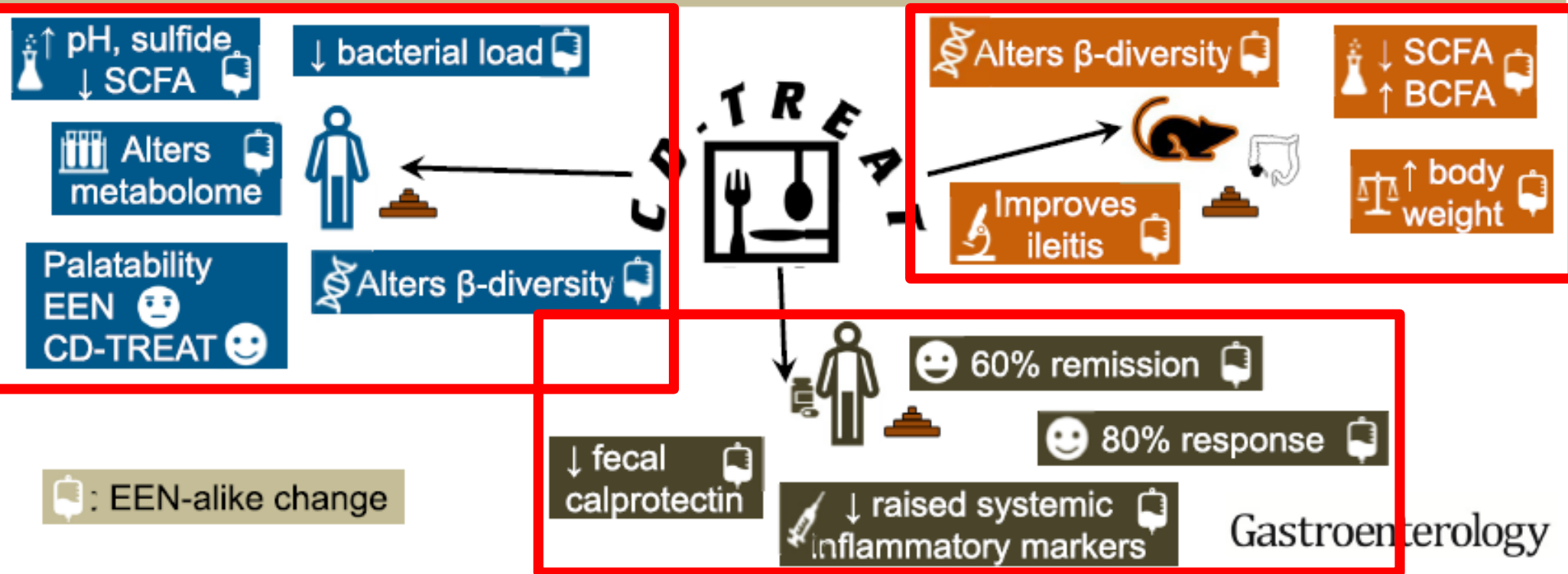


Cohen et al., JPGN 2014;59: 516–521.

Suskind et al., J Clin Gastroenterol 2018;52:155-63.

CD-TREAT: Mimicking EEN

CD-TREAT: Crohn's Disease Treatment-with-EATing



- Proof-of-concept... novel dietary treatment trialed in healthy volunteers, subsequently in rats with gut inflammation/dysbiosis similar to human CD, and in a pilot trial in children with active CD.
- Efficacy of CD-TREAT on human CD clinical outcomes needs to be ascertained in large well-controlled clinical trials.
- CD-TREAT has the potential to be used interchangeably with EEN: adults; long-term dietary maintenance therapy.

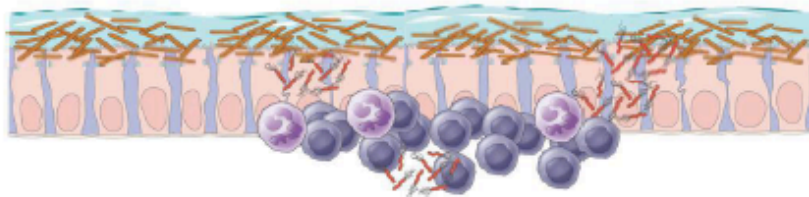
Svolos et al., Gastroenterology Apr 2019;156:1354-67.

Crohn's Disease Exclusion Diet is Equally Effective but Better Tolerated than Exclusive Enteral Nutrition for Induction of Remission in Mild to Moderate Active Paediatric Crohn's Disease: A Prospective Randomized Controlled Trial

Dietary Therapy: Crohn's Disease Exclusion Diet + Partial Enteral Nutrition vs. Exclusive Enteral Nutrition



Western Diet



Habitual Diet Triggering Crohn's Disease
Increased Proteobacteria Dysbiosis, Intestinal permeability, Inflammation, Active Disease

EEN



Exclusive EN



Western Diet

CEDED+PEN

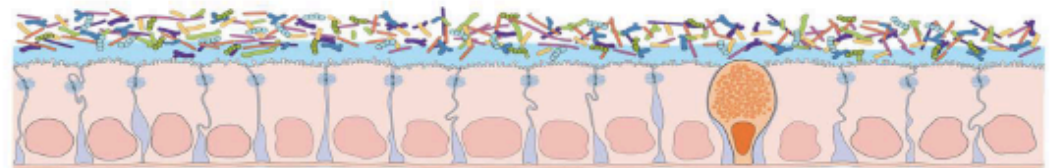
50% EN



CEDED

Remove
Animal Fat
Wheat
Dairy
Red Meat
Emulsifiers
Maltodextrin
Carrageenan

Add
Fruits
Vegetables



Crohn's Disease Exclusion Diet+ PEN vs. EEN

Primary endpoint: CEDED+PEN is better tolerated than EEN

Secondary endpoints:

Both CEDED+PEN and EEN are effective to achieve remission at week 6

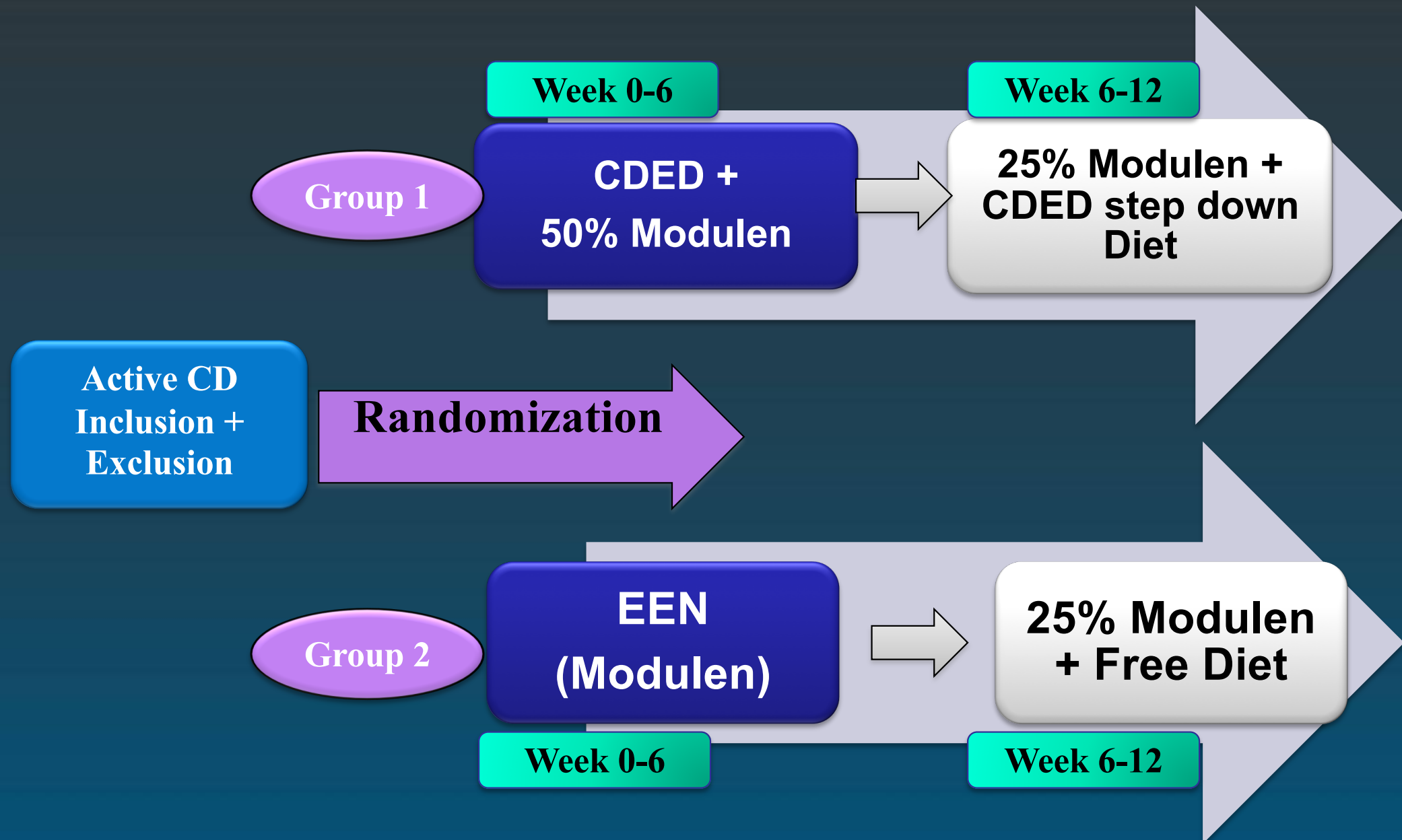
CEDED+PEN is superior to sustain remission and reduce inflammation at week 12

CEDED+PEN: associated with reduction in Proteobacteria and Intestinal Permeability

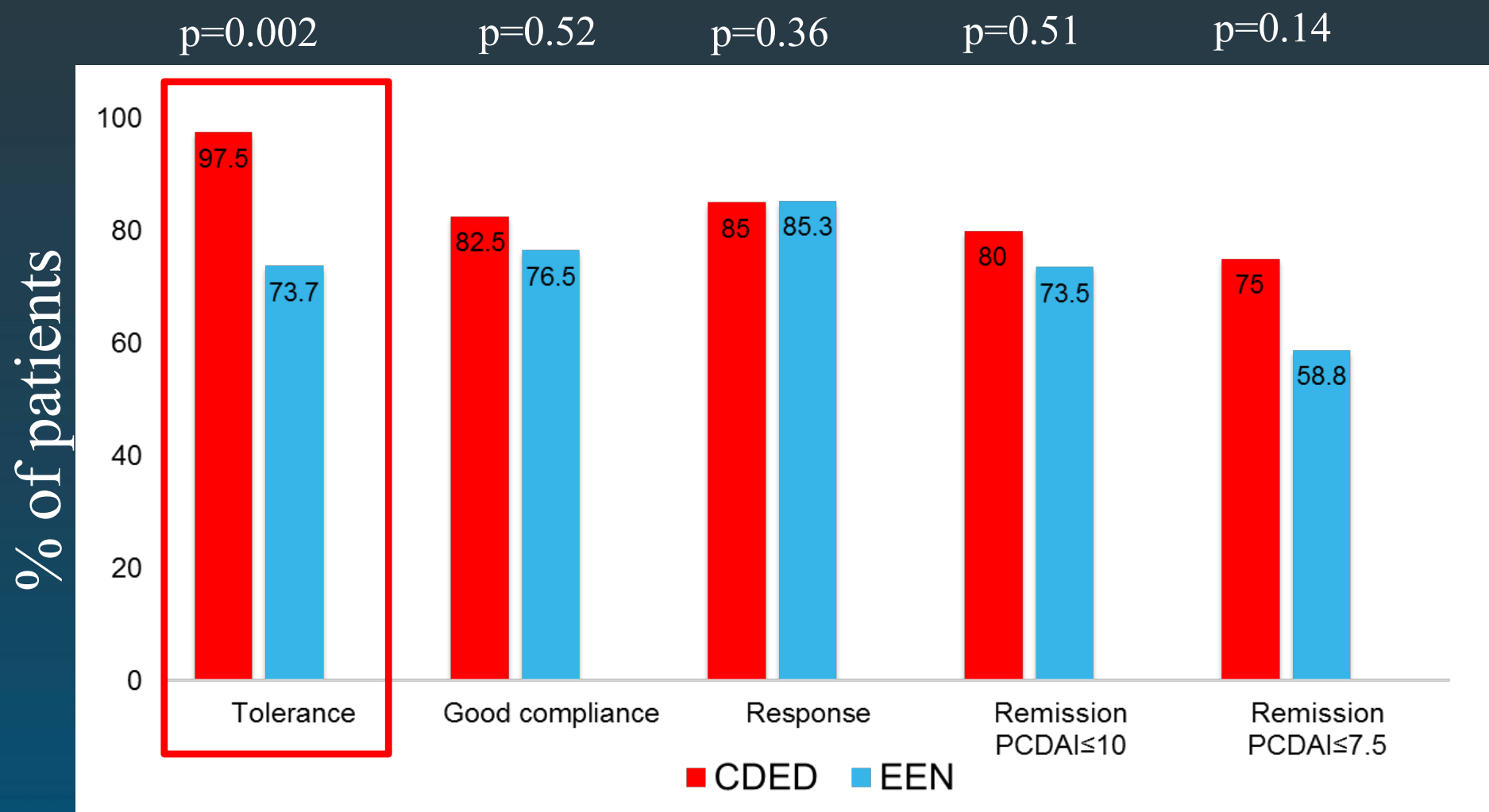
CDED- Crohn Disease Exclusion Diet

- ✓ Structured, step down diet
- ✓ Allowed and disallowed foods and products
- ✓ Exclusion of specific components
 - ☒ **Gluten**
 - ☒ **Gluten free baked goods ,breads , Yeast**
 - ☒ **Dairy products**
 - ☒ **Animal fat**
 - ☒ **Processed meats**
 - ☒ **Products containing emulsifiers**
 - ☒ **Low Sugar but not low carbohydrate diet**
- ✓ The diet contains at least 18-20 grams of fiber per day

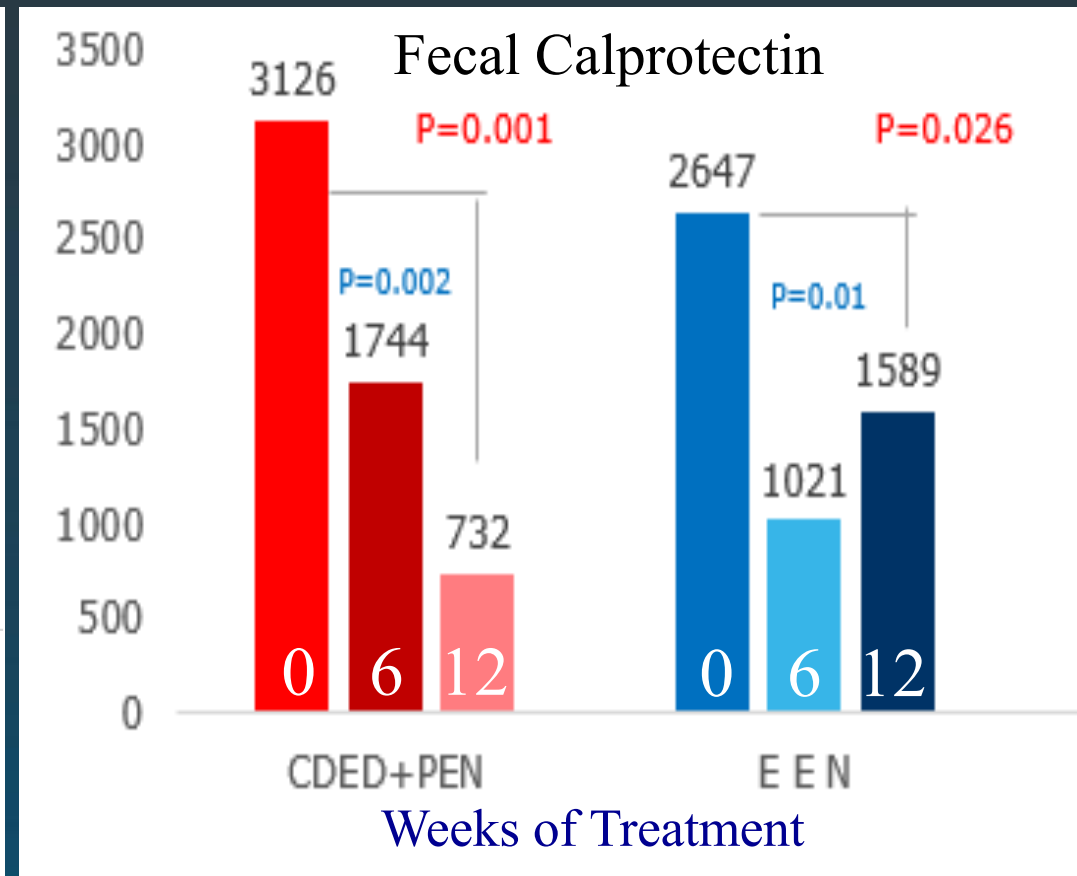
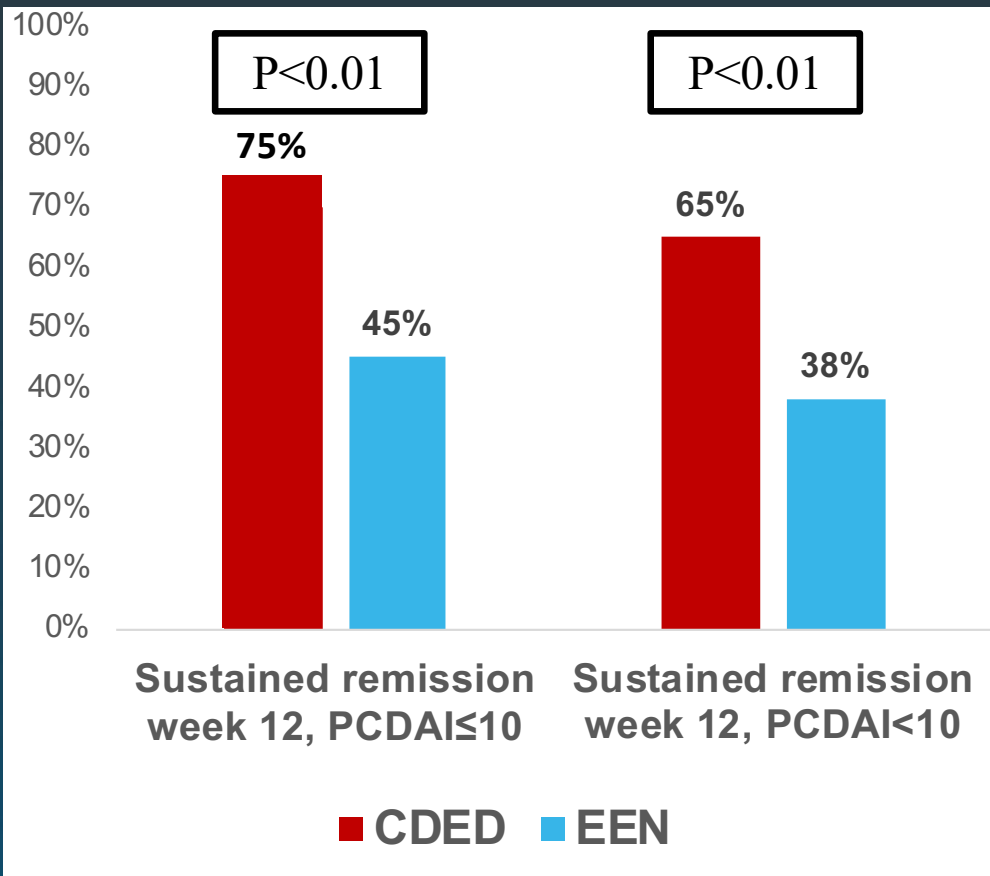
Prospective CDDED RCT - Design



Results: Week 6 Primary and Secondary Endpoints



Sustained Remission & Fecal Calprotectin are Superior at week 12 with CDED



What does this do to gut microbes?

change in community composition from baseline

■ increase

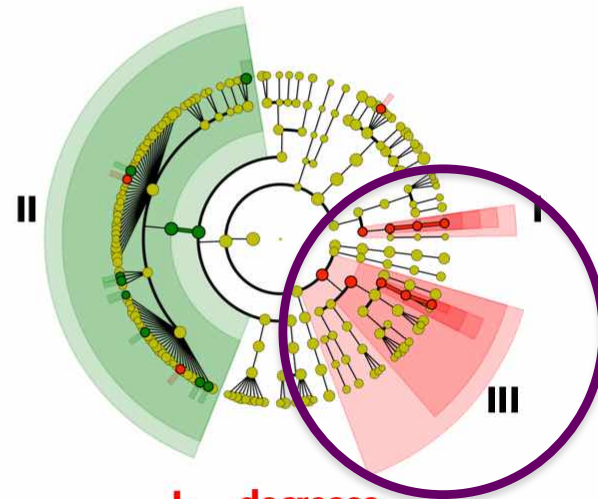
■ decrease

- CDED: similar changes from week 0 to weeks 6 & 12

CDED

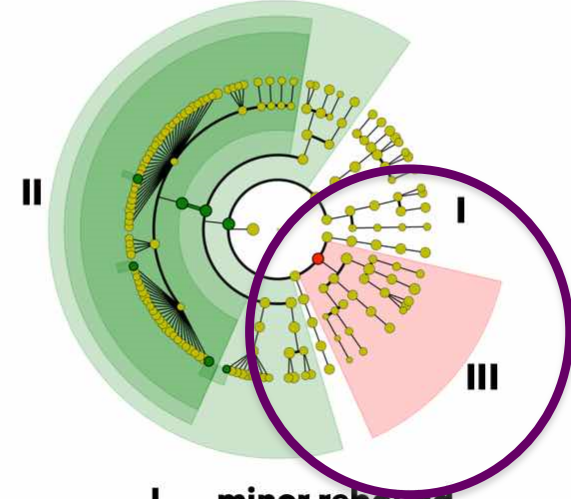
- I. Actinobacteria:
- II. Clostridia:
- III. Proteobacteria:

week 0 to week 6



- I. decrease
- II. increase
- III. decrease

week 0 to week 12

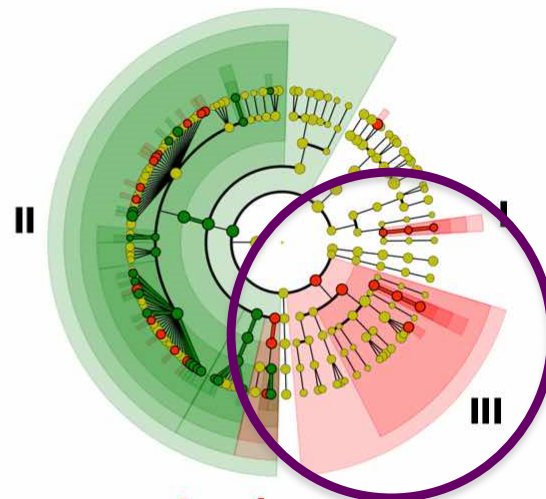


- I. minor rebound
- II. increase (expanded)
- III. decrease (sustained)

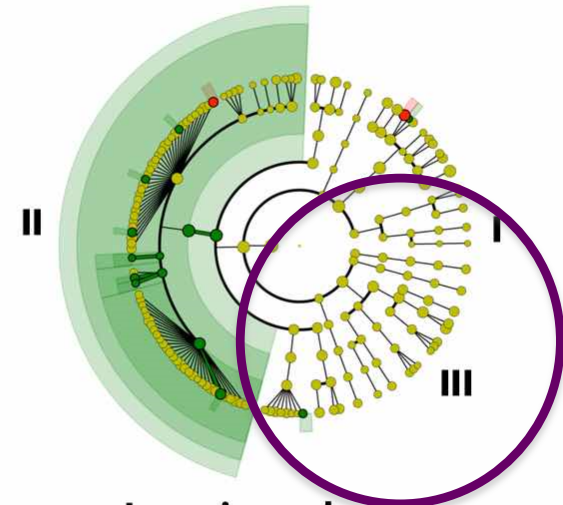
- EEN: changes seen on week 6 - not maintained to week 12

EEN

- I. Actinobacteria:
- II. Clostridia:
- III. Proteobacteria:



- I. decrease
- II. increase
- III. decrease

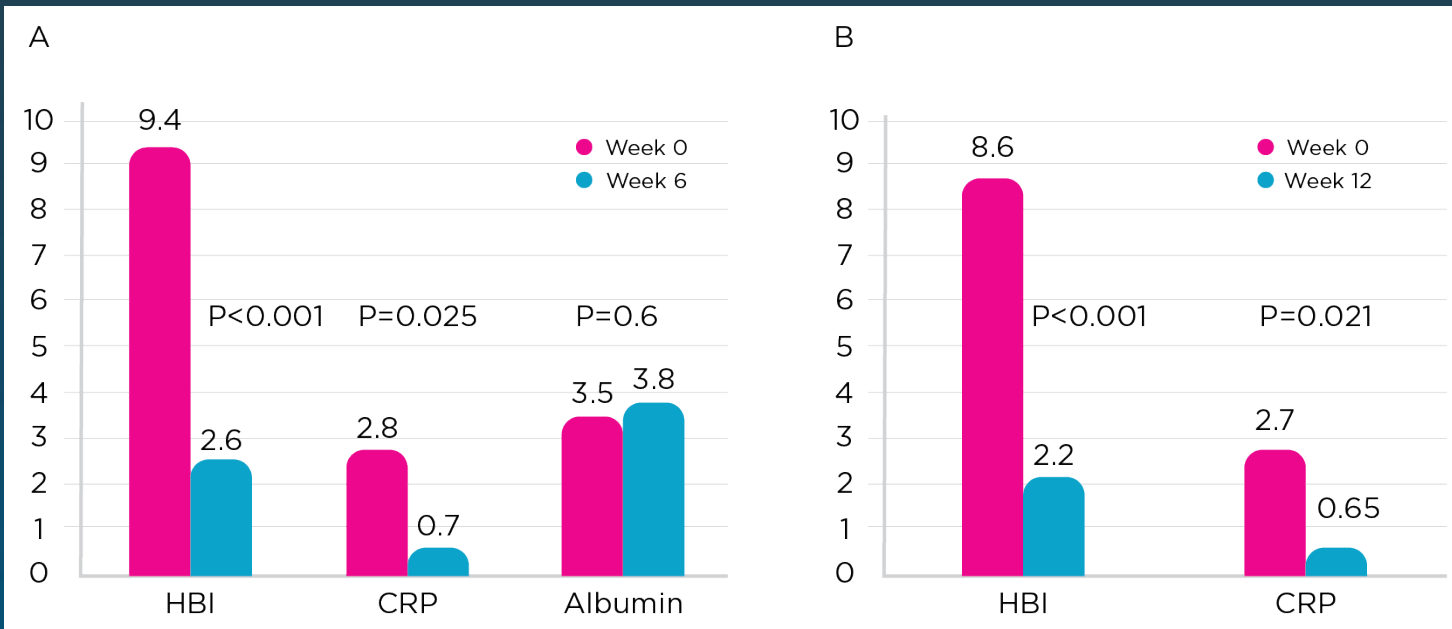


- I. minor rebound
- II. increase (contracted)
- III. major rebound

Additional CDED-related Studies

Dietary Therapy With the Crohn's Disease Exclusion Diet is a Successful Strategy for Induction of Remission in Children and Adults Failing Biological Therapy

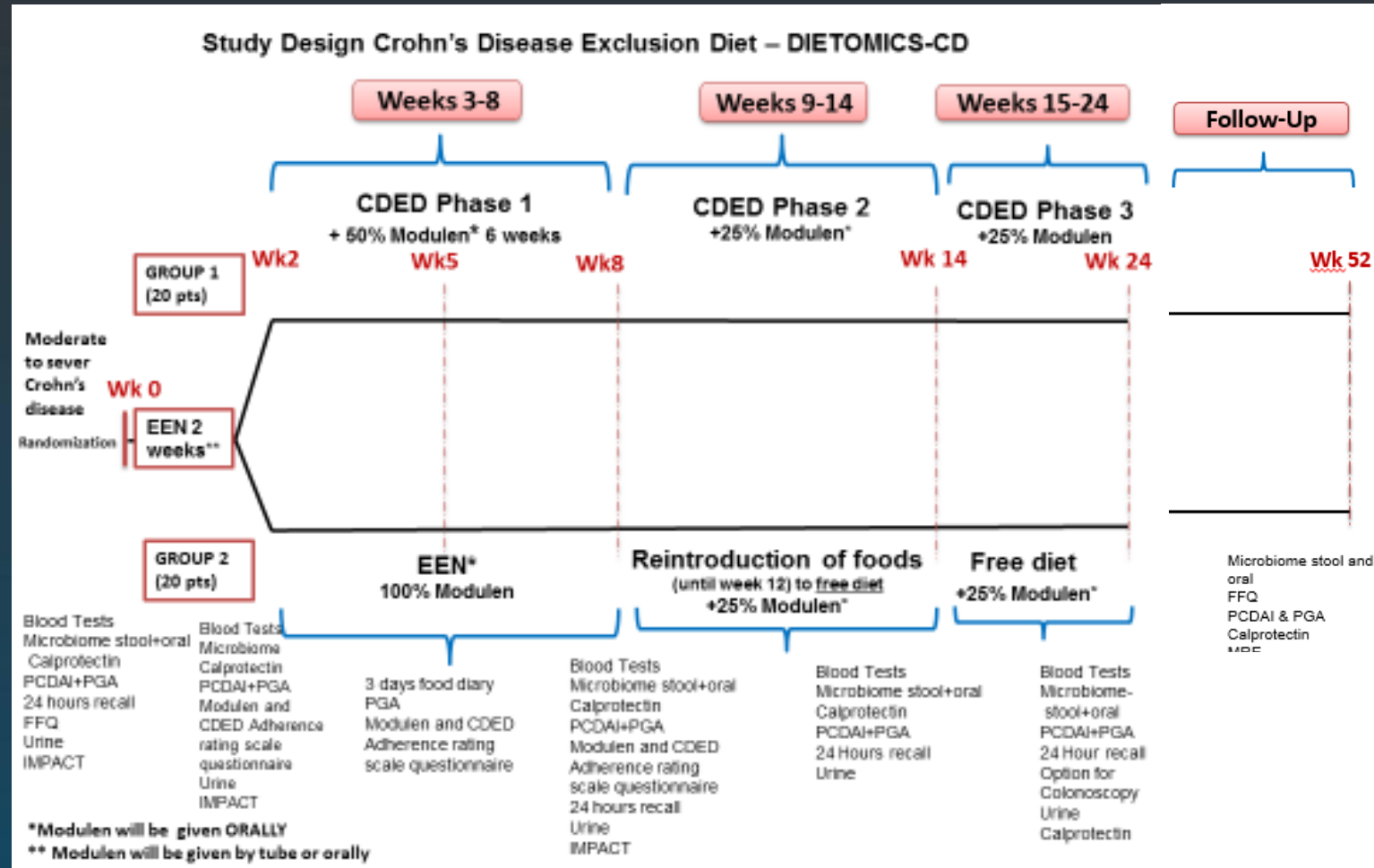
- 21 patients: loss of response to anti-TNF (10 children, 11 adults)
- 17/21 (81%) failed combination therapy
- 10/21 (47%) failed 2 biologics
- 17/21 (81%) Dose escalation
- 7/21 Post resection; 2/21 Steroid dependent



6 weeks
13/21
HBI ≤ 3
62%
Remission

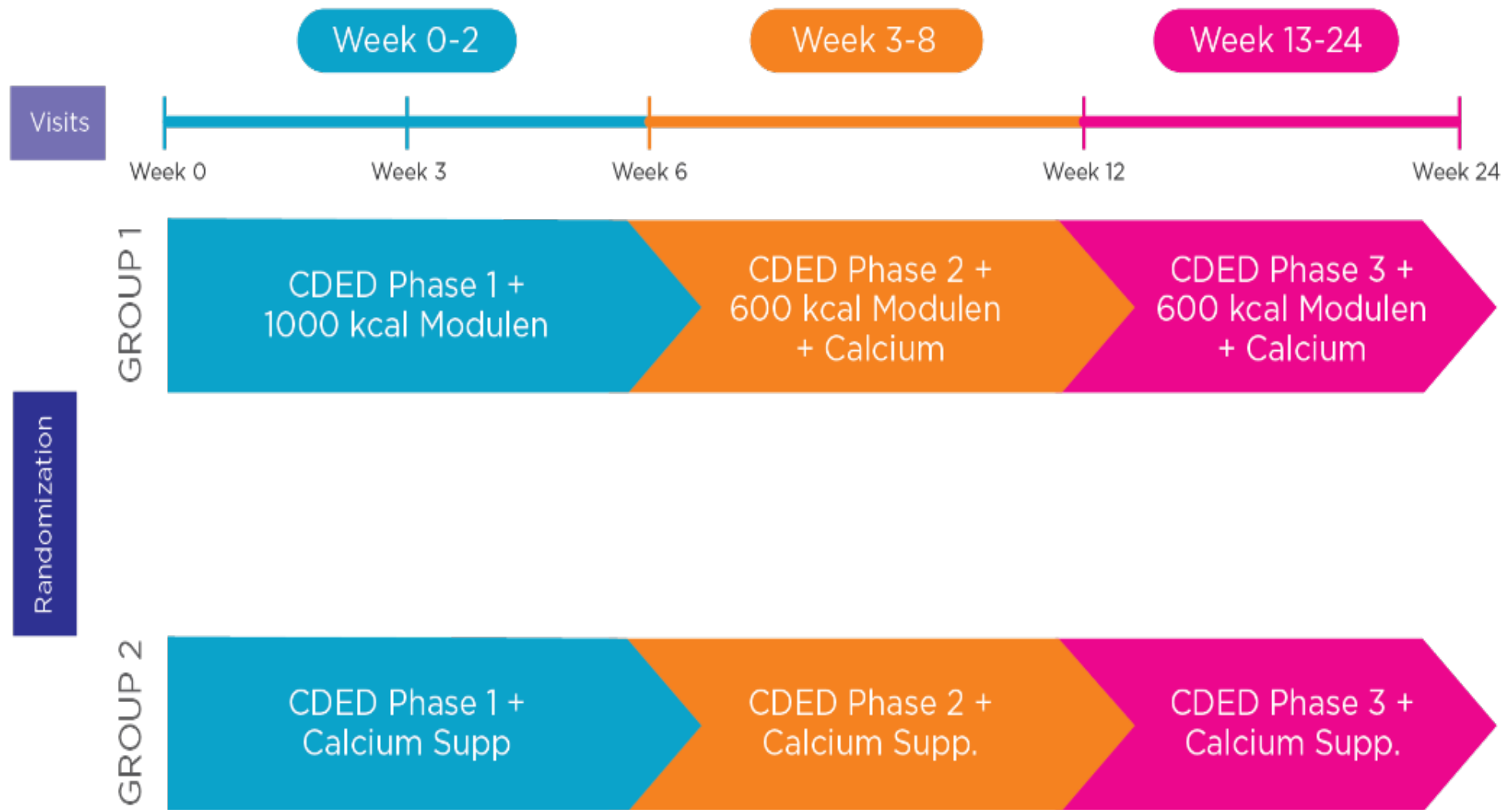
Additional CD/ED-related Studies

- DietOmics Study:
- Long-term
- International
- 48/70 pts recruited



- UC Diet:
- INDUCT:
- Mild-mod pediatric UC
- 5ASA +/- diet
- Ethics approved
- Starting in 7 countries

Adult CDED Study Scheme



* Courtesy of Dr. Arie Levine

Advice for Our Patients: A balanced approach

- Nutritional therapy vs. general advice
- Practice dependent: MD alone vs. MDT
- Diet is not (yet) ready to replace medications
- Nutritional therapy is professional and needs to be prescribed
- This is not for everyone
- We're looking to improve QOL, not just make life more complicated

What do we do in Edmonton?



EPIC

Edmonton Pediatric IBD Clinic



Jessica Min
Multidisciplinary team
Website: kidsibd.ca



! It is important to have Doctor and Dietitian guidance with any restrictive or avoidance diet, since they have a risk of not providing your child with adequate nutrients and vitamins to grow and develop to their best potential.

Diet and risk of developing IBD

- Reduced risk of IBD with a diet high in fruits and vegetables.
- Increased risk of IBD with diets high in animal fat, animal protein and refined sugar. These foods are common in a typical "western diet"

What food choices may help improve my (child's) IBD when they are in remission?

A **MEDITERRANEAN-TYPE DIET** (instead of a typical Western diet) has been shown to help prevent flares and better manage IBD. This means a diet high in fruits and vegetables, olive oil and oily fish, whole grains, nuts, minimally processed dairy, and lean proteins.

It is important to remember that *there is no "IBD Diet" that will cure your child's IBD* but your Doctor and Dietitian can help you make food choices that will support your child's healthy growth and development.

There is *no recommended maximum portion size for many processed foods* – generally the less often, the better. Your Dietitian can help you adapt these recommendation to your family and your child's preferences.

TRY THIS

Whole Grains

- Brown rice
- Whole Potatoes (mashed, roasted, boiled)
- Whole Wheat Pasta
- Oatmeal (add your own toppings)
- Cheerios or shredded wheat
- Brown bread

Fruits and Vegetables

- Whole, fresh fruit and vegetables
- Canned or frozen fruit and vegetables with no added salt or sauces

Unsaturated Fats and Oils

- Olive oil
- Vegetable oils (canola, sunflower, flaxseed)
- Soft Margarine

Lean Proteins

- Chicken, turkey, and poultry
- Fish
- Beans, lentils, chickpeas
- Eggs
- Whole nuts, natural nut butters

Dairy products

- Milk (any fat percentage)
- Plain yogurt (add your own fruit, honey, or maple syrup for sweetener)
- Cheese

Drinks

- Water
- White milk

INSTEAD OF

Refined Grains

- White rice
- Frozen French fries or boxed mashed potatoes
- White Pasta
- Packaged pre-sweetened oatmeal
- Froot Loops or sugar added breakfast cereals
- White bread

Processed fruit and vegetables (with added sugars, thickeners, and emulsifiers)

- Canned fruit
- Fruit leathers
- Fruit or Vegetable juice
- Fruit gummies

Saturated Fats

- Butter, lard, shortening
- Hard margarine
- Deep fried foods

Processed meats and proteins

- Sausages, hot dogs, pepperoni
- Deli meats
- Peanut butter (with sugar added)
- Chicken nuggets

Dairy products with thickeners and sugars

- Processed cheese slices
- Chocolate milk
- Sugar sweetened yogurt
- Ice cream

Processed drinks

- Pop
- Energy drinks
- Coffee
- Alcohol
- Sugar sweetened drinks (5 Alive, Sunny D, Kool Aid)
- Sugar alternative drink flavours (Mio, Crystal lite)

Practical Advice for Our Patients[#]

- Food is important – impacts gut & microbes → IBD
- Gradual change in life style – start with awareness
- Eat a variety of foods – local, seasonal
- Prefer whole foods to refined/processed
- Eat more plant-based and less animal-based
- Make food from fresh (when possible)
- Avoid preservatives, emulsifiers
- Feed your bugs: natural, diverse fibre
- ** *Dietary Guidance for Patients with IBD from the IOIBD paper under review* **

Relates to dietary advice, not EEN or CDED

Summary

- Patients are demanding guidance on diet
- Huge knowledge gaps, but this is changing
- EEN and CDED are effective for active Crohn disease, but not perfect
- Prescribed diets need professional support
- Nutritional advice – follows good rationale but lacks solid evidence
- Challenge: diet is very hard to study...
- Future: science-driven/personalized diets

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My Lab

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- Crohn's Colitis Canada (CCC)
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- IMAGINE SPOR Network

Thank You!!

Looking for a PhD in translational IBD?
Come and talk to me!
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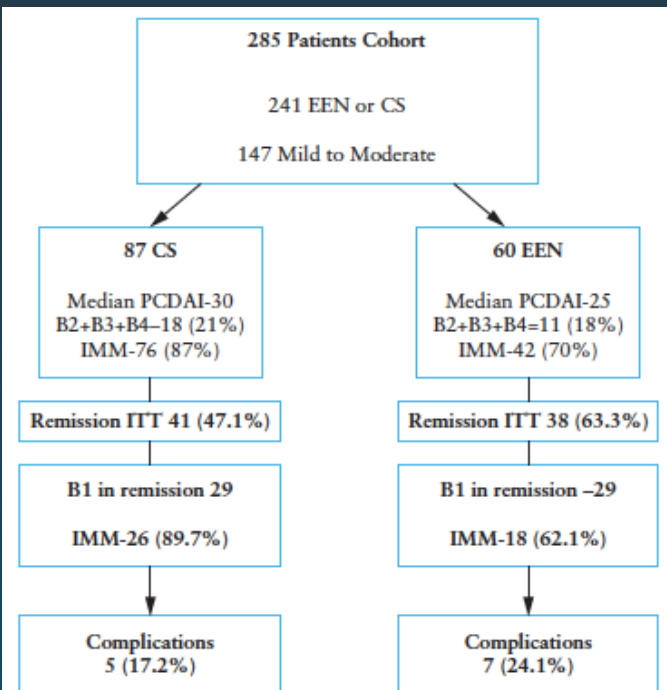
**Edmonton
Pediatric
IBD
Clinic**



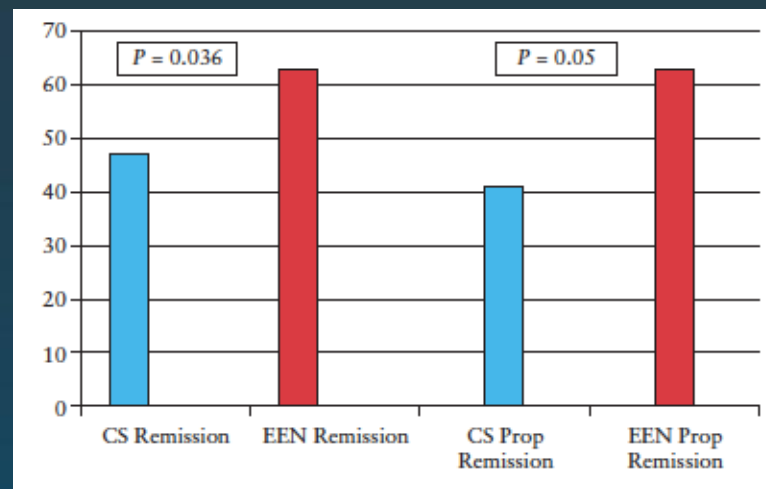
Stage 1 (First 6 weeks) Mandatory or Allowed Foods Coupled with Modulen	Stage 2 (Second 6 weeks) Mandatory or Allowed Foods Coupled with Modulen
The diet should be administered by a trained dietitian or physician	The diet should be administered by a trained dietitian or physician
Mandatory Daily Foods and Quantities	Mandatory Daily Foods and Quantities
Fresh Chicken breast 150-200 gr /day	Fresh Chicken breast 150-200 gr /day
2 Eggs/ day	2 Eggs/ day
2 Bananas /day	2 Bananas /day
1 Fresh Apple/ day	1 Fresh Apple/ day
2 Potatoes /day	2 Potatoes /day (or ½ sweet potato and one potato)
Potatoes must be cooked and refrigerated before use	Potatoes must be cooked and refrigerated before use
Allowed Foods Daily	Allowed Foods Daily
Fresh Strawberries	Fresh Strawberries
Fresh Melon (1 slice)	Fresh Melon (1 slice)
Rice flour	Rice flour
White rice and rice noodles (unlimited)	White rice and rice noodles(unlimited)
2 Tomatoes (additional allowed for cooking)	2 Tomatoes(additional allowed for cooking)
2 Cucumbers (medium size)	2 Cucumbers (2 medium size)
2 Avocado halves	2 Avocado halves
1 Carrot	1 Carrot
Spinach 1 cup uncooked leaves	Spinach 1 cup uncooked leaves
Lettuce (3 leaves)	Lettuce (3 leaves)
Onion	Onion
Fresh green herbs (Basil, Parsley, Coriander, Rosemary, Thyme, Mint , Dill etc)	Fresh green herbs (Basil, Parsley, Coriander, Rosemary, Thyme, Mint, Dill etc)
1 glass freshly squeezed orange juice from fresh oranges (not from cartons or bottles)	1 glass freshly squeezed orange juice from fresh oranges (not from cartons or bottles)
Water, sparkling water	Water, sparkling water
Salt, pepper, paprika, cinnamon, cumin, tumeric	Salt, pepper, paprika, cinnamon, cumin, tumeric
3 tablespoons honey	3 tablespoons honey
4 teaspoons sugar	4 teaspoons sugar
Fresh ginger and garlic cloves, lemons and limes	Fresh ginger and garlic cloves
*****	One slice whole grain bread daily
*****	Quinoa
*****	3 Tablespoons cooked lentils or peas
*****	6 almonds or walnut halves (unprocessed)
*****	Baking soda

Foods allowed only once a week	Foods allowed only once a week
Fresh lean fish (not deep fried, dietitian guidance required)	Fresh lean fish (not deep fried, dietitian guidance required)
*****	200 gr Sirloin or fillet steak (Maximum)
*****	1 slice whole grain bread (Maximum)
*****	1 can tuna (in olive or canola oil) drained
*****	½ cup oatmeal or cut oats
*****	Additional daily foods from week 7
*****	Broccoli, Cauliflower 2 florettes daily
*****	4 fresh mushrooms (not canned)
*****	½ red bell pepper
*****	1 zucchini or slice squash
*****	1 pear or kiwi or ripe nectarine
*****	Additional daily foods from week 10
*****	Most vegetables (restricted amounts with dietitian guidance)
*****	Most fruits (restricted amounts with dietitian guidance)
*****	Quinoa
*****	3-4 Tablespoons cooked lentils or peas
Stage 1 Disallowed Foods Partial List	Stage 2 Disallowed Foods Partial List (unless allowed above)
Dairy	Dairy
Animal fat	Animal fat
Wheat	Wheat
Emulsifiers	Emulsifiers
Artificial Sweeteners	Artificial Sweeteners
Other cuts or parts of chicken	Other cuts or parts of chicken
Other sources animal or soy protein	Other sources animal or soy protein
Carrageenans	Carrageenans
Maltodextrins(and sucralose)	Maltodextrins (and sucralose)
Sulfite containing foods	Sulfite containing foods
Xanthan gum	Xanthan gum
Packaged, canned or frozen precooked foods, doughs, baked goods	Packaged, canned or frozen precooked foods, doughs, baked goods
Frozen , canned fruits and vegetables	Frozen , canned fruits and vegetables
Oral Iron supplements	Oral Iron supplements
Soy or Gluten free products	Soy or Gluten free products
Ready to use sauces, syrups, spreads, dressings, margarine, butter	Ready to use sauces, syrups, spreads, dressings, margarine, butter
Vinegar, soy sauce, ketchup, mayonnaise	Vinegar, soy sauce, ketchup, mayonnaise
Alcoholic beverages, soft drinks, juices	Alcoholic beverages, soft drinks, juices
Deep fried or oily foods	Deep fried oily foods

Differences in Outcomes Over Time With Exclusive Enteral Nutrition Compared With Steroids in Children With Mild to Moderate Crohn's Disease: Results From the *GROWTH CD* Study



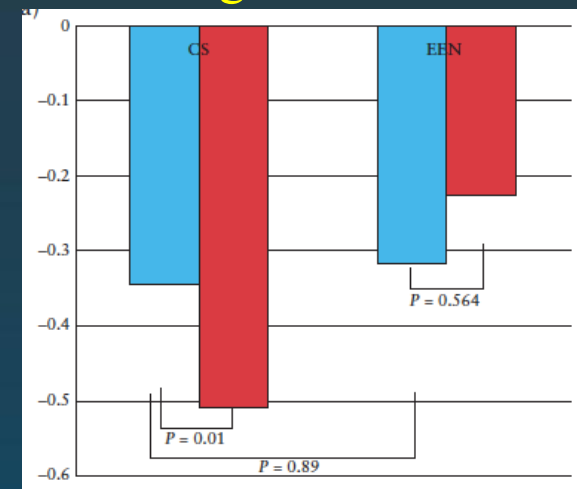
Induction of Remission



ITT

Propensity

Height Z Score



CS

EEN

Cohen-Dolev *et al.*, JCC 2018;12:306-12.

The Past and Future Biology of the Human Microbiome in an Age of Extinctions

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Leading Edge

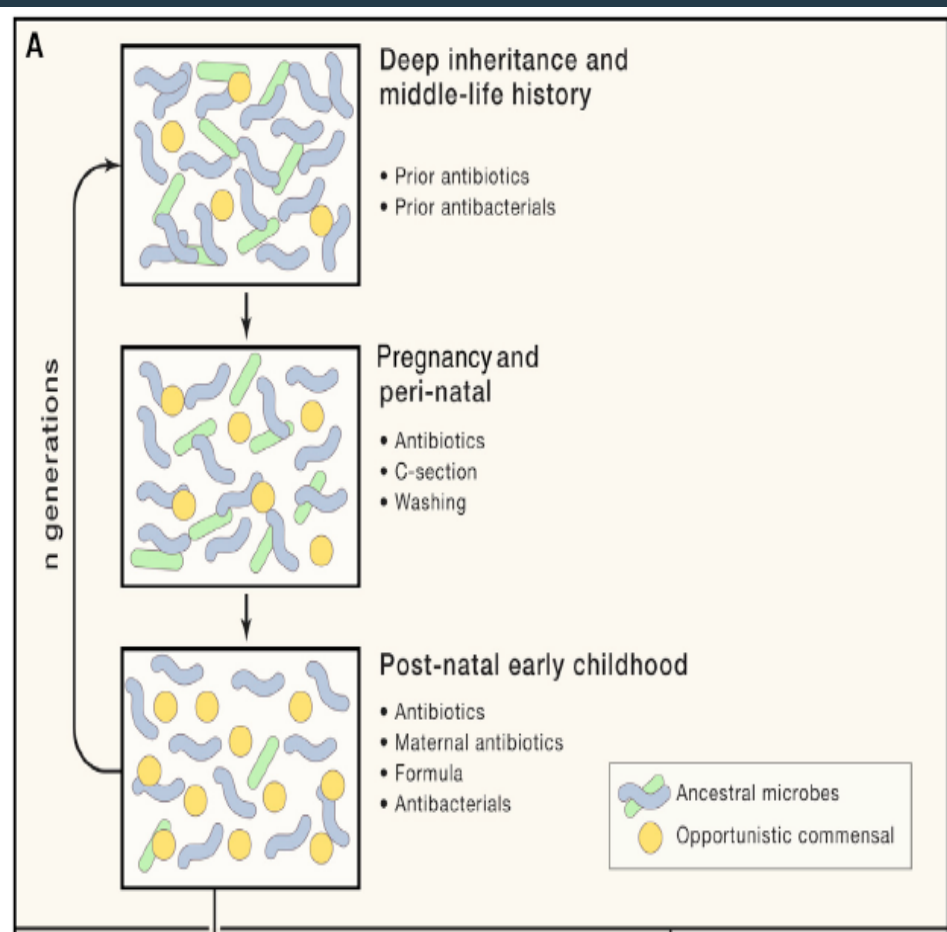
Commentary

Cell 172, March 8, 2018

Microbiome conservancy stores global fecal samples

Research could help prevent or treat diseases of the gut

Disappearing Microbiome



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