

# 2019 SCSG GI SYMPOSIUM



# The why and how of applying the FODMAP diet in clinical practice

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# Topics to be covered

- **Diet and IBS**
- **The FODMAP concept**
- **How to implement the FODMAP dietary strategy**
- **Issues in its implementation**
- **Where it fits into management algorithms for IBS**

# Why should we use diet in IBS?

- Ingestion of food triggers symptoms in >60% patients
- Huge patient interest in using diet to treat illness
- Primary behavioural factor manipulated by IBS patients
- Multiple mechanisms by which food → symptoms
- RCT evidence for efficacy of dietary change in IBS
- If we don't engage, the naturopath *et al* will

# Most common dietary strategies for IBS

- ~~• **Gluten-free diet**~~
- **Low FODMAP diet**
- ~~• **Exclusion diets based on antibody or leukocyte activation test**~~

## ACG Guidelines

*Ford et al, Am J Gastroenterol 2018*

We suggest a low FODMAP diet for overall symptom improvement in IBS patients. (Recommendation: weak; Quality of evidence: very low)

We suggest against a gluten-free or exclusion diet based upon antibody or leukocyte activation test for overall symptom improvement in IBS patients. (Recommendation: weak; Quality of evidence: very low)



# The FODMAP Concept

# The FODMAP concept: Consider all indigestible and slowly-absorbed short-chain carbohydrates collectively

Fructose



Lactose

*Hypolactasia*



Fructans



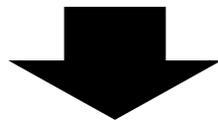
Galacto-oligos



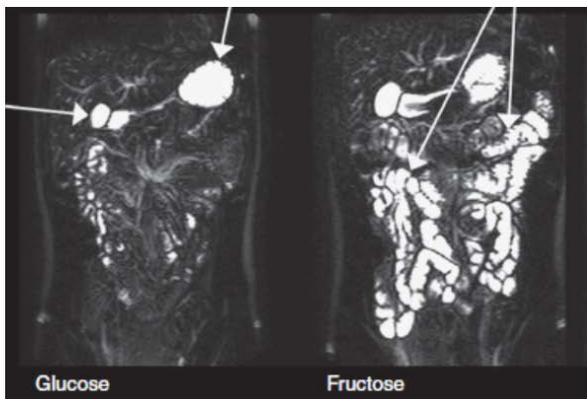
Polyols



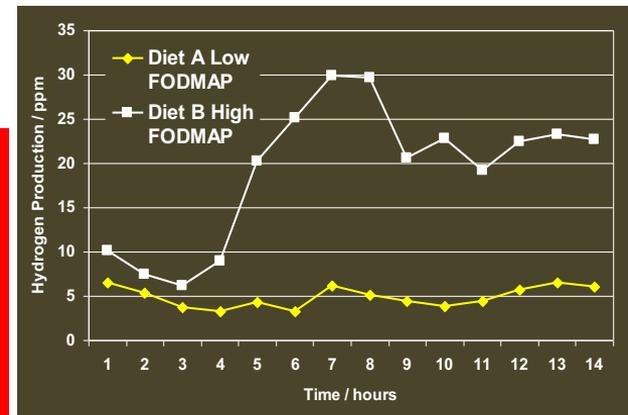
**All may distend intestine via osmotic effect + gas production**



**Additive contribution to symptoms in the presence of visceral hypersensitivity**



*Murray et al, AJG 2014*



*Ong et al, JGH 2010*

# FODMAPs - where are these found?

**F**ermentable  
**O**ligosaccharides  
**D**isaccharides  
**M**onosaccharides  
**A**nd  
**P**olyols

XS Fructose

Lactose

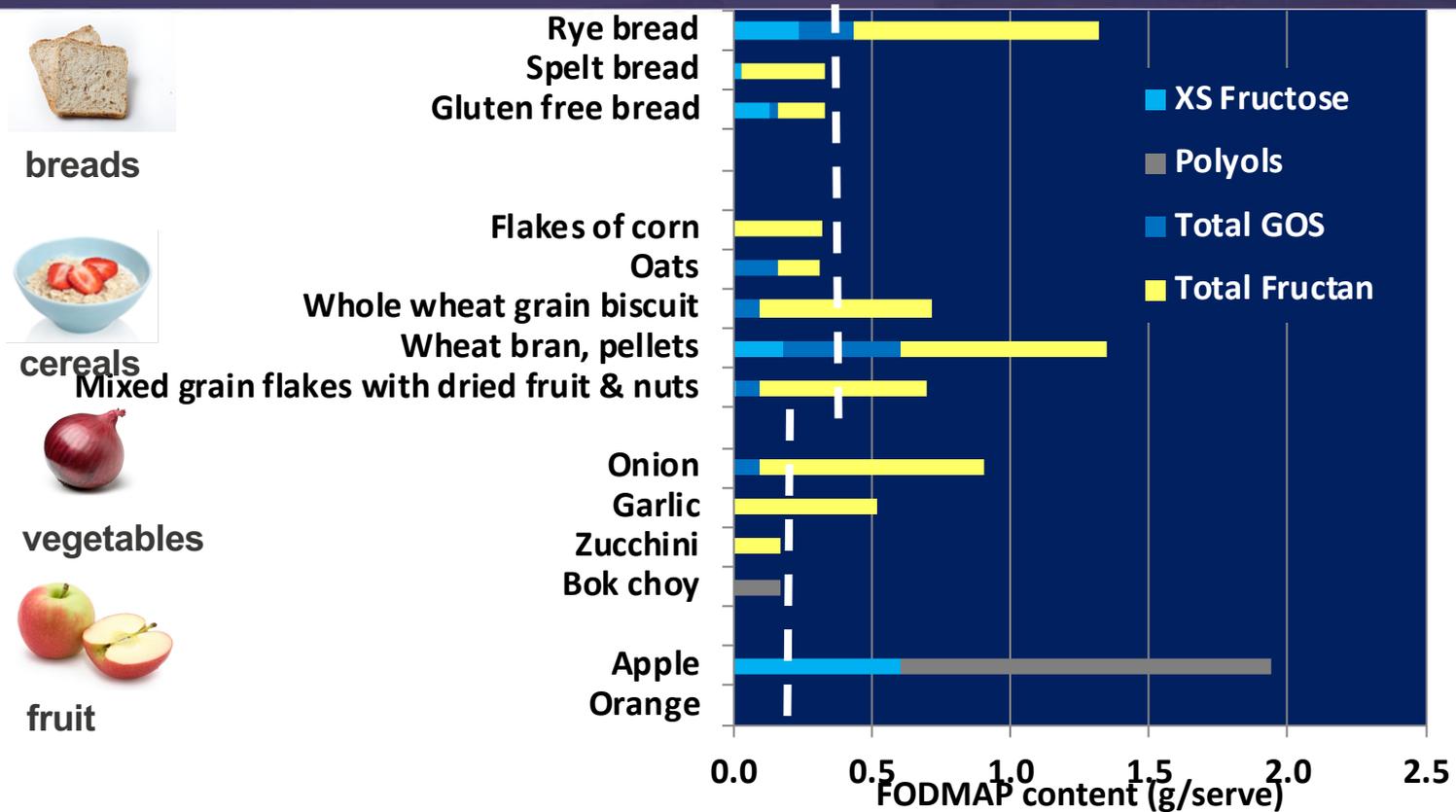
Fructans

GOS

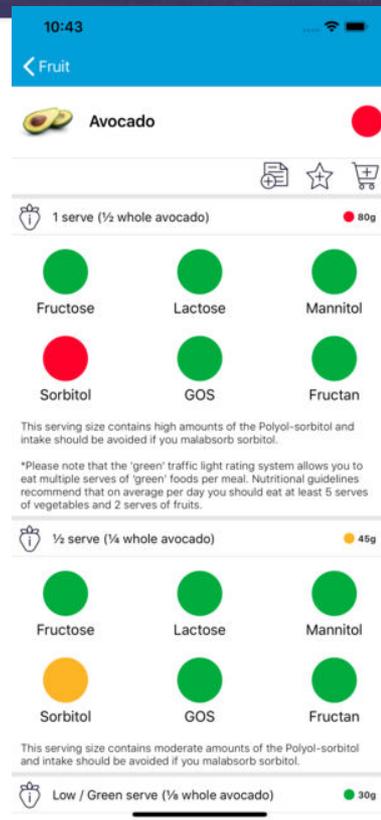
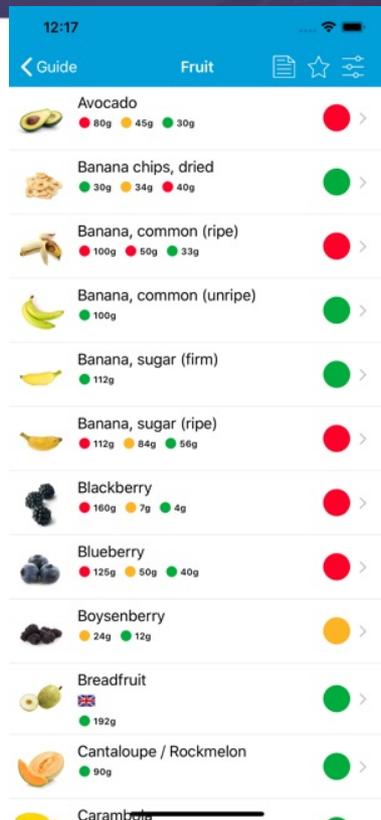
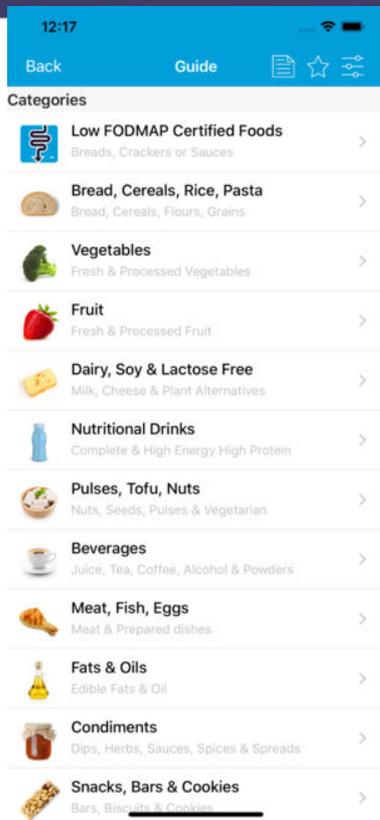
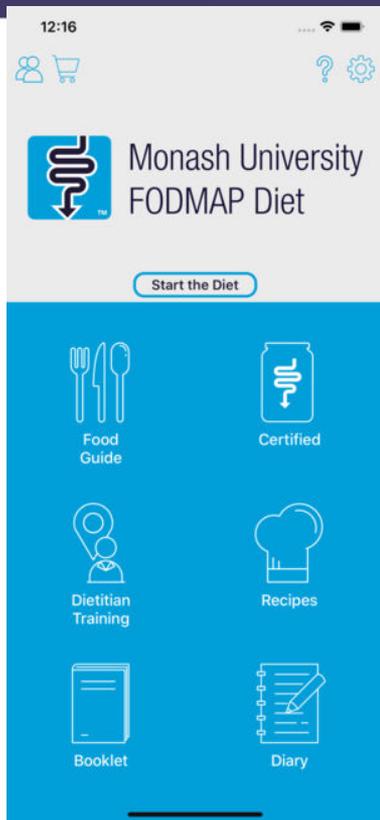
Polvols



# Cut-off values for content of FODMAPs in foods



# Monash University FODMAP Diet App



***Funds raised go towards more analysis of foods & further research***



# How to implement the FODMAP dietary program

# Low FODMAP diet



Phase 1

Avoid all foods high in FODMAPs  
Replace with foods low in FODMAPs in each food group

Efficacy

4-6 weeks

benefit  
adherent

**Dietitian-delivered**

Phase 2

STEP 2: Personalised maintenance diet

Phase 3

PERSONALISED maintenance diet

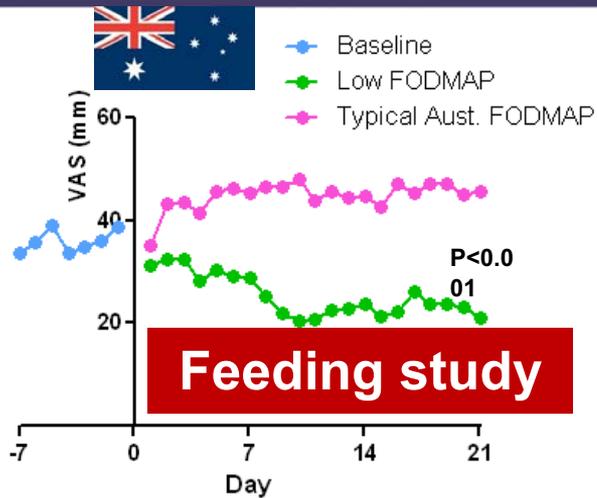


# Phase 1:



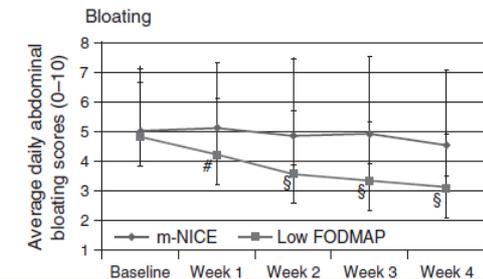
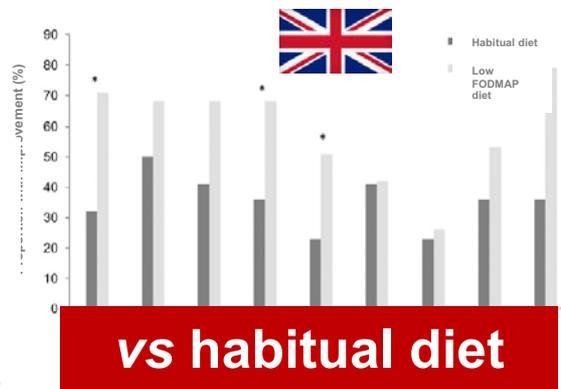
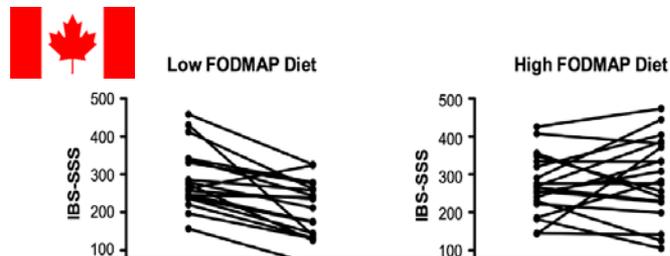
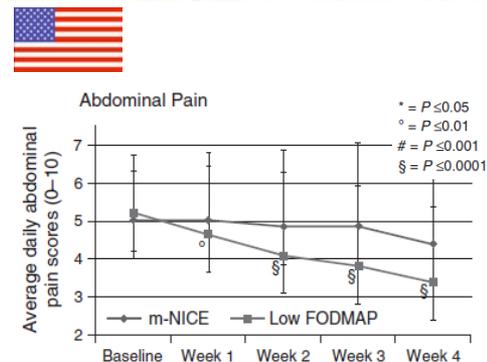
- **Goals:**
  - To determine the role of FODMAPs in symptom genesis
  - Patient to learn about FODMAPs and where they are in food
- **Not meant to be a long-term option**
  - If of no benefit, must be stopped
  - If needed strictly long-term to maintain quality of life, need to consider other strategies (e.g., psychotherapeutic strategies)

# RCTs of Phase 1 FODMAP vs other diet for IBS



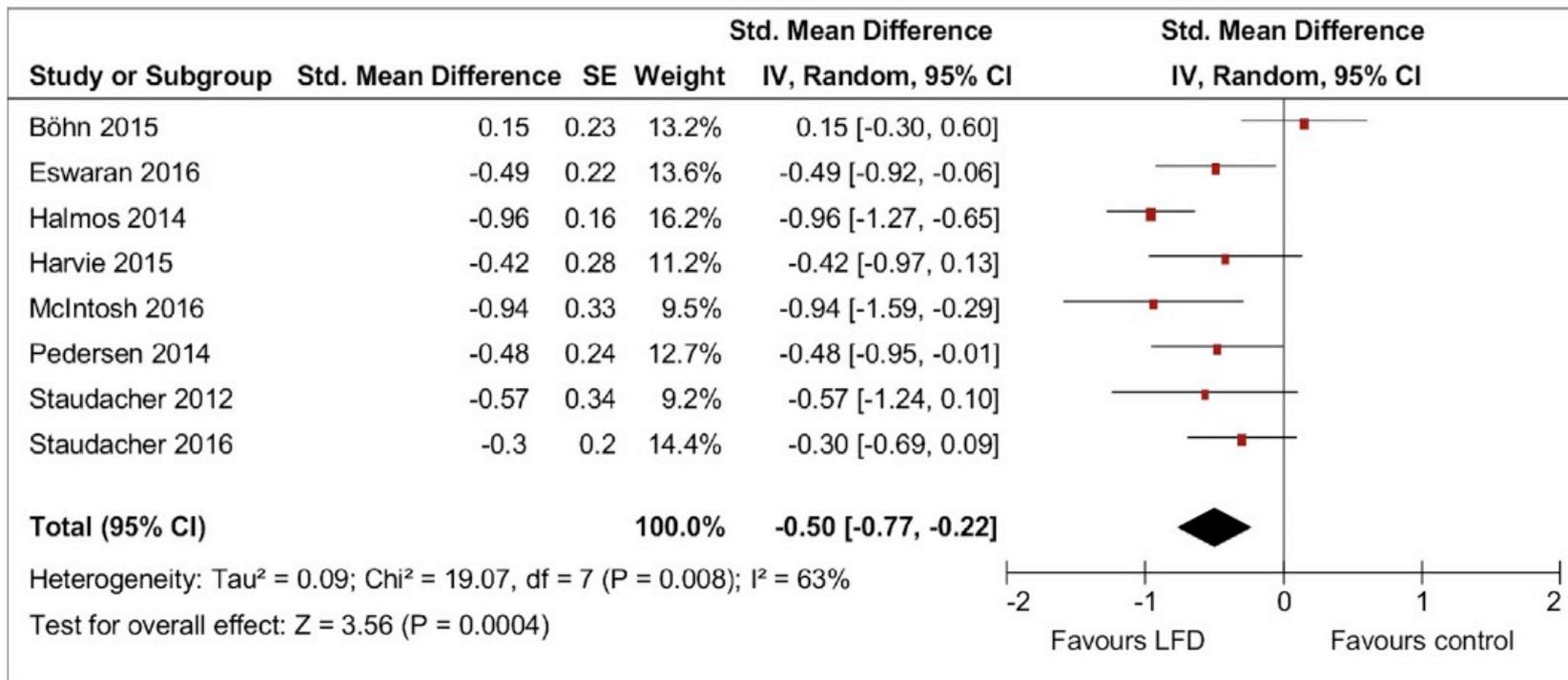

	Diet		p
	Sham diet (n=53)	Low FODMAP diet (n=51)	
<b>IBS-SSS*</b>			
Total score	224 (89)	173 (95)	<b>0.001</b>
Pain severity	40 (23)	33 (24)	0.062
Days of pain	44 (29)	30 (27)	<b>0.001</b>
Distension severity	40 (24)	29 (25)	<b>0.002</b>
Satisfaction with bowel	53 (17)	43 (23)	<b>0.002</b>
Affecting life			<b>0.022</b>
Change in IBS			<b>0.001</b>

**vs placebo diet**



Staudacher et al, JHND 2012; Halmos et al Gastroenterology 2014; McIntosh et al, Gut 2017; Eswaran et al, AJG 2017; Staudacher et al Gastroenterology 2018

# Meta-analysis: Effect of low FODMAP diet on abdominal pain



# Phase 2: FODMAP re-challenge



- **Aim:**
  - To identify sensitivities to individual FODMAP sub-groups and find balance between good symptom control and expansion of the diet
- **Why re-challenge?**
  - Some FODMAPs are prebiotics (fructans & GOS) → ‘protect’ microbiota
  - Improve nutritional adequacy & social inclusion
  - Improve food variety
  - Patients learn specific triggers
- **The process:**
  - One challenge at a time and monitor symptom response
  - 2-3 day ‘break/washout’ in between each challenge

# Phase 3: 'Personalised' FODMAP diet



- **Mild restriction only**
  - ↓ effect on food-related quality of life
  - Restrict according to specific FODMAPs that seem a problem to the individual
  - ↓ risk of nutritional inadequacy and major effects on gut microbiota
- **Patient is empowered (self management)**
  - ↑ or ↓ restriction as IBS fluctuates in severity
  - understand the bad day rather than be anxious about it

# Phase 3: 'Personalised' FODMAP diet



**6 prospective studies**

**3-18 months follow up (with reintroduction)**

**>75% been able to reintroduce → personalised diet**

**Overall sustained symptom response in 57- 82%**

**No evidence of harm**

*De Roest et al, Int J Clin Pract 2013; Peters et al, APT2016; O'Keefe et al, NGM 2017; Harvie et al, World J Gastroenterol 2017; Schumann APT 2017*

# Predictors of response to FODMAP diet

## Not predictors:

- Bowel patterns - efficacy similar across in IBS-C, IBS-D & IBS-M
- Breath hydrogen test patterns after fructose, polyols .....

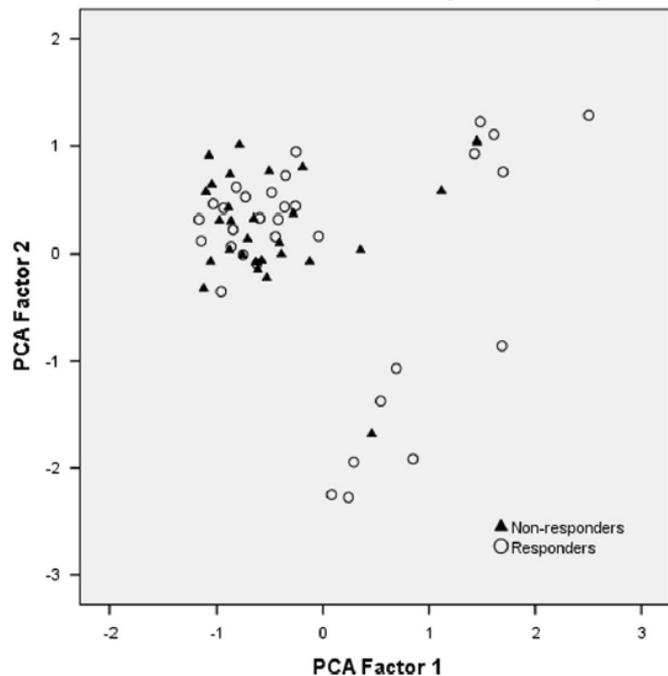
## Predictors

- **Composition of fecal microbiota**
  - ↑ saccharolytic bacteria *Chumpitazi et al, APT 2016*
  - Predictive patterns *Valeur et al, DDS 2018; Bennett et Al Gut 2018; Hustop[ft et al NGM 2017*
- **Pattern of fecal VOC (volatile organic compounds)** *Rossi et al, CGH 2018*

# Predictors of response to FODMAP diet

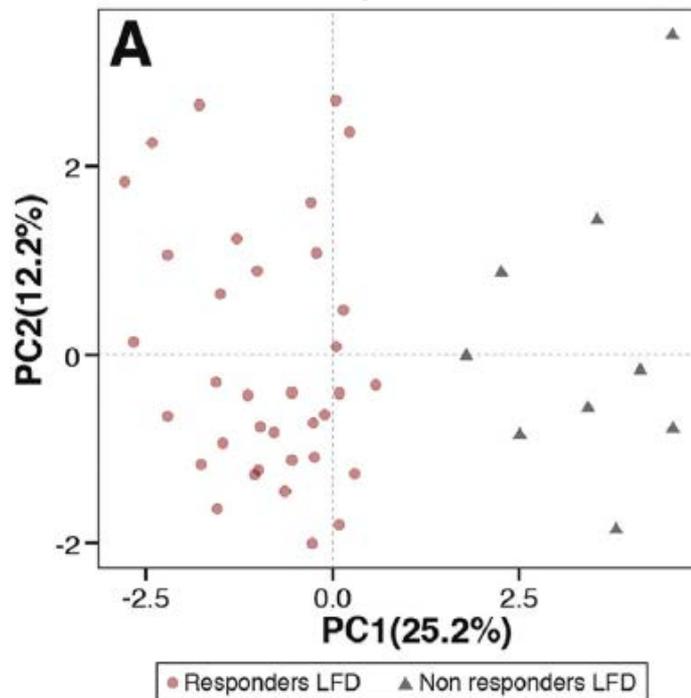
## *Microbiota vs sniffing the poop*

Faecal microbiota (GA test)



*Valeur et al, DDS 2018*

Faecal volatile organic compounds



*Rossi et al, CGH 2018*

# Strict low FODMAP diet – risks

- **Exacerbate or precipitate disordered eating in the vulnerable**
  - **Avoidant/Restrictive Food Intake Disorder (ARFID)**
    - **Avoidance/restriction of food associated with weight loss &/or nutritional deficiency or significant psychosocial issues**
  - **Orthorexia nervosa = obsession with healthy eating**
- **Lead to nutritional issues**
  - **Inadequacy – calcium and fibre most at risk**
  - **Food-related quality of life - ↑cost, difficulty eating out**
- **Effect on gut microbiome**
  - **No effect on diversity**
  - **Effects on bacterial community - reversed with personalised diet**



## Issues in the implementation of the FODMAP dietary strategy

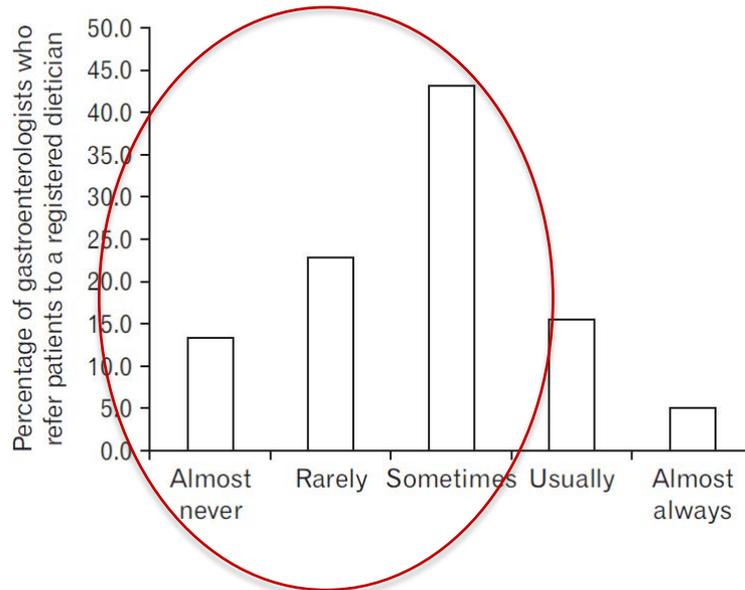
# Enthusiasm of Gastroenterologists?

We suggest a low FODMAP diet for overall symptom improvement in IBS patients. (Recommendation: weak; Quality of evidence: very low)

**American College of Gastroenterology**

*Ford et al, Am J Gastroenterol 2018*

- **>50% of 1,562 Gastroenterologists in USA recommend dietary therapy to >75% of their IBS patients**
- **Yet only 21% refer patients to dietitians (<1 in 3 GI dietitians)**



*Lenhart et al, J Neurogastroenterol Mot 2018*

# Do you really need a dietitian?

- 1. Most evidence for efficacy has come from this setting**
- 2. Maintaining nutritional adequacy important (calcium, fibre)**
- 3. Reintroduction phase important to reduce potential impact of the diet on both quality of life and the gut microbiota**
- 4. Wary of those at risk of disordered eating or need of psychological input**
- 5. Can deal with practical issues - reading food labels, meal planning, recipes**

***BUT ..... The dietitian needs to be adequately trained & equipped***

# Dietitian vs no dietitian in the real world

- Attending a gastro clinic & previously recommended to trial FODMAP diet
- N=80; 58 IBS, 11 IBD, 1 celiac , 10 other
- Retrospectively interviewed + CNAQ (food frequency questionnaire)

Index		Dietitian n=24	No dietitian n=56	P-value
Overall response: $\geq 50\%$ improvement		67%	50%	0.17
Phase 1	Appropriate implementation	96%	71%	0.02
	< 12 g/d FODMAPs	72%	31%	<0.01
Phase 2	Appropriate implementation	70%	39%	0.02
Phase 3	Appropriate implementation	65%	29%	<0.01

# Dr Google as the teacher

Readability & quality of internet dietary information on IBS = poor!

## Low FODMAP Dietary Food Lists are Often Discordant

*McMeans et al AJG 2016*

### Readability & quality

DISCERN Instrument <sup>a</sup>	Means (SD)	Inter-rater agreement (95% CI) <sup>b</sup>
Pediatrics (n = 24)		
Reliability	2.8 ± 0.62	0.78 (0.61–0.98)
Quality of information	2.2 ± 0.97	0.67 (0.50–0.84)
Overall quality	2.1 ± 0.98	0.93 (0.86–0.97)
Adults (n = 29)		
Reliability	3.4 ± 0.41	0.62 (0.48–0.88)
Quality of information	2.7 ± 0.96	0.489 (0.27–0.71)
Overall quality	3.0 ± 0.14	0.79 (0.61–0.89)

<sup>a</sup>The DISCERN instrument provides ratings ranging from 1 to 5, with categories including low quality (<3), moderate quality (≥3 to <4), and high quality (≥4).

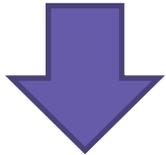
## Dietary advice for IBS

	Pediatric Web sites (n = 24)	Adult Web sites (n = 29)
Diet		
High fiber	16 (89%)	21 (72%)
Low FODMAP	8 (44%)	19 (66%)
Caffeine and/or artificial sweeteners and/or alcohol intake reduction	8 (44%)	16 (55%)
Lactose free or dairy free	7 (39%)	12 (41%)
Fructose and/or sorbitol reduction	1 (6%)	11 (38%)
Fat reduction	4 (22%)	10 (34%)
Refer to doctor	6 (25%)	-
High-gas-food elimination	-	7 (24%)
Starch intake reduction	-	6 (21%)
Gluten free	1 (6%)	4 (14%)
High carbohydrate	2 (11%)	-
Low fiber	-	3 (10%)
Strict elimination	-	1 (3%)

*Cruz et al, Clin Gastroenterol Hepatol 2018*

# Teaching the diet without a dietitian

- **Reality**
  - FODMAP-trained dietitians are not often readily available or funded
  - Many patients learn the low FODMAP diet without a dietitian
  - No one piece of paper can teach the diet

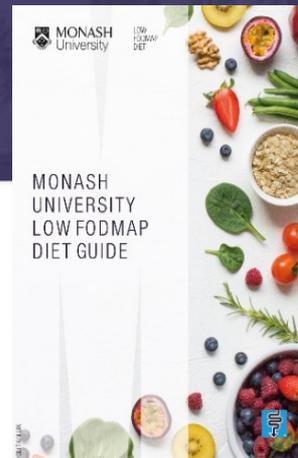


**Doctor can upskill - toolkit**

**Utilise upskilled Nurse Practitioners/Physician Assistants**

***Best to engage with/employ a skilled Dietitian***

# The Dietitian's Tool-Kit



## Patient Booklets

## You Tube-Animation video



Monash University low FODMAP diet animation  
[https://www.youtube.com/watch?v=Z\\_1Hzl9o5ic](https://www.youtube.com/watch?v=Z_1Hzl9o5ic)



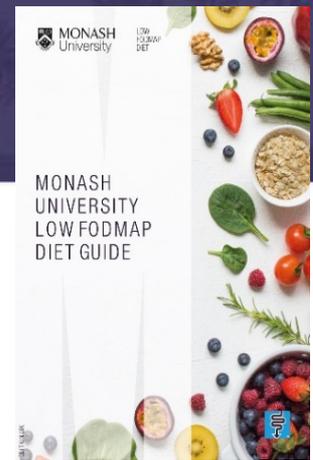
## The App



## Training courses

- On-line - Monash University

# Gastroenterologist's ~~The Dietitian's~~ Tool-Kit



## Patient Booklets

## You Tube-Animation video



Monash University low FODMAP diet animation  
[https://www.youtube.com/watch?v=Z\\_1Hzl9o5ic](https://www.youtube.com/watch?v=Z_1Hzl9o5ic)



## The App



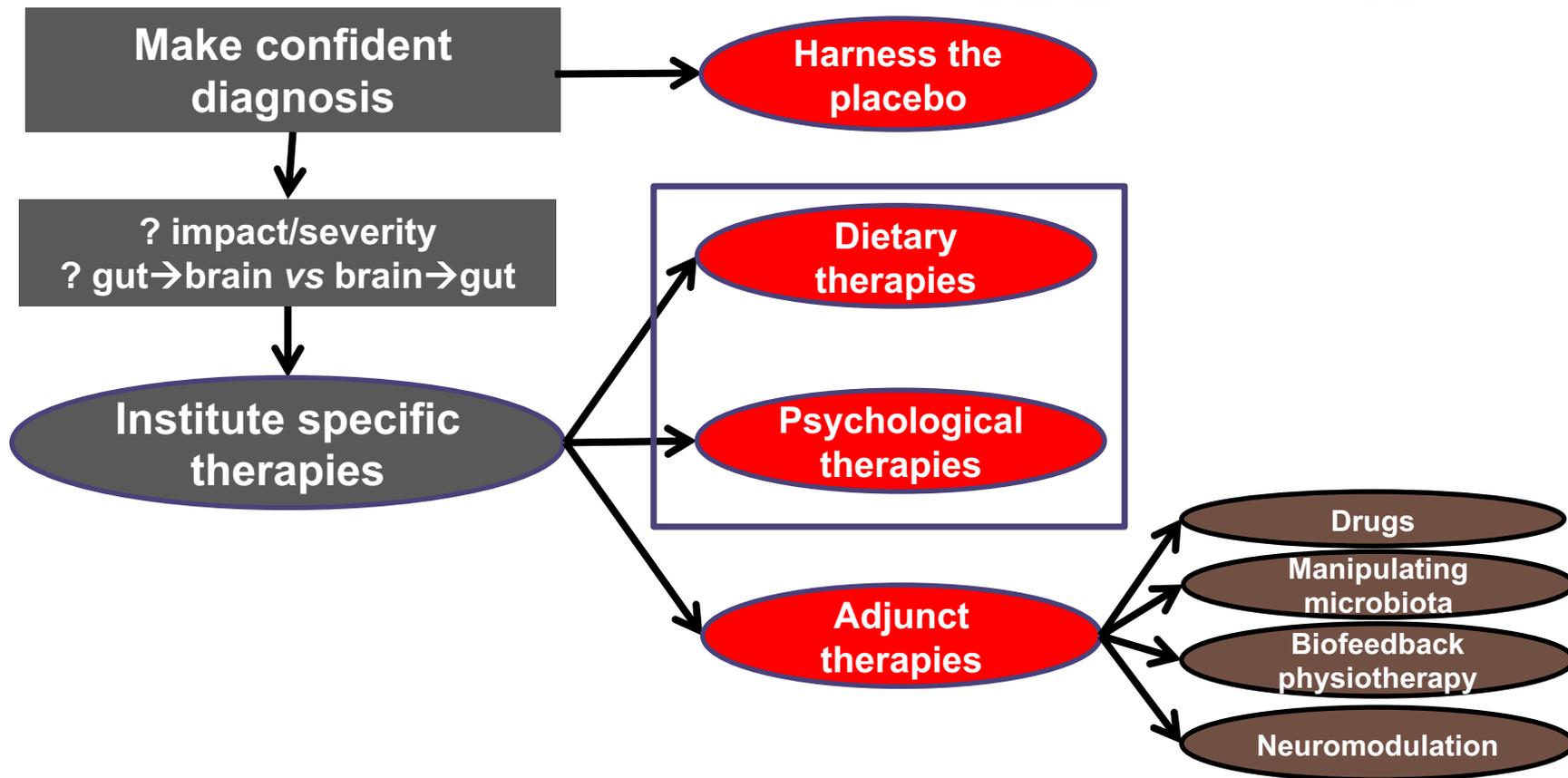
## Training courses

- On-line - Monash University



**Where does the FODMAP dietary strategy fit into management algorithms for IBS?**

# Management strategies in IBS in 2019



# Why diet and psychological therapies?

- **Well-defined strategies**
- **For a chronic, non-fatal illness**
  - **Managing lifestyle & psychological issues is an attractive option**
  - **Non-curative drugs that work only while you take them is an unattractive option**
- **Efficacy for all symptoms in 3 of 4 patients**
- **Self-empowering**

# Psychotherapeutic approaches

## *Stress management, relaxation, meditation*

<b><i>Cognitive behaviour therapy</i></b>	<b>CBT</b>	<b>Focuses on relationship between situations, thoughts, physical reactions &amp; emotions Learn to build insight in the relationship between each of these factors &amp; ways to intervene on thoughts, behaviours and physiological response to improve mood and emotions</b>
<b><i>Mindfulness-based therapy</i></b>	<b>MBT</b>	<b>Uses meditation and relaxation to foster awareness and acceptance of the present moment Learn to engage this non-judgmental and non-reactive mindset in one's day-to-day activities</b>
<b><i>Gut-directed hypnotherapy</i></b>	<b>GDH</b>	<b>Focuses on post-hypnotic suggestions on the health of the GI tract</b>
<b><i>Psychodynamic therapy Interpersonal therapy</i></b>	<b>PDT IPT</b>	<b>Unstructured &amp; aim to build insight into one's illness experiences</b>
<b><i>Body awareness therapy</i></b>	<b>BAT</b>	<b>Treatment of somatoform autonomic dysfunction with proprioception via simple structured movement exercises based on human anatomical and physiological prerequisites to achieve optimal movement dynamics</b>
<b><i>Acceptance &amp; commitment therapies</i></b>	<b>ACT</b>	<b>uses processes of acceptance, defusion, commitment and behavior change to increase psychological flexibility</b>

# Psychological therapies for IBS

## One-on-one

### On-line or self-taught

#### 1.1.5 Self-administered / minimal contact cognitive behavioural therapy

Study	Psychological therapies	Control	Weight	Risk ratio	Year		
Sanders 2007	16	17	10	11	4.3%	1.04 (0.83, 1.29)	2007
Lackner 2008	10	25	27	27	2.7%	0.41 (0.26, 0.66)	2008
Moss-Morris 2010	8	31	26	33	2.0%	0.33 (0.18, 0.61)	2010
Subtotal (95% CI)		73	71	9.0%		0.53 (0.17, 1.66)	

Total events 34 63  
 Heterogeneity:  $r^2 = 0.97$ ;  $\chi^2 = 44.54$ , d.f. = 2 ( $P < 0.00001$ );  $I^2 = 96\%$   
 Test for overall effect:  $Z = 1.09$  ( $P = 0.27$ )

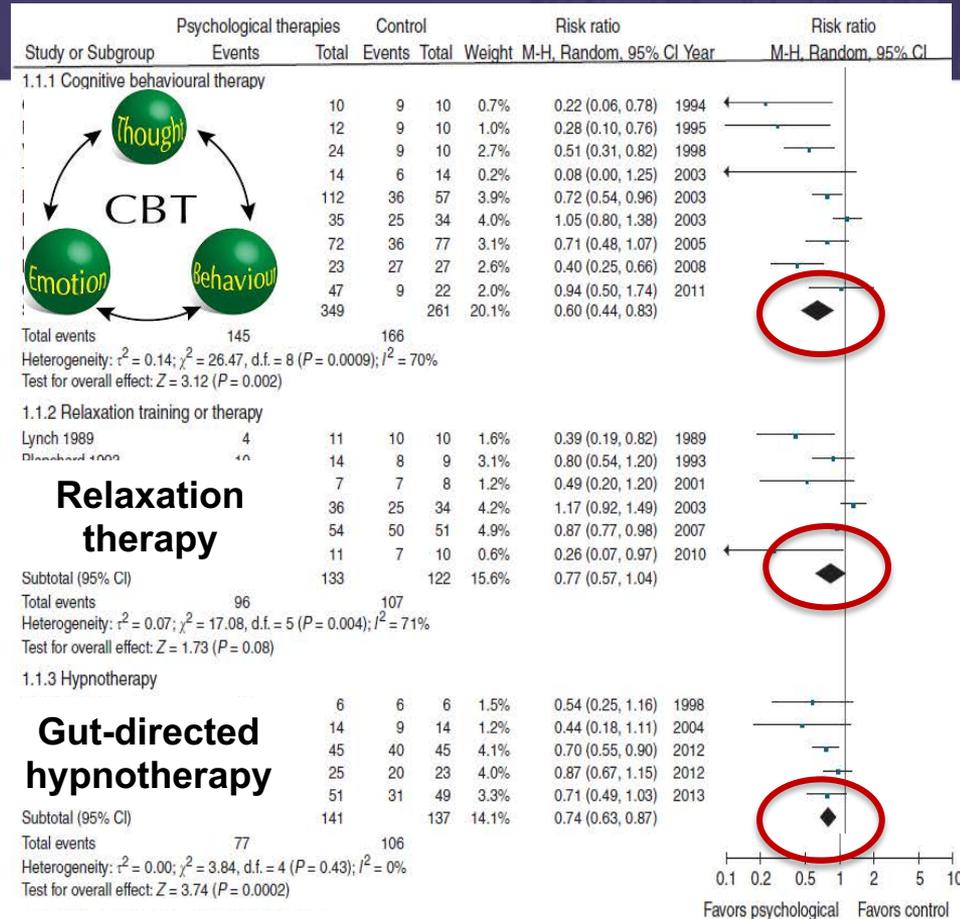
#### 1.1.6 Cognitive behavioural therapy via internet

Study	Psychological therapies	Control	Weight	Risk ratio	Year		
Hunt 2009	25	28	26	26	4.8%	0.90 (0.78, 1.04)	2009
Ljotsson 2010	26	43	42	43	4.2%	0.62 (0.48, 0.79)	2010
Subtotal (95% CI)		71	69	8.9%		0.75 (0.48, 1.17)	

Total events 51 68  
 Heterogeneity:  $r^2 = 0.09$ ;  $\chi^2 = 9.56$ , d.f. = 1 ( $P = 0.002$ );  $I^2 = 90\%$   
 Test for overall effect:  $Z = 1.27$  ( $P = 0.20$ )



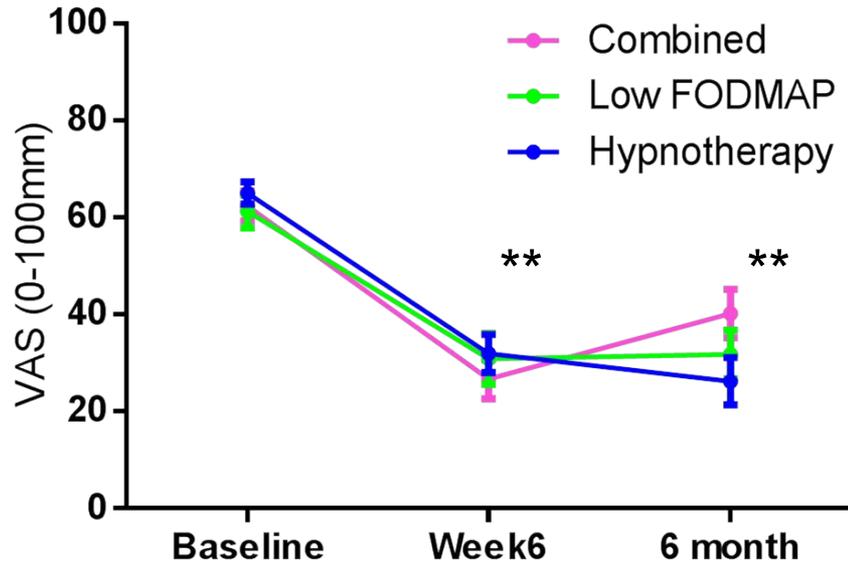
Ford et al, AJG 2014



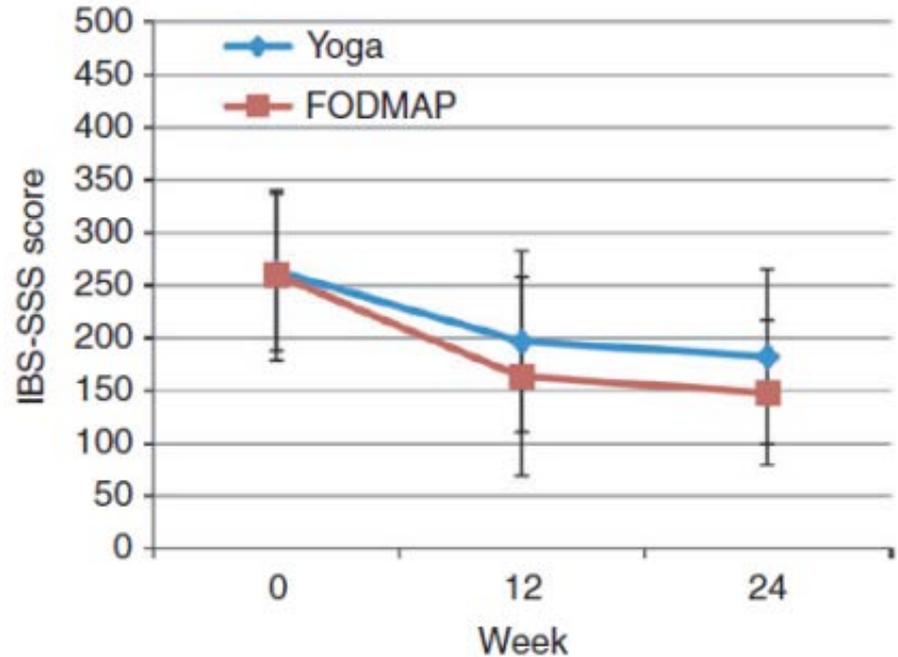
# Which strategy?

## FODMAP diet vs Gut-directed hypnotherapy or Hatha yoga

### Mean of overall symptoms



*Peters et al, Aliment Pharm Ther 2016*



*Schumann et al, Aliment Pharm Ther 2017*

# Gut-directed hypnotherapy or yoga in IBS

**When applied as a primary therapy, are as effective as a FODMAP diet in the short and longer term**

- ***Not a rescue therapy but a front-line therapy***
- ***?Same for other psychotherapeutic approaches (e.g. CBT, mindfulness)***

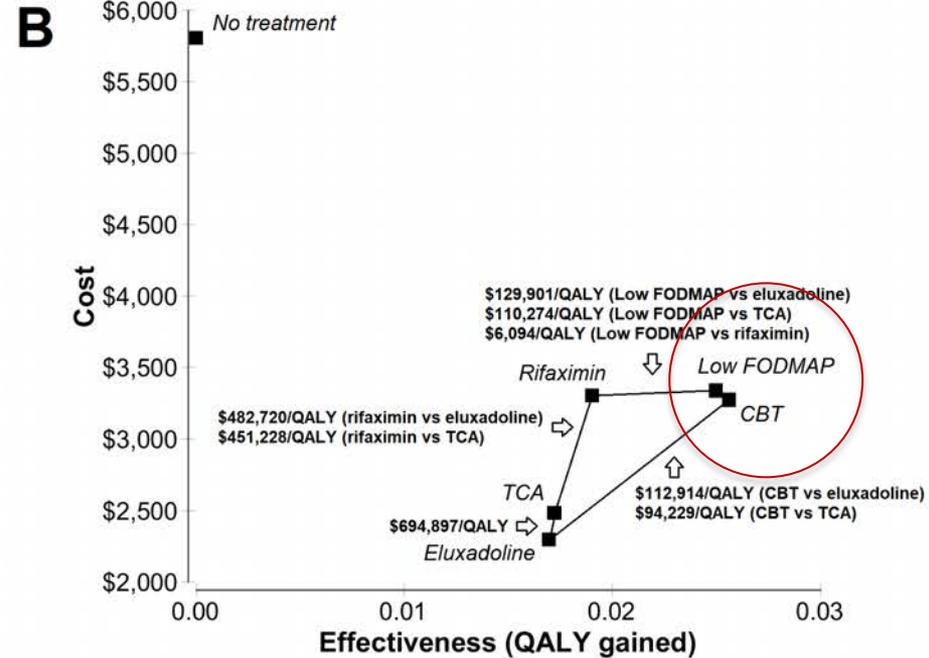
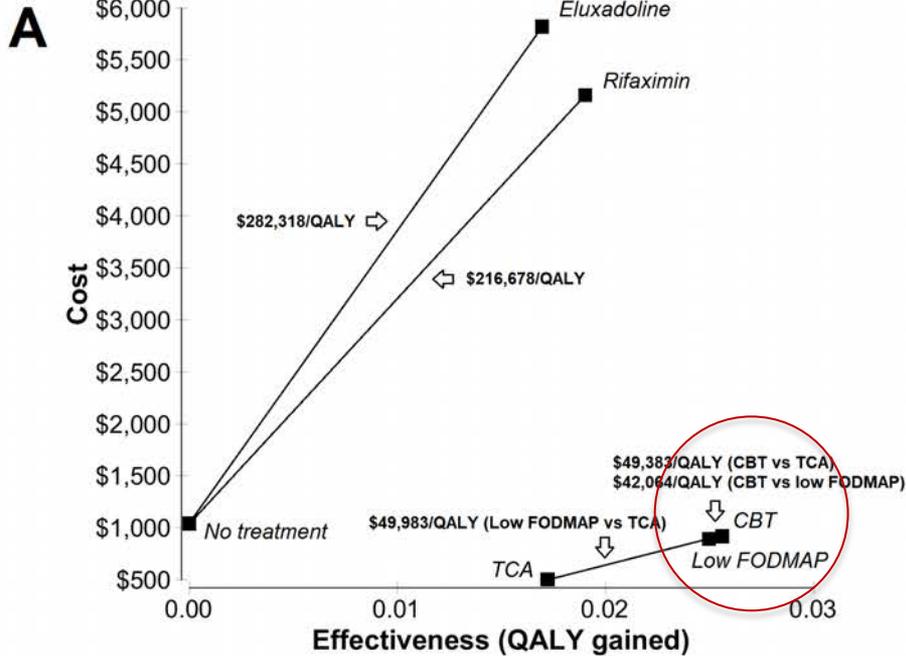
# Making the choice of therapy

- **Availability of expertise**
- **Patient buy-in**
- **Concurrent co-morbidities**
  - e.g., significant weight loss, loss of appetite, depression &/or anxiety, pelvic floor dyssynergia
- **Risks of specific therapies = choose another**
  - Diet: risk of or current disordered eating
  - Hypnotherapy: psychosis
- **Cost-effectiveness**

# Cost-effectiveness of IBS-D treatments

## Payer perspective

## Patient perspective



# ***Take-home messages: FODMAP dietary strategy***

- **Matured to a dynamic process of reintroduction and personalisation phases with maintenance of efficacy**
- **Efficacious for IBS & is evidence-based**
- **It is best delivered by dietitians**
- **Gastroenterological guidelines support its use**
- **Should be applied early in management**
- **Cost-effective for payer and patient[ (at least for IBS-D)**
- **Personalised therapy is the rule – consider risks vs likely benefit**

# Evolution of therapeutic approach to IBS

Therapy	20 <sup>th</sup> century
<i>Placebo</i>	<ul style="list-style-type: none"><li>• Placebo</li></ul>
<i>Frontline</i>	<ul style="list-style-type: none"><li>• Drugs</li></ul>
<i>Adjunct</i>	<ul style="list-style-type: none"><li>• Diet</li></ul>
<i>Rescue</i>	<ul style="list-style-type: none"><li>• Psychology</li><li>• Psychiatry</li></ul>
<i>'Ownership'</i>	<ul style="list-style-type: none"><li>• Neurogastroenterology</li></ul>

# Evolution of therapeutic approach to IBS

Therapy	20 <sup>th</sup> century	2019 & beyond
<b><i>Placebo</i></b>	<ul style="list-style-type: none"><li>• Placebo</li></ul>	<ul style="list-style-type: none"><li>• Placebo</li></ul>
<b><i>Frontline</i></b>	<ul style="list-style-type: none"><li>• Drugs</li></ul>	<ul style="list-style-type: none"><li>• Diet</li><li>• Psychological therapies</li></ul>
<b><i>Adjunct</i></b>	<ul style="list-style-type: none"><li>• Diet</li></ul>	<ul style="list-style-type: none"><li>• Drugs</li><li>• Diet</li><li>• Psychological therapies</li><li>• Manipulating microbiota</li><li>• Biofeedback/physiotherapy</li></ul>
<b><i>Rescue</i></b>	<ul style="list-style-type: none"><li>• Psychology</li><li>• Psychiatry</li></ul>	<ul style="list-style-type: none"><li>• Psychology</li><li>• Psychiatry</li></ul>
<b><i>'Ownership'</i></b>	<ul style="list-style-type: none"><li>• Neurogastroenterology</li></ul>	<ul style="list-style-type: none"><li>• Multi-disciplinary</li></ul>