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Obesity management in diabetes

Prof Rob Andrews and Dr Mimi Chen

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Conflict of interests for Rob Andrews

Investigator on number of studies

- Early ACTID, EXTOD, EXTOD education, Motivate T2DM, EXTOD immune, EXTOD sedentary.
- PI for some commercial studies with the drugs talking about today.

Positions

- Founding member of EXTOD
- Member Obesity Management Collaborative UK
- Recent chair of clinical study group 3 – prevention and treatment of type 2 diabetes

Conflict of interests for Mimi Chen

Received speaker honoraria, patient care improvement grants, joint working funding, and conference or advisory meeting support at different times from Eli Lilly, AstraZeneca, Novo Nordisk, Sanofi, and Merck. All relationships were managed in line with NHS and institutional governance and did not influence this presentation.

Overview -1

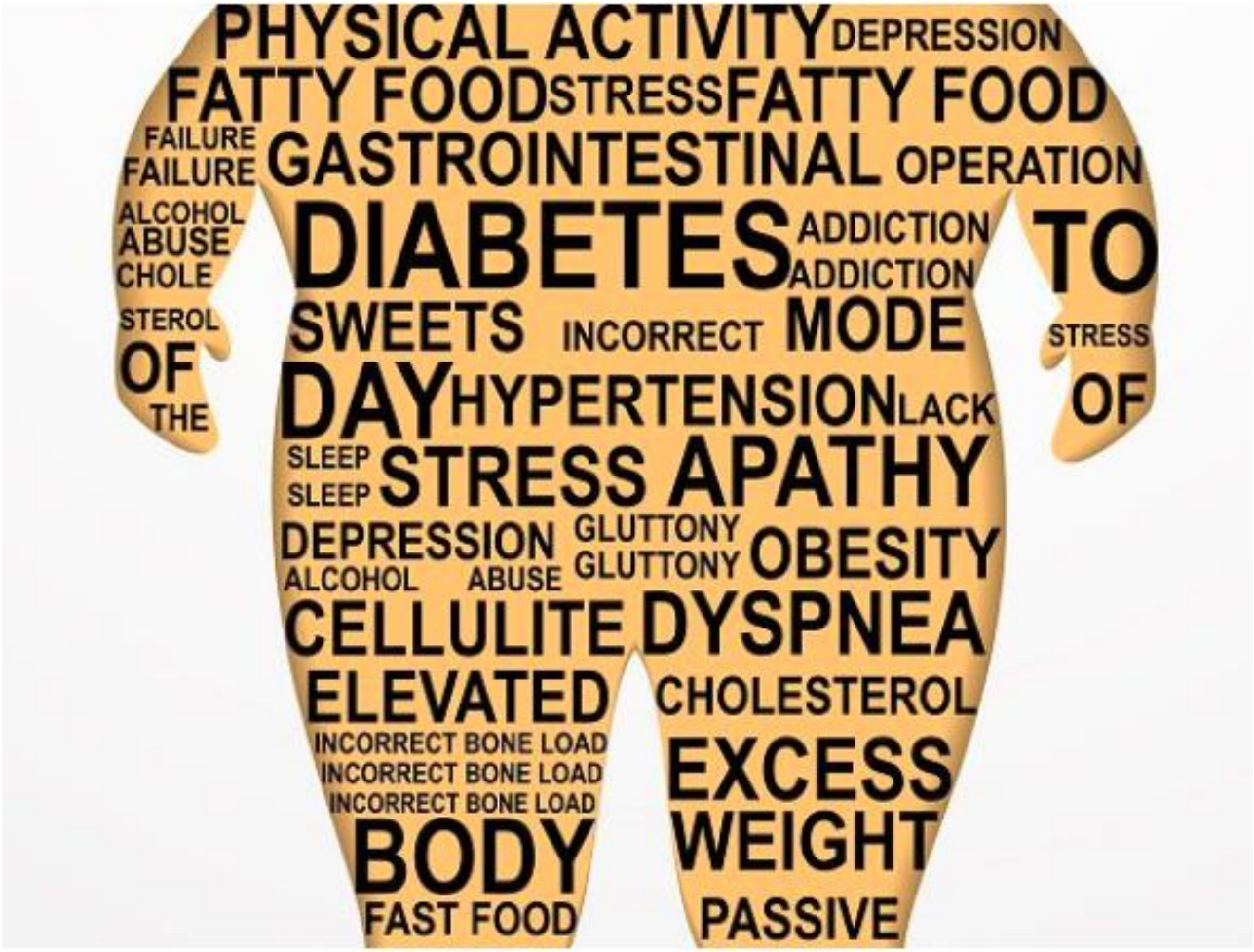
We will cover five topics

- The facts about obesity
- How to assess someone with clinical obesity
- The role of diet and exercise in helping manage weight in people with diabetes.
- The role of weight lost medication in helping manage weight in people with diabetes.
- The role of Bariatric surgery in helping to manage weight in people with diabetes.

Overview - 2

Within each topic we will have true and false questions for you to answer and then go over the answers.

The facts about obesity



Facts about obesity questions

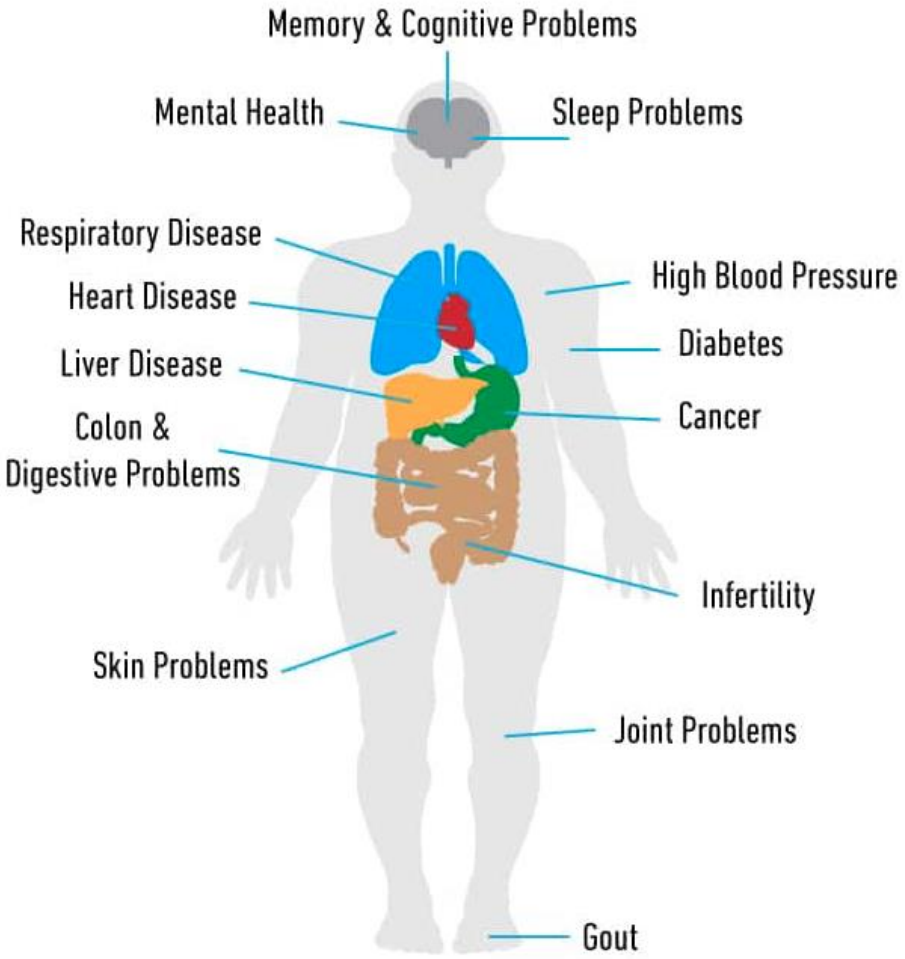
Say whether these statements are true or false

1. Roughly a 1/2 of people with T2D are clinically obese.
2. The rate of obesity in T1D is similar to the general population
3. Obesity is believed to cause about 50 diseases.
4. The weight that someone is 50% determined by genes.
5. There are genes that cause weight gain that protect against diseases such as diabetes.
6. The recommended way of determining if some one is clinically obese is to measure their BMI.

Obesity in T2D and T1D

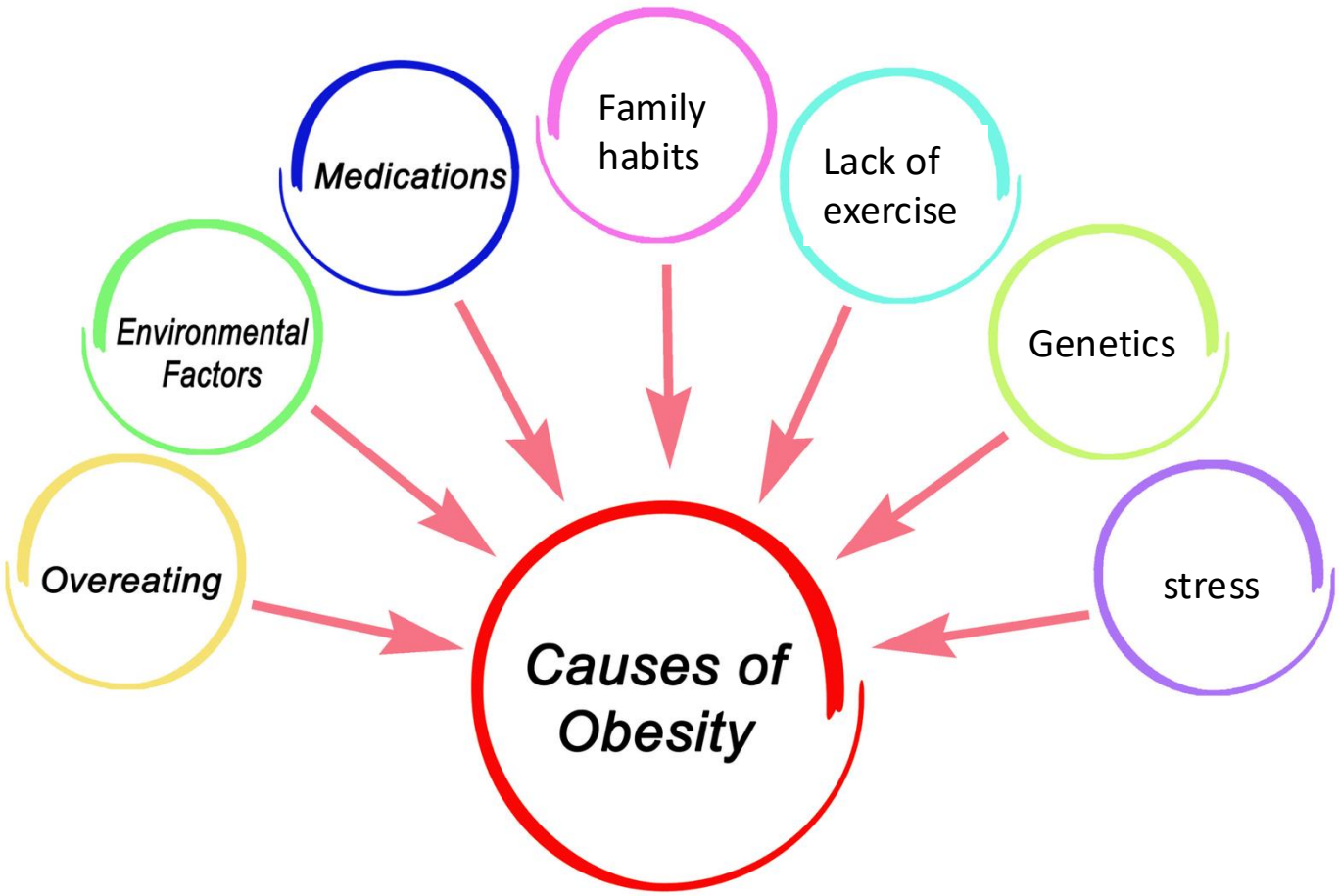
Diabetes Type	Overweight/Obese (%)	Obese (%)
Type 2 Diabetes	~90%	~52%
Type 1 Diabetes	~60%	~22-28%
General UK Population	~64.5%	~26.5%

Consequences of obesity

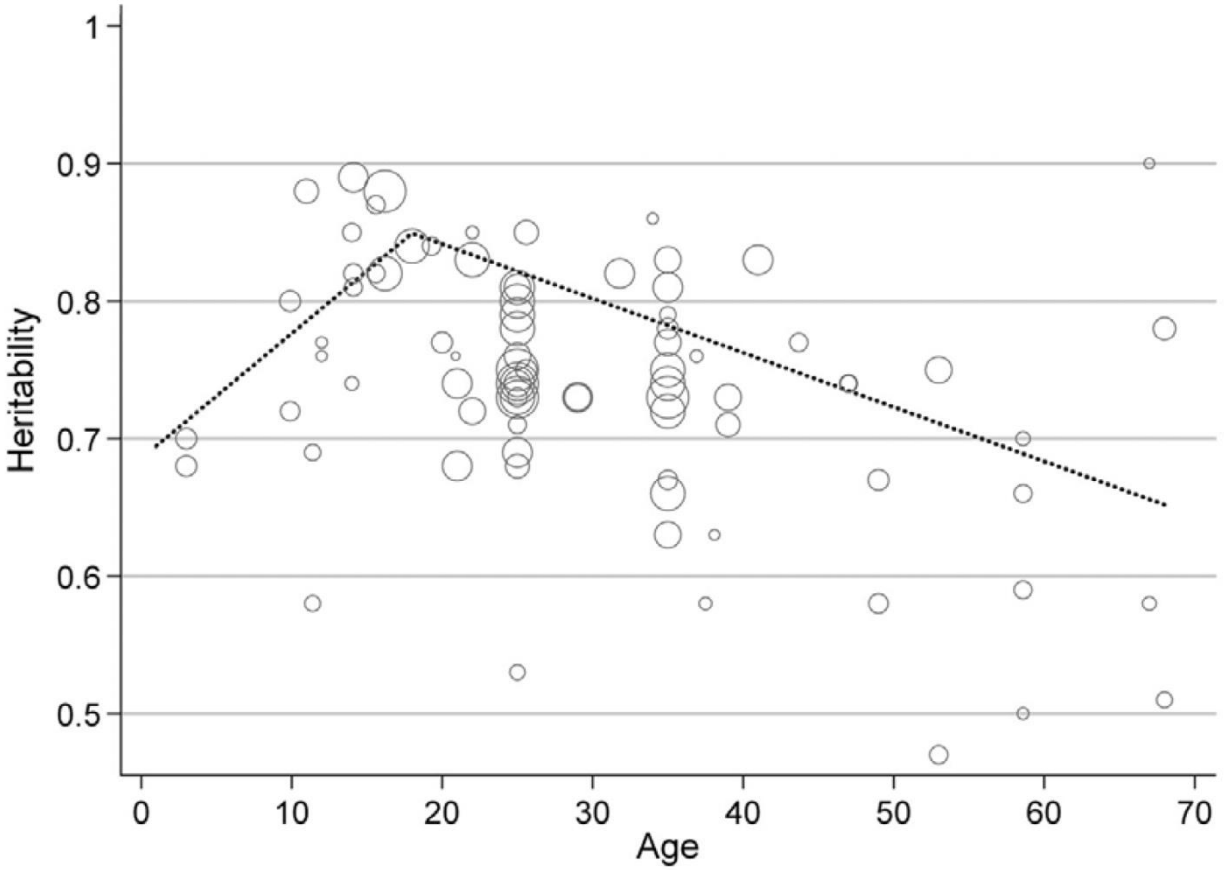


Obesity is thought to cause over 200 diseases

Causes of obesity - 1

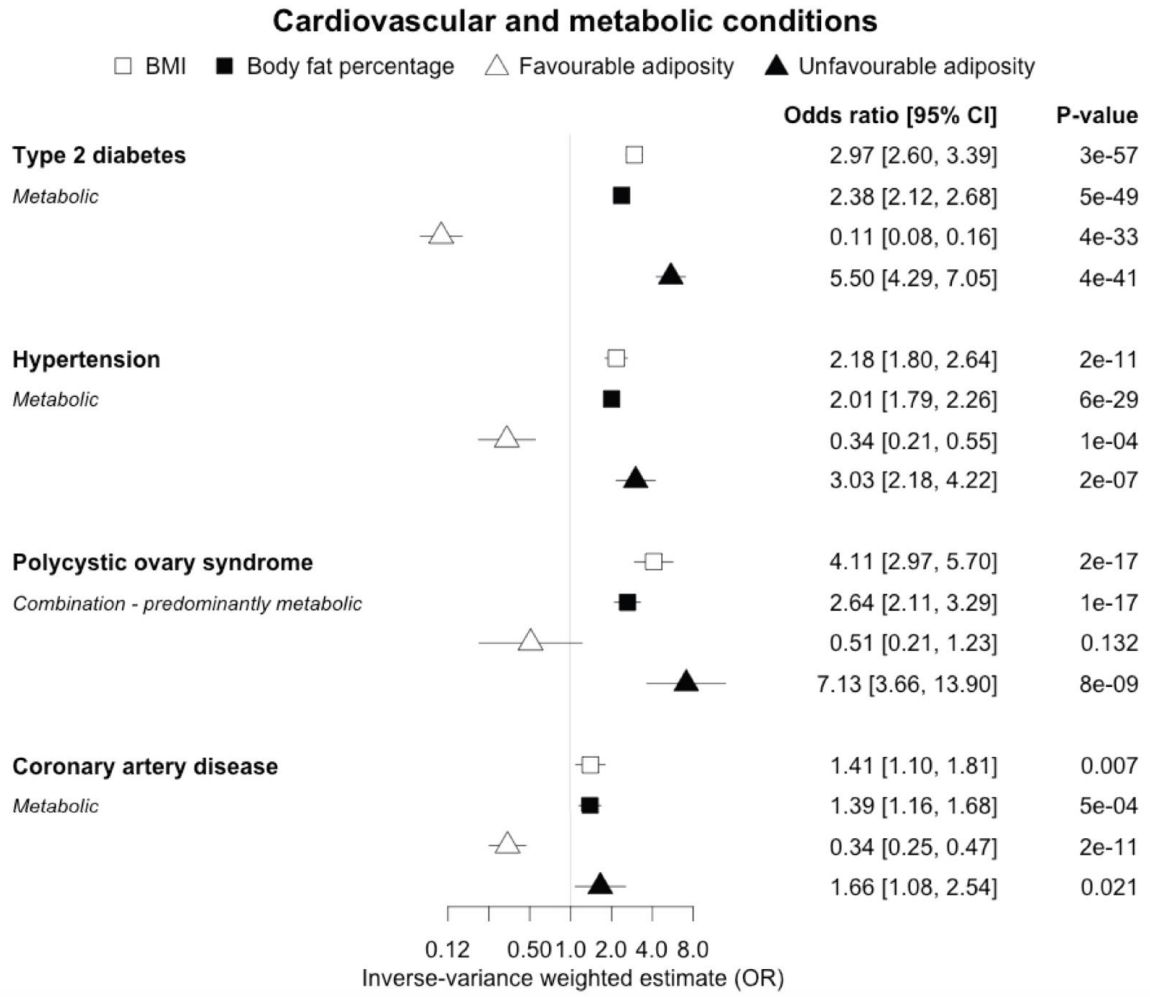


Causes of obesity - 2



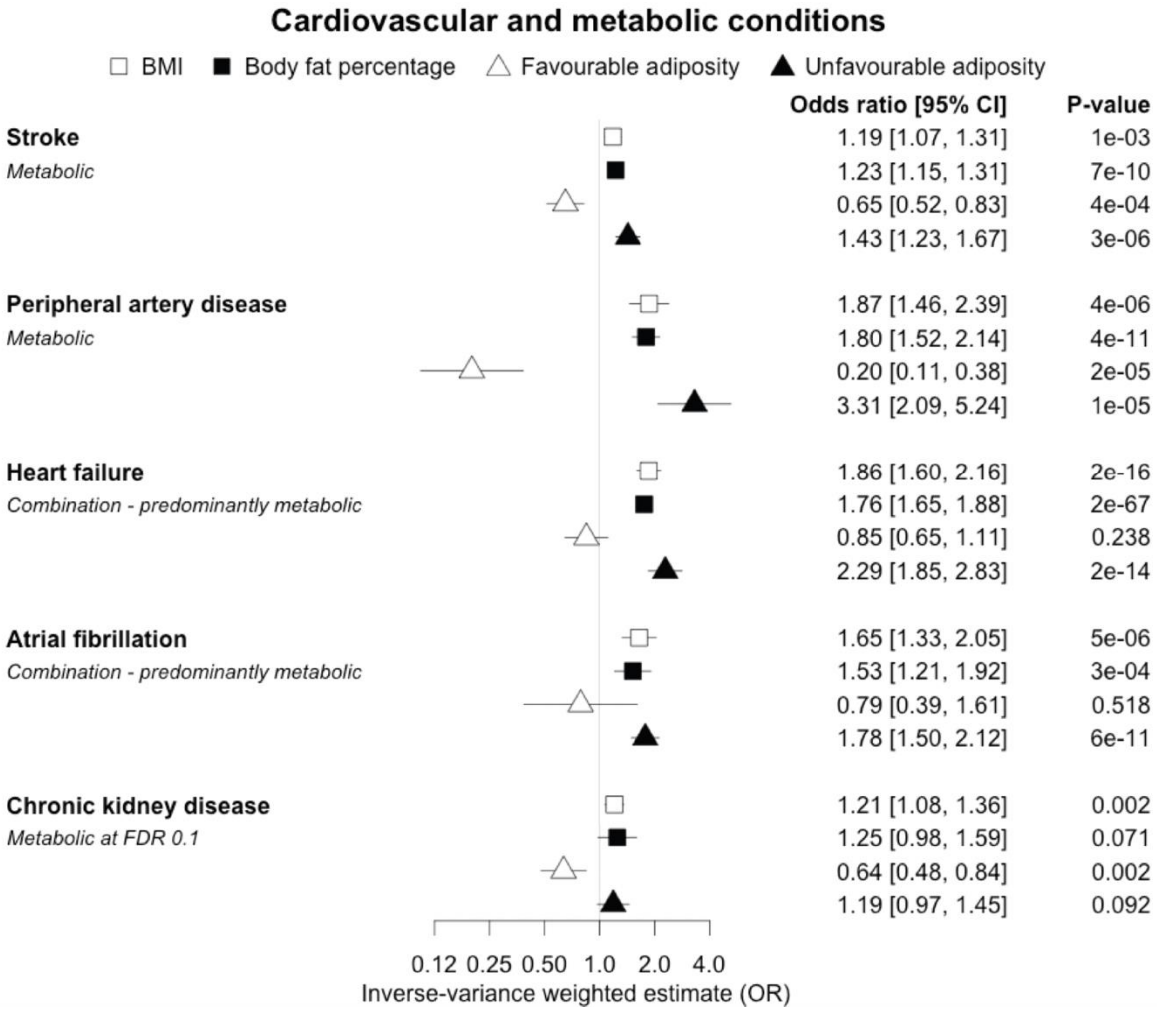
Elks CE et al. (2012). *Front Endocrinol*

Favourable and unfavourable weight gain



Martin *et al*. eLife 2022;11:e72452

Favourable and unfavourable weight gain



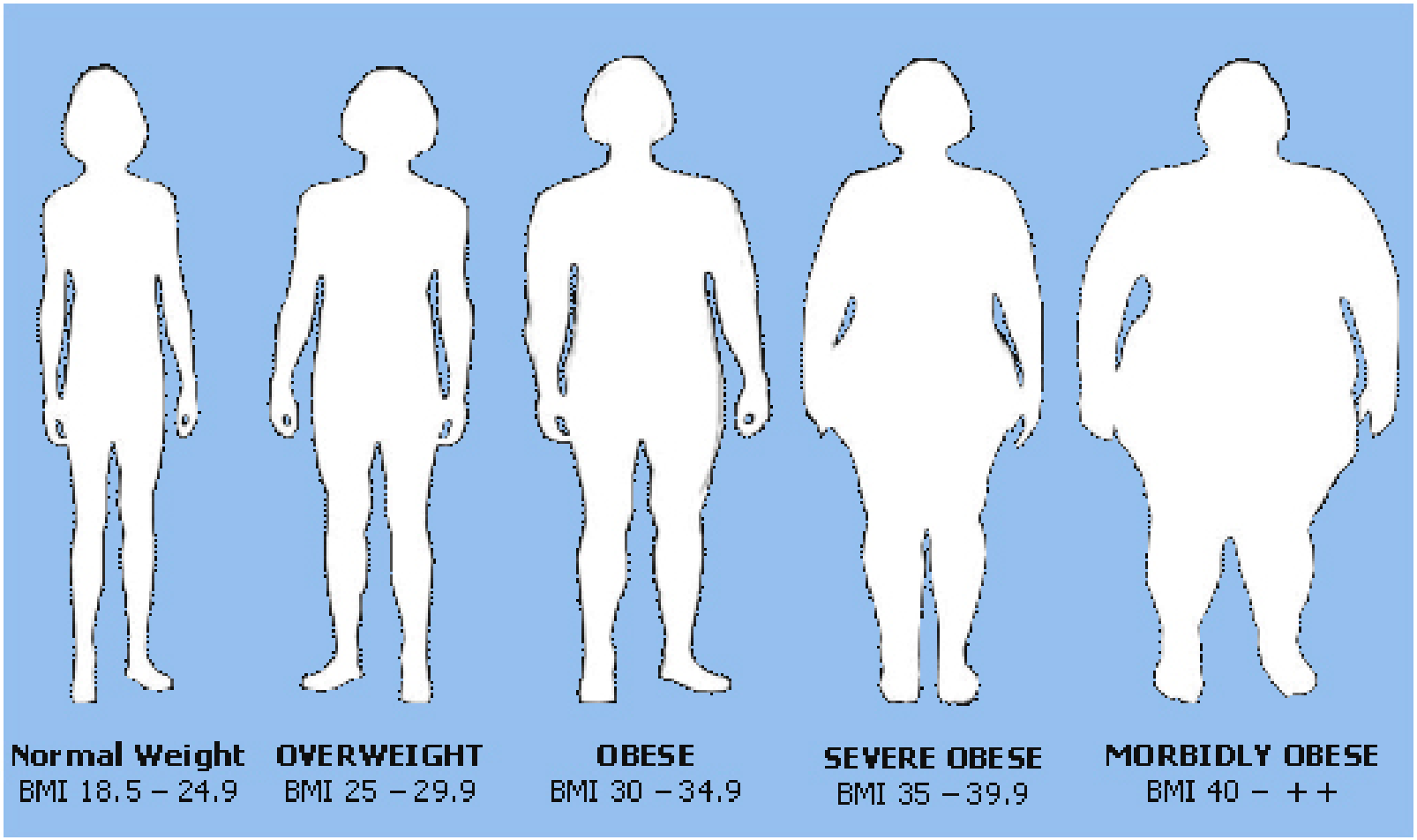
Martin *et al*. eLife 2022;11:e72452

Human Obesity – A definition

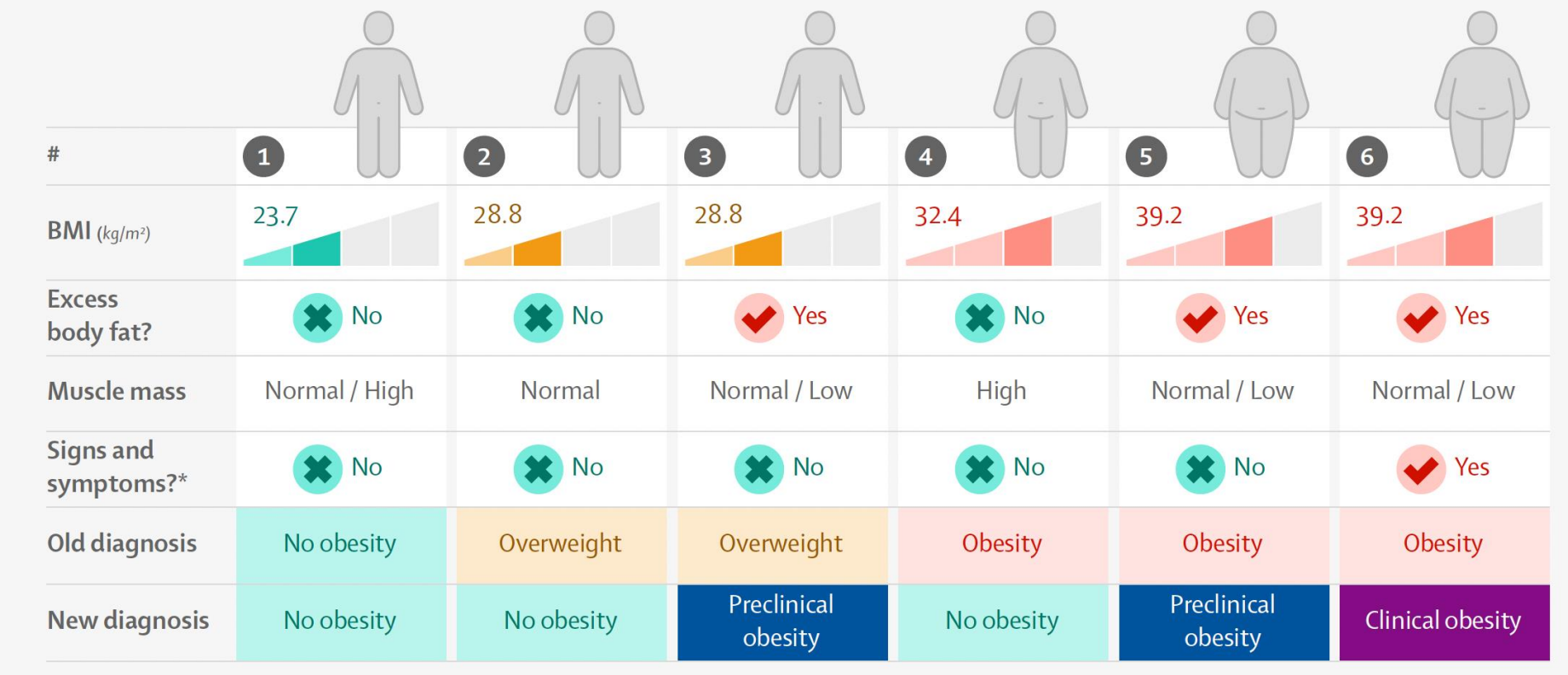
"A heritable (biological) neuro-behavioural disorder that is highly sensitive to (our toxic) environmental conditions"

O'Rahilly & Farooqi 2008

Old way of defining obesity - BMI



New diagnostic method



#	1	2	3	4	5	6
BMI (kg/m²)	23.7	28.8	28.8	32.4	39.2	39.2
Excess body fat?	✖ No	✖ No	✔ Yes	✖ No	✔ Yes	✔ Yes
Muscle mass	Normal / High	Normal	Normal / Low	High	Normal / Low	Normal / Low
Signs and symptoms?*	✖ No	✖ No	✖ No	✖ No	✖ No	✔ Yes
Old diagnosis	No obesity	Overweight	Overweight	Obesity	Obesity	Obesity
New diagnosis	No obesity	No obesity	Preclinical obesity	No obesity	Preclinical obesity	Clinical obesity

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www.thelancet.com/commissions/clinical-obesity

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Facts about obesity answers

Say whether these statements are true or false

1. Roughly a 1/2 of people with T2D are clinically obese. **True**
2. The rate of obesity in T1D is similar to the general population **True**
3. Obesity is believed to cause about 50 diseases. **False, 200**
4. The weight that someone is 50% determined by genes. **False, 70%**
5. There are genes that cause weight gain that protect against diseases such as diabetes. **True**
6. The recommended way of determining if some one is clinically obese is to measure their BMI. **False will dependent on fat and muscle mass and symptoms**

How to assess someone

How to assess someone questions -1

Say whether these statements are true or false

1. There are agreed philosophies as how to manage appointments when talking about weight.

2. A weight history is not helpful in determine cause of weight gain with more sophisticated tests needed.

3. Disorder eating is common and 10-15 % of people with obesity binge eat.

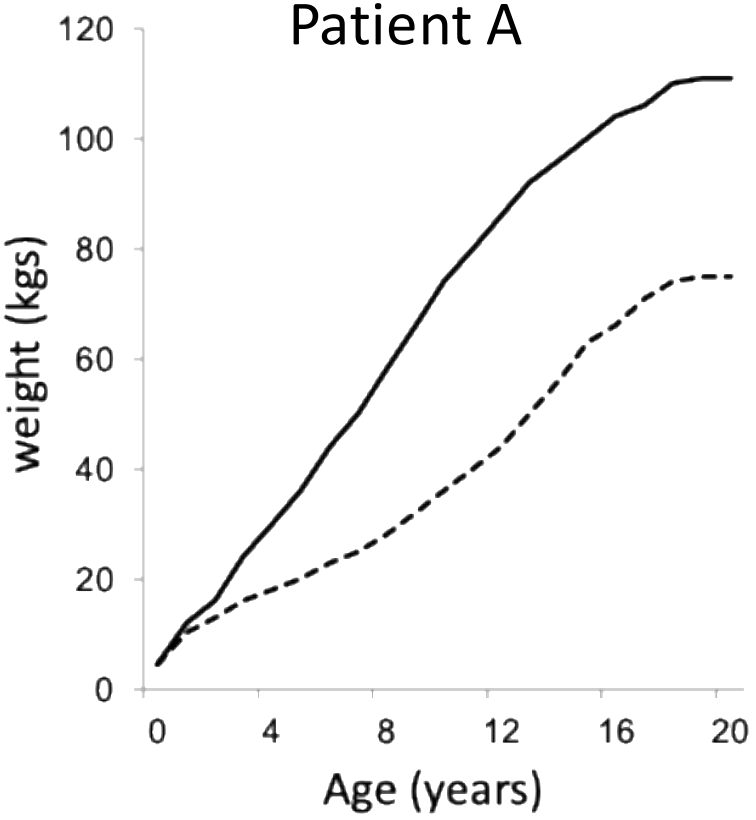
4. Identifying barriers to weight loss and medical problems helps determine what treatment will be offered.

5. When asked by patients you can tell them how much weight they can expect to lose with each treatment option.

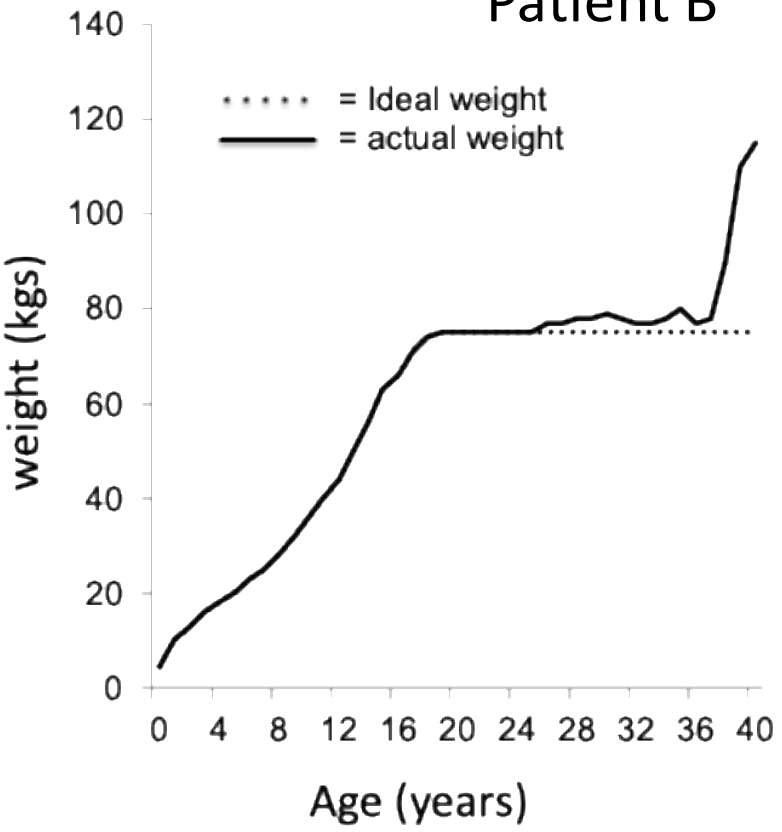
How to assess someone questions -2

What is the likely cause of the weight gain in each of these patients

Patient A



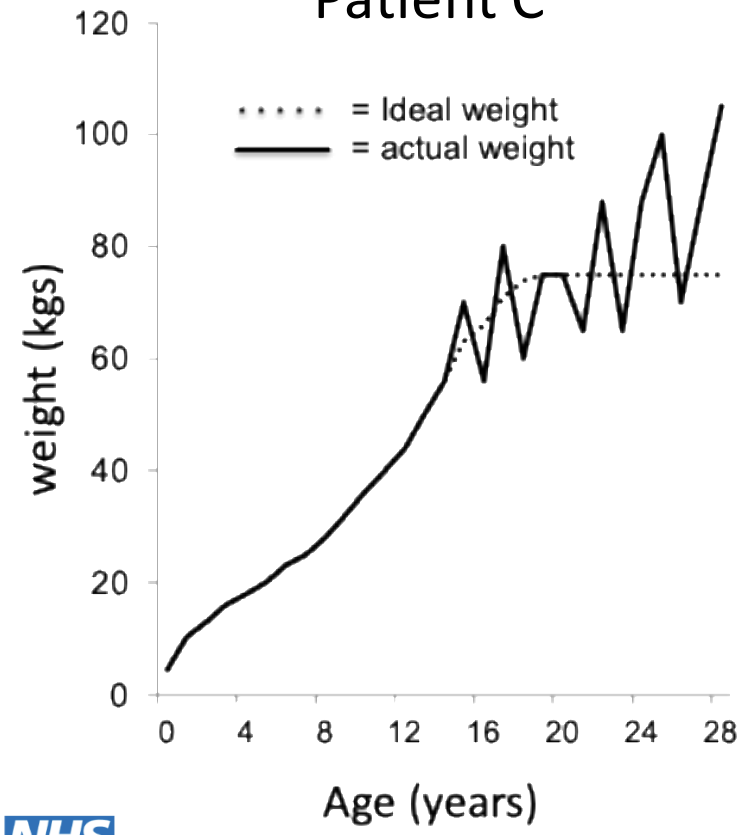
Patient B



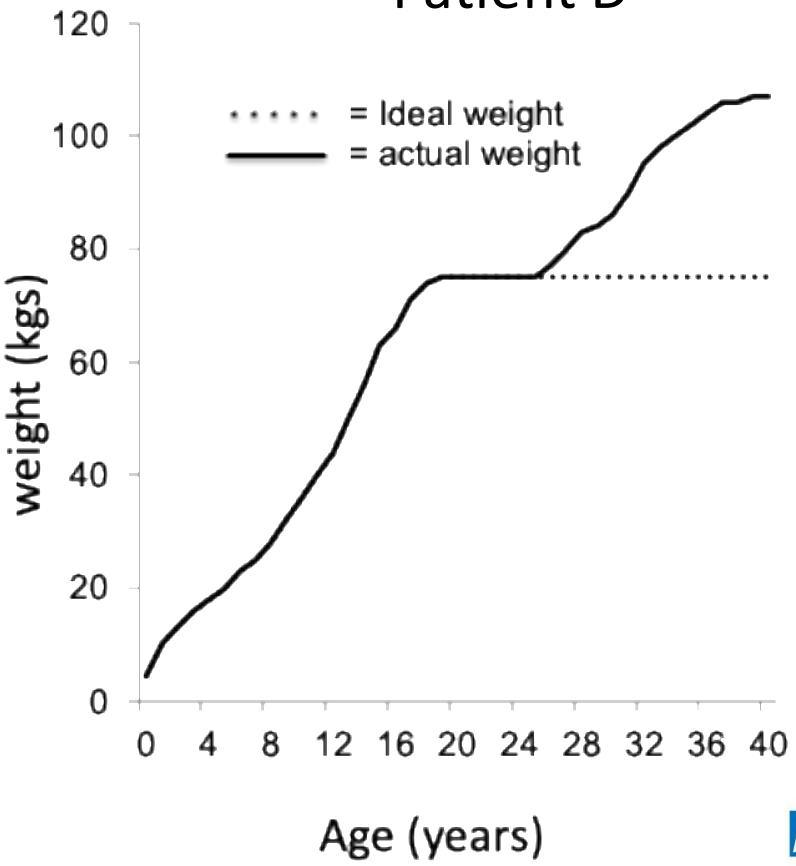
How to assess someone questions - 3

What is the likely cause of the weight gain in each of these patients

Patient C



Patient D

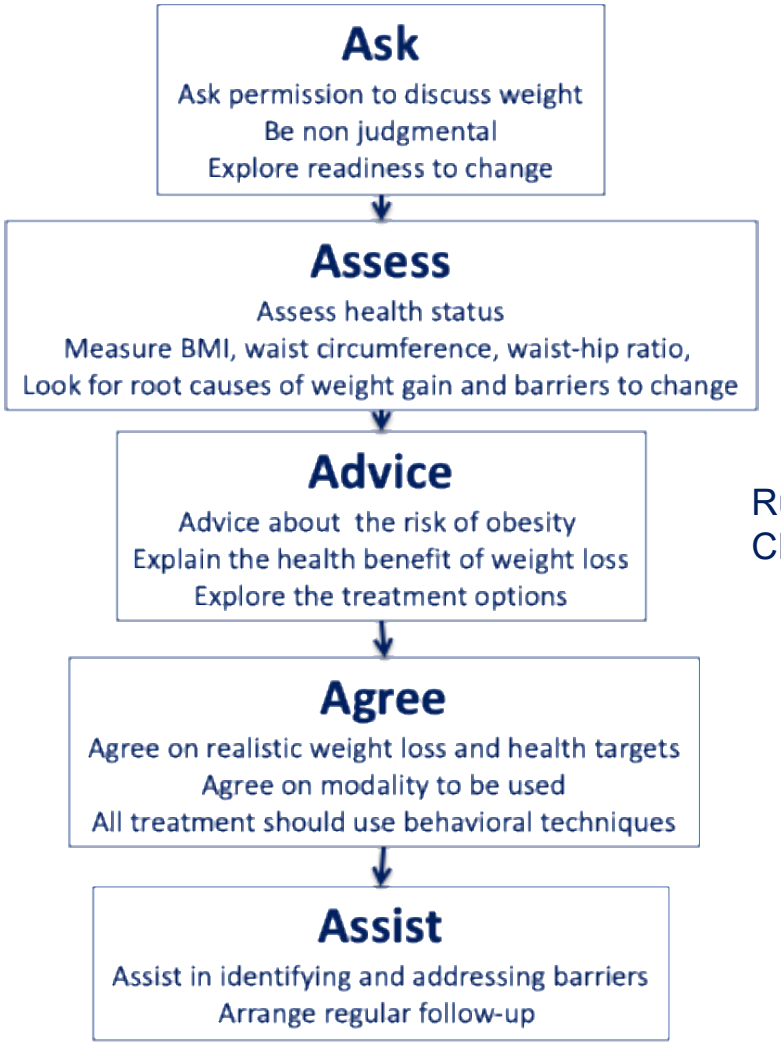


Expected weight loss - questions

Say whether these statements are true or false

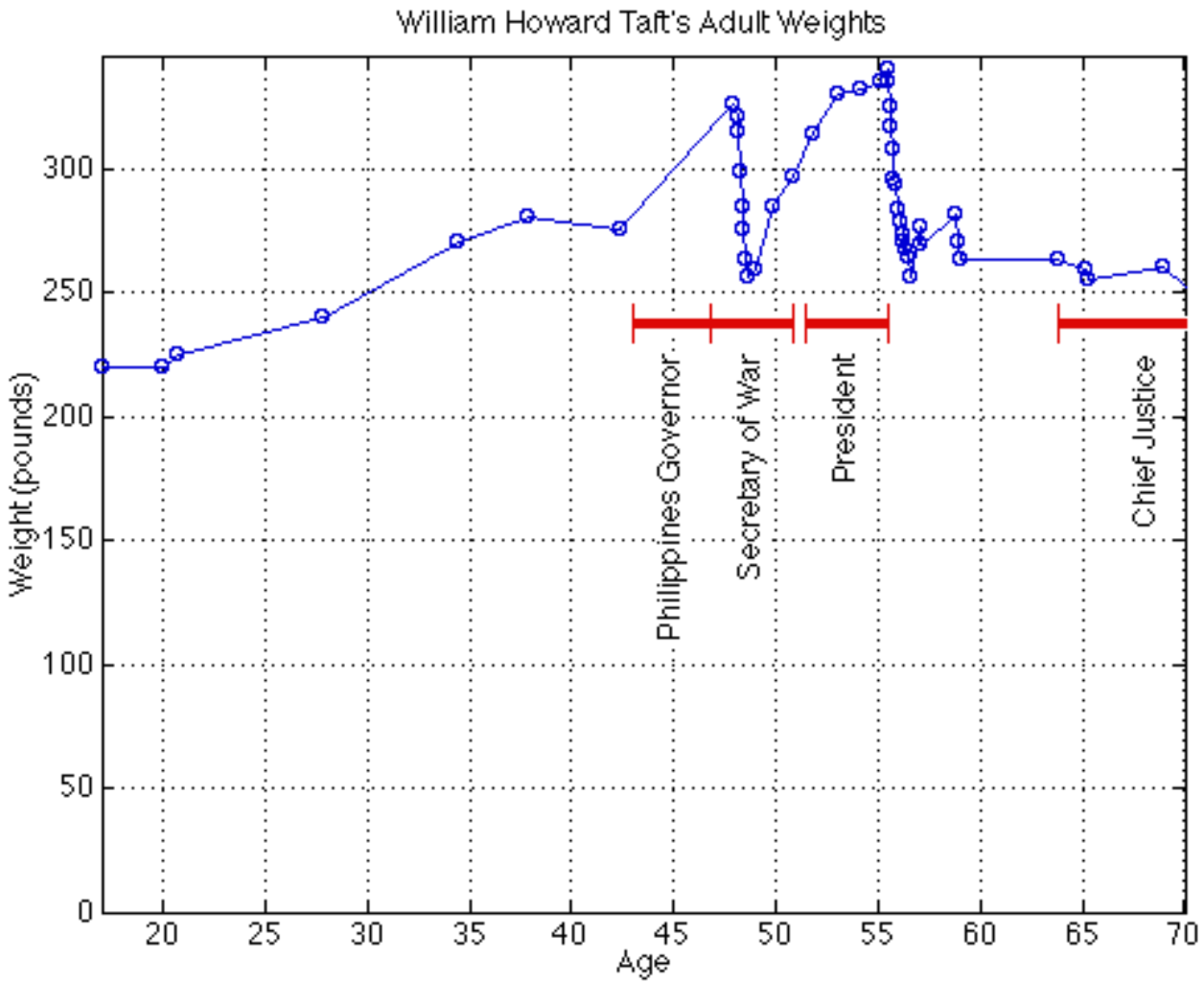
- Semaglutide (wegovy) causes a weight loss of 12-15% at 12 months.
- Tirzepatide causes a weight loss of 15—18% at 18 months.
- In the Uk at 3 years the weight loss with
  - Band is 20%.
  - Sleeve is 27%.
  - Bypass is 27%.

Philosophy (5 A's)



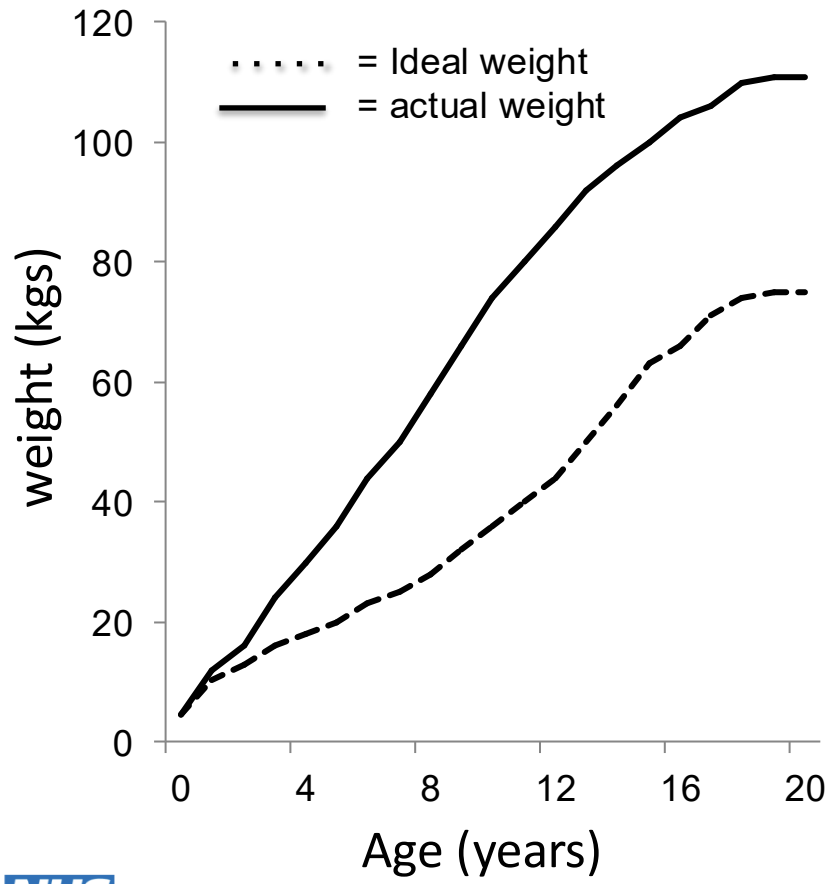
Rueda-Clausen CF et al.
Clin Obes. 2014 Feb;4(1):39-44

Weight history is the key



Patient A

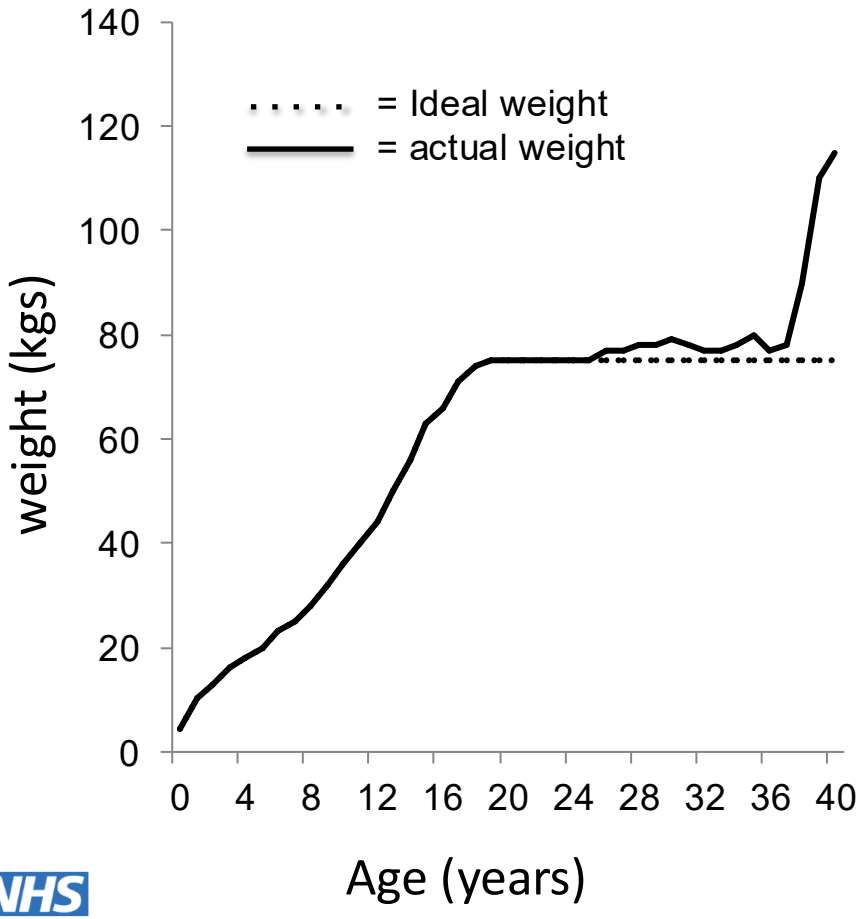
Genetic obesity



- An early onset of obesity (before age of 5)
- Hyperphagia
- Developmental delay
- short stature
- diarrhoea
- Very strong family history of obesity
- Low BP

Patient B

Hormonal could be cause or life event



Deficiency

Hypothyroidism – small effect

GH – small effect, other signs

Hypopit – small effect, other signs

Excessive production

Cortisol – rapid wt gain, other signs

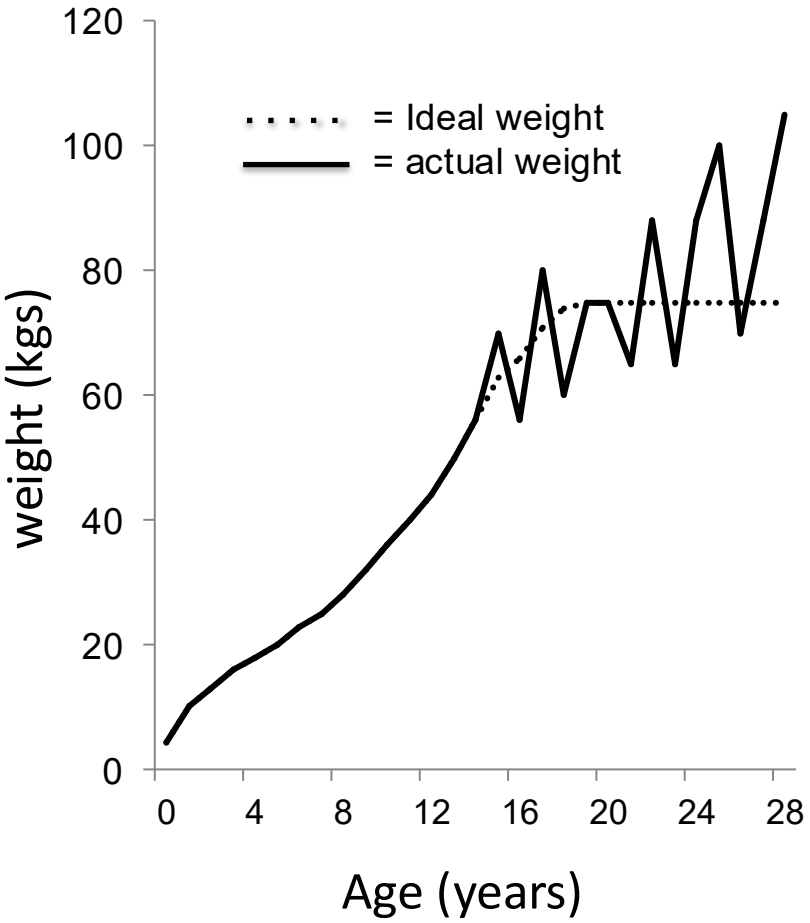
Affecting appetite

Craniopharyngioma

Prader Willi Syndrome

Inherited (genetic) causes

Patient C



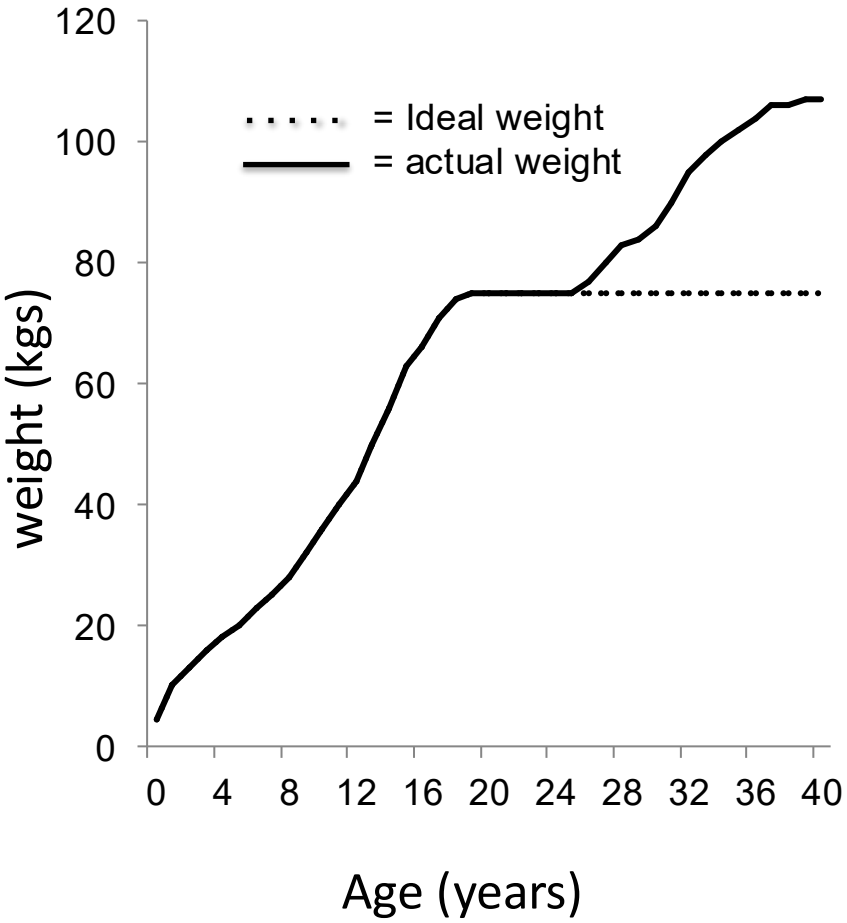
Eating disorders

- Anorexia
- Bing eating

Other causes

- Yo-yo dieting
- On and off GLP-1

Patient D



Gradual weight gain overtime

- Misjudgment as needs change
- Life event

Spectrum of eating behaviours

Intuitive eating

Disordered eating behaviours

Intuitive eating

- Eats when hungry
- Eats intentionally and with purpose
- Stops eating when satisfied/ full
- Positive body image
- Includes a variety of healthy foods
- Eats a range of different foods, Including indulgences at times

Disordered eating

- Restricts intake to control weight/shape
- Unresponsive to hunger/ fullness cues
- Uses food to manage emotions or environment
- Compulsive eating and/or overeating
- Limited or inflexible food intake
- Firm dietary rules

Eating disorders

- Anorexia nervosa (well under 1% of adults with obesity in treatment settings)
- Bulimia nervosa (around 2–5% of adults with obesity in treatment settings)
- Binge eating disorder (around 10–15% of adults with obesity in treatment settings)
- Other eating disorders (together with anorexia nervosa, roughly 1–3% of adults with obesity in

Reasons for treating eating disorders first before trying to lose weight

EDs reduce capacity to follow healthy weight-management

When someone is preoccupied with food, has compulsive bingeing, purging or rigid restriction, they are less able to engage wth the behavloural skills that make weight-loss programmes safe and effective (regular meal patterns, hunger/fullness awareness, bala-nced intake)

Dieting can trigger or worsen ED behaviours in vulnerable people

Multiple reviews and classic models show that dietary restriction is a common trigg-ger for bingeing and some ED syndromes; while dieting is not the sole cause, it can “activate” ED symptoms in vulnerable ind-ividuals. That risk is why clinicians screen for disordered eating before recommending dieting

Clinical guidelines and specialty organisations recommend ED-first approaches or careful coordination

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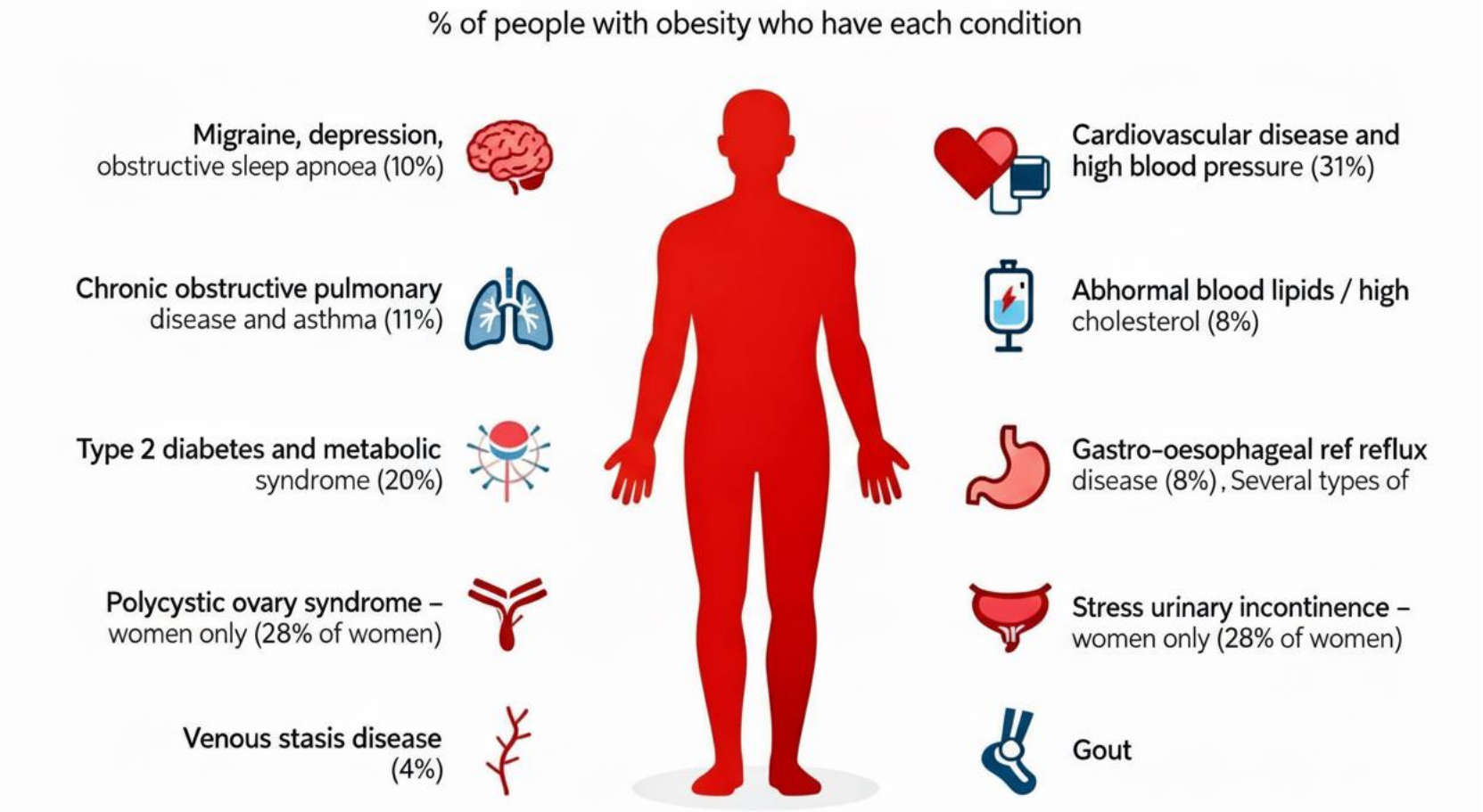
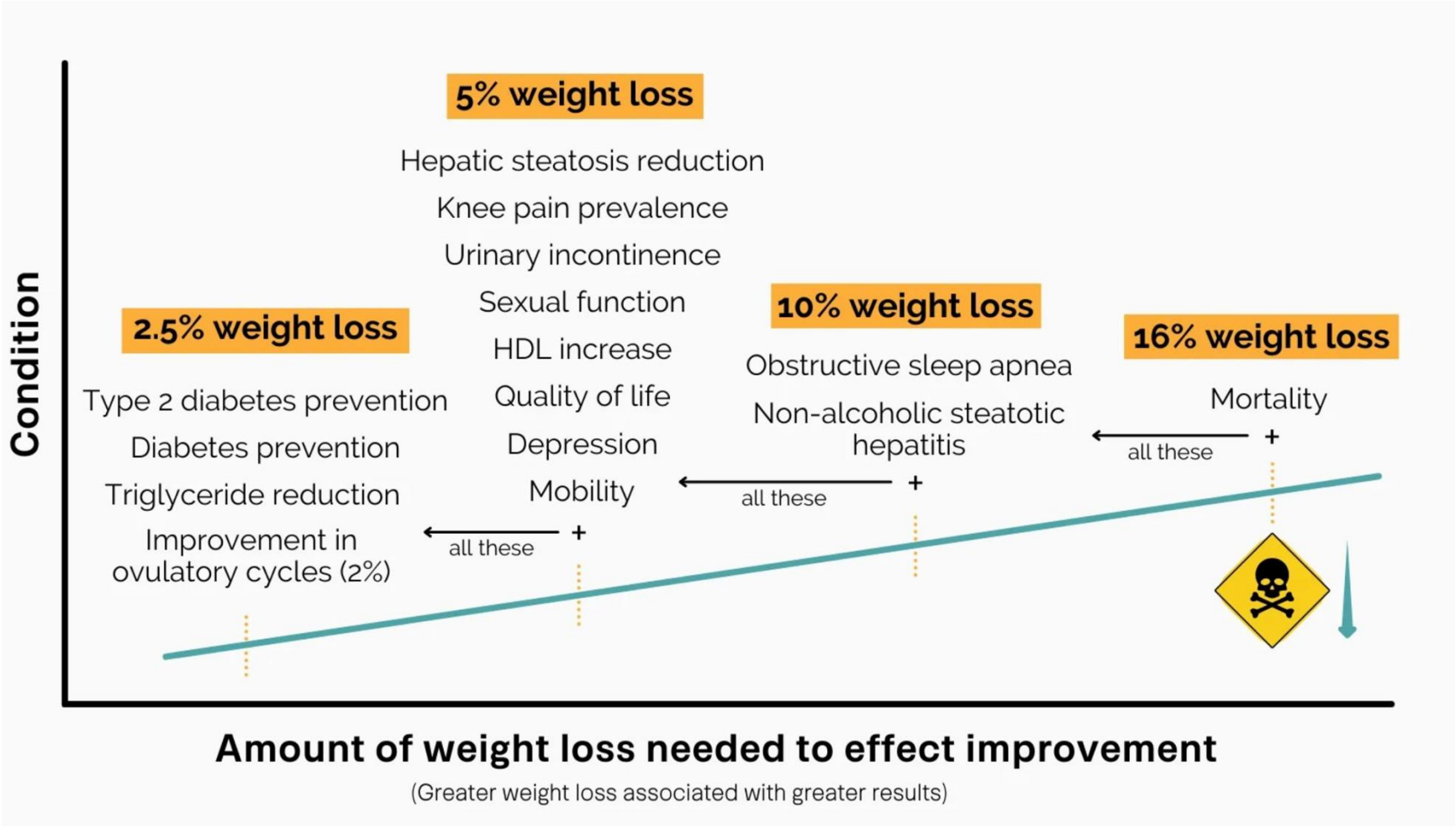
Step 3 – identify the co-morbidities



Explain effect of different weight loss on co-morbidities



Do not create false hope syndrome

- The amount of weight loss that can be achieved (and maintained!)
- The speed with which the weight can be lost
- The ease with which lifestyle changes can be made
- The effects that weight loss will have on other aspects of life

As this will increase sense of failure

How to assess someone answers -1

Say whether these statements are true or false

1. There are agreed philosophies as how to manage appointments when talking about weight. **True**

2. A weight history is not helpful in determine cause of weight gain with more sophisticated tests needed. **False – very helpful**

3. Disorder eating is common and 10-15 % of people with obesity binge eat. **True**

4. Identifying barriers to weight loss and medical problems helps determine what treatment will be offered. **True**

5. When asked by patients you can tell them how much weight they can expect to lose with each treatment option. **See next answers to see if true or false**

Expected weight loss - answers

Say whether these statements are true or false

- Semaglutide (wegovy) causes a weight loss of 12-15% at 12 months. False – about 11% - Link here
- Tirzepatide causes a weight loss of 15—18% at 18 months. True Link here
- In the UK at 3 years the weight loss with
  - Band is 20%. False – about 14% - Link here
  - Sleeve is 27%. False – about 19% - Link here
  - Bypass is 27%. True - Link here

Diet, exercise and remission

Diet, Exercise & Remission (T or F)

1. Low-carbohydrate or ketogenic diets are not recommended in people with Type 1 diabetes.

2. Exercise alone usually leads to significant weight loss.

3. Type 2 diabetes remission is only achievable with bariatric surgery.

4. Diet composition is more important than adherence.

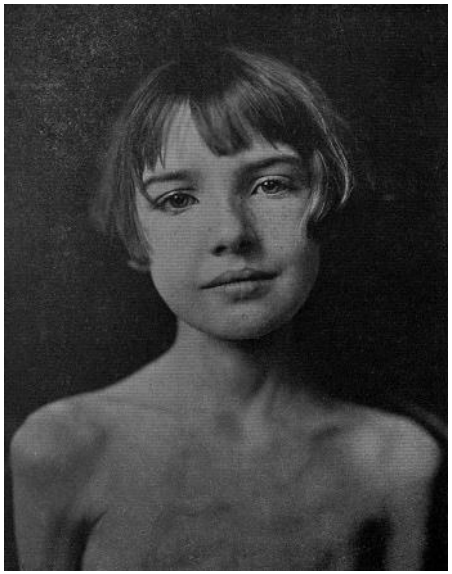
5. People with Type 1 diabetes cannot safely lose weight.

Why weight matters in diabetes

- Obesity is a disease modifier rather than a simple comorbidity
- Excess adiposity worsens insulin resistance and glycaemic variability
- **Increased Cardiovascular, renal, and hepatic risks with weight**
- Impact differs significantly between Type 1 and Type 2 diabetes

The good old days

Type 1 diabetes



Type 2 diabetes

Nowadays…

Type 1 and Type 2 diabetes: key distinctions

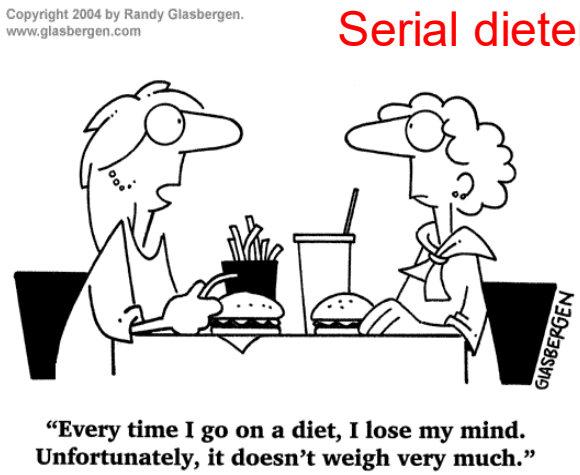
- Type 2 diabetes is commonly obesity-driven and potentially reversible
- Type 1 diabetes is not caused by obesity but is adversely affected by it
- Obesity in Type 1 diabetes increases insulin resistance and CV risk
- Double diabetes is increasingly prevalent in UK clinical practice

Some healthcare professionals' view on weight loss

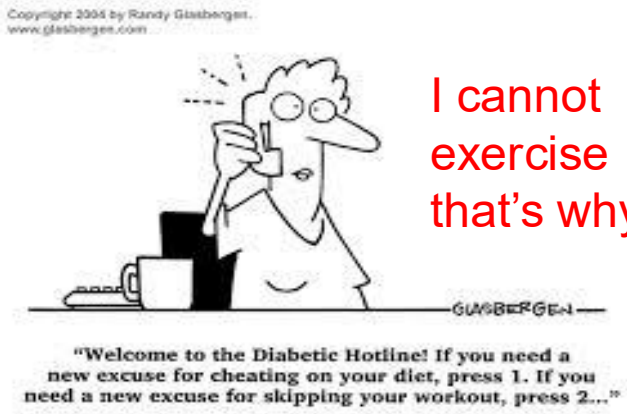
+

'Eat less move more' is just too simplified – often does not work in patient with morbid morbidities

Who is ready for weight loss?



Serial dieters..

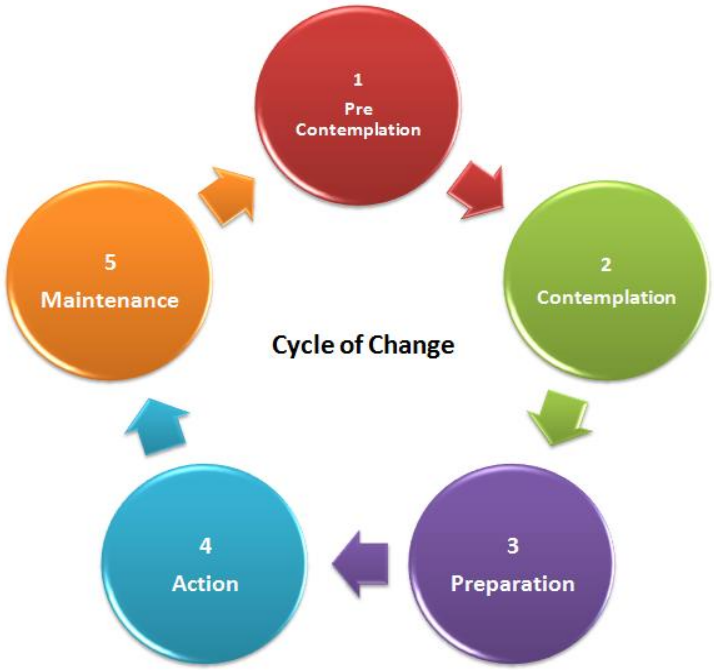


I cannot exercise that's why..

- Patient expectation
- Patient suitability
- Treatments selections
  - Lifestyle changes
  - Medical
  - Surgery

Understand your patients

- Are your patients ready for weight loss?
- What are their reasons? Weight vs DM vs cosmetic etc
- Are they suitable for lifestyle, medial or surgery? Medical vs Psychological
- Managing expectations
- Informed decision
- NICE guideline
- Local guideline



Dietary approaches – what actually works

- **Understand your patients**
- Calorie deficit is the common denominator
- Multiple effective eating patterns:
  - Low-energy / total diet replacement
  - Mediterranean-style
  - Lower-carbohydrate approaches
  - Time restricted eating
- Adherence --> Health goals
- (Not Macronutrient ideology)

Dietary intervention: essentials

- Energy deficit aligned with clinical and patient goals
- Adequate protein intake to preserve lean mass
- High fibre and low glycaemic load carbohydrate choices
- Avoidance of rigid macronutrient ideology
- Emphasis on eating patterns rather than prescriptive rules
- Structured medical nutrition therapy rather than generic advice
- Individualised, culturally appropriate, and sustainable
- Focused on metabolic and cardiovascular health
- Delivered within a multidisciplinary diabetes &/or obesity services

Lifestyle modifications are essential

Portion control

Keep active to **maintain** weight loss

Learning from existing studies

Better weight loss from*:

- Group sessions
- At regular and fixed meeting times – regular support
- More experienced facilitators

Which diet is better^

- Calories reduction is the only thing that matters

Calorie control – weight loss

Exercise – maintaining weight loss

*Comparison of range of commercial or primary care led weight reduction programmes with minimal intervention control for weight loss in obesity: Lighten Up randomised controlled trial. BMJ 2011 Nov;343:d6500
^Lifestyle Modification for Obesity: New Developments in Diet, Physical Activity, and Behavior Therapy. Circulation. 2012 Mar 6;125(9):1157-70

Benefits of Lifestyle intervention in T2D

- 5 to 10% weight loss improves glycaemia & comorbidities
- Greater weight loss reduces medication burden
- Substantial weight loss may induce remission in selected patients
- Weight loss often enables treatment de-escalation
- Earlier intervention aligns with NICE and UK evidence

Benefits (& caution):Lifestyle intervention in T1D

- Weight loss does not reverse diabetes but improves insulin sensitivity
- Total daily insulin dose commonly reduces
- Cardiovascular risk profile improves with sustained weight loss
- Insulin adjustment is essential to minimise hypoglycaemia

Caution:

- higher hypoglycaemia risk with calorie restriction

What's available (various nationally)

Councils run Tier 2 weight management programme (dietitian, health coach, exercise trainer etc) BMI<40

NHS Type 2 Diabetes Path to Remission Programme; Commercial run – weight watchers, slimmer world etc

Tier 3 MDT: dietetic vs medial (medical, dietitian, psychologist, CNS) for BMI >35+comorbidities or BMI>40

Exercise in diabetes: why it matters

- Exercise improves insulin sensitivity independent of weight loss
- Skeletal muscle is a major glucose disposal organ
- Cardiovascular and renal risk reduction occurs independent of HbA1c
- Benefits apply to both Type 1 and Type 2 diabetes

Type 1 diabetes – key differences

Weight gain common with intensive insulin therapy

Structured weight loss is possible but more complex

Risks:

- Hypoglycaemia
- Disordered eating
- Ketosis with extreme dietary restriction

Useful links for exercise support

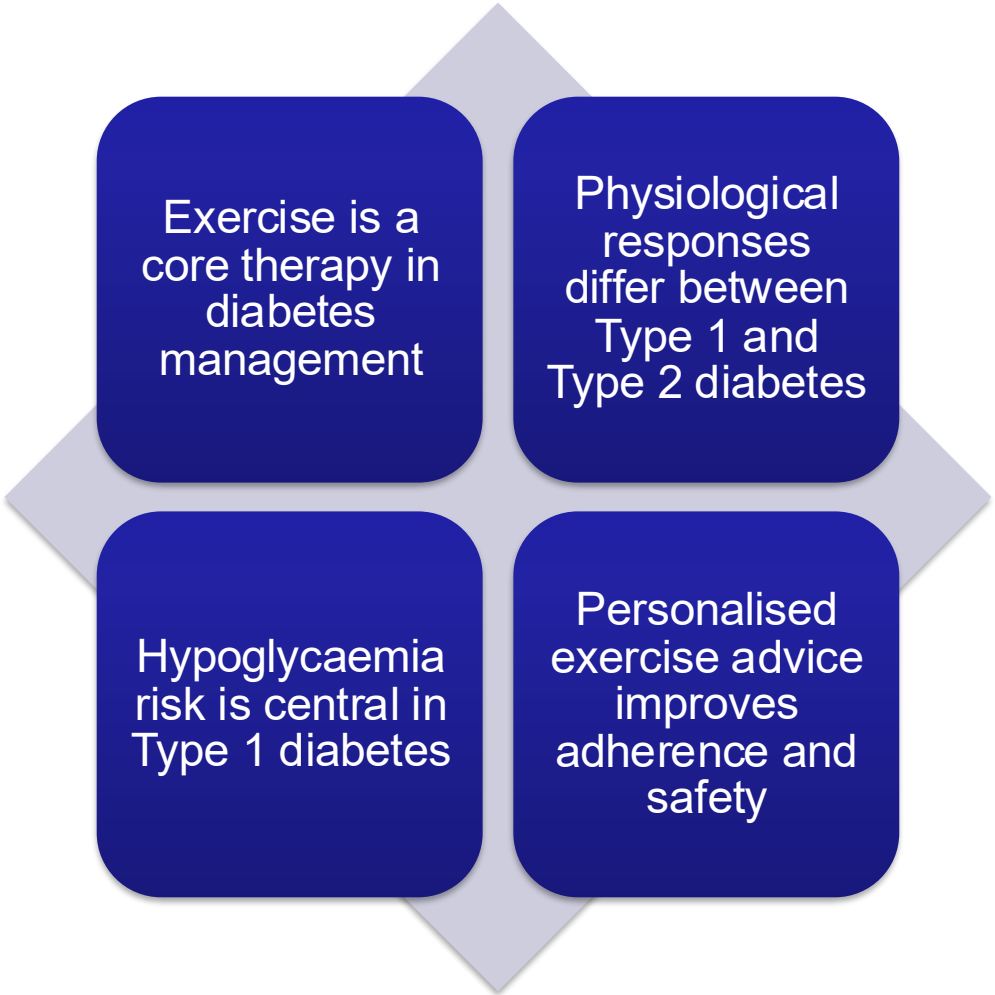
👉 EXTOD (Exercise for Type 1 Diabetes) – Patient advice

- Practical patient-oriented guidance referenced by DTN-UK education programmes.
  https://extod.org/patient-advice

👉 Breakthrough T1D – Exercise and Type 1 diabetes support

- Practical tips on adjusting insulin, choosing activity types, and glucose monitoring.
  https://breakthrought1d.org/t1d-resources/exercise/

Key take-home messages on exercise



Diet, Exercise & Remission

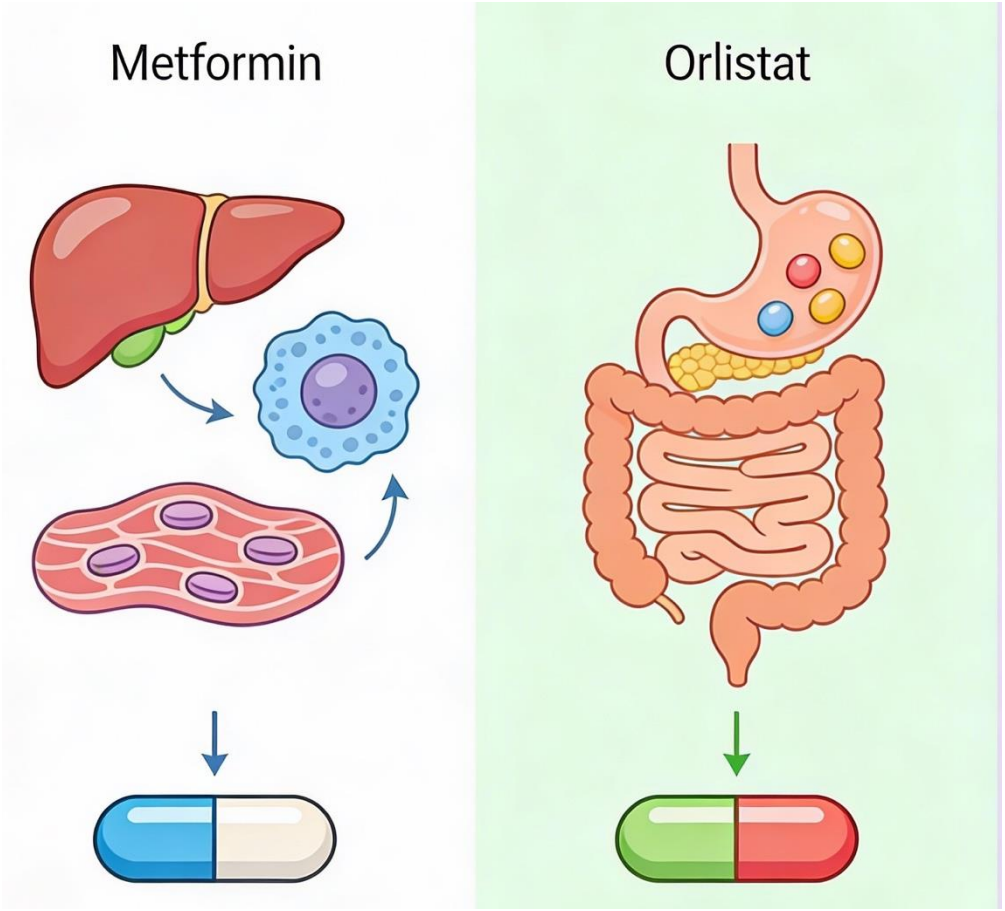
1. **"Low-carbohydrate or ketogenic diets are generally unsafe in people with Type 1 diabetes".→ False**
   Key discussion: Not universally unsafe, but higher risk; requires specialist input and careful insulin adjustment.
2. **"Exercise alone usually leads to clinically significant weight loss." → False**
   Key discussion: Exercise is vital for health and maintenance, but diet drives weight loss.
3. **"Type 2 diabetes remission is only achievable with bariatric surgery."→ False**
   Key discussion: Diet-induced weight loss can achieve remission, especially early disease.
4. **"The most important predictor of dietary success is the specific macronutrient composition."→ False**
   Key discussion: Adherence and sustainability matter more than diet type.
5. **"People with Type 1 diabetes cannot safely lose weight."→ False**
   Key discussion: Weight loss is possible but requires careful planning and monitoring.

Medication

Weight loss medication

"This is one of those new miracle drugs.
If you can afford it, it's a miracle."

Old weight loss drugs



Metformin questions

Say whether these statements are true or false

1. The average weight loss with metformin is 3-4 kg for T2D.
2. The average change in BMI is 0.7 kg/m^2 in T1D.
3. Metformin in people with T2D is the best drug for preventing death.
4. Metformin reduces weight gain by 3-4 kg in people started on or changes to different antipsychotic medication.
5. Metformin lowers the risk of cancer in people with T2D.
6. Metformin has no effect on risk of dementia in people with T2D.

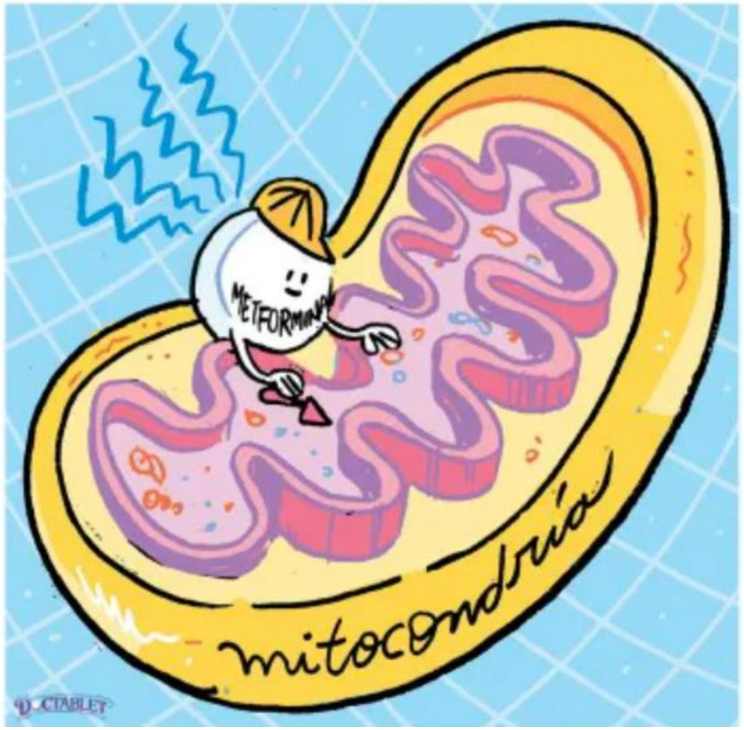
Orlistat questions

Say whether these statements are true or false

1. The average weight loss with orlistat is 3-4 kg in T2D.
2. The average weight loss with orlistat is 2-3 kg in T1D.
3. Weight loss at 12 weeks predicts weight loss at 1 and 2 years.
4. In studies only 2% of people are still on orlistat at 2 years.
5. Specific dietary advice can improve adherance.
6. Is safe to use if trying to become pregnant.

Metformin action

Reduces production of glucose from liver



Improves insulin sensitivity
Decreases inflammation
Enhances the release of GDF15

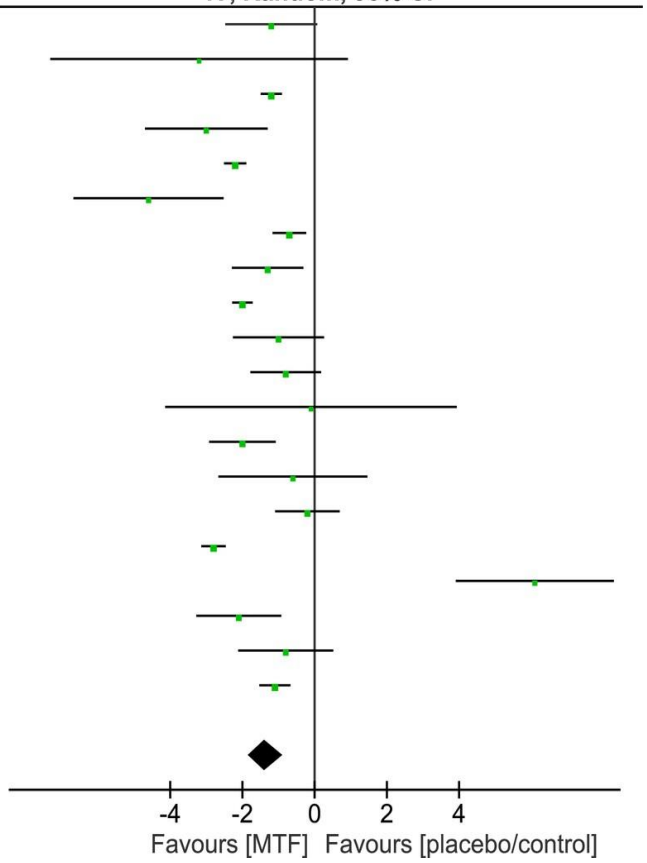
Nat Rev Endocrinol **19**, 460–476 (2023

Metformin - weight loss T2D

Study or Subgroup	MTF Mean	MTF SD	MTF Total	placebo/control Mean	placebo/control SD	placebo/control Total	Weight	Mean Difference IV, Random, 95% CI
Charles 1998	-2	6.2	164	-0.8	5.5	160	4.8%	-1.20 [-2.48, 0.08]
Davis 2018	-1.7	8.9	36	1.5	10	45	1.1%	-3.20 [-7.32, 0.92]
Fontbonne1996	-2	1.4	164	-0.8	1.3	160	7.3%	-1.20 [-1.49, -0.91]
Garinis 2010	-8	3.1	20	-5	2.6	25	3.7%	-3.00 [-4.70, -1.30]
Goodwin 2021 (NPJ)	-1.6	3.8	1394	0.6	4.7	1499	7.2%	-2.20 [-2.51, -1.89]
Haukeland 2009	-4.3	4.3	20	0.3	2.2	24	3.0%	-4.60 [-6.68, -2.52]
He 2012	-0.8	2.4	180	-0.1	2.1	180	7.0%	-0.70 [-1.17, -0.23]
Iqbal 2012	-1.4	3	85	-0.1	4	107	5.6%	-1.30 [-2.29, -0.31]
Knowler 2002	-2.1	2.2	1073	-0.1	4.2	1082	7.3%	-2.00 [-2.28, -1.72]
Kulkarni 2018	-2	2.7	30	-1	2.2	28	4.8%	-1.00 [-2.26, 0.26]
Lim 2009	-1	3.2	65	-0.2	2.7	79	5.6%	-0.80 [-1.78, 0.18]
Loves 2018	-12.4	4.5	12	-12.3	4.8	9	1.1%	-0.10 [-4.14, 3.94]
Meyerhardt 2019	-0.8	1.9	35	1.2	2	34	5.8%	-2.00 [-2.92, -1.08]
Mogul 2014	-4.7	3.1	14	-4.1	2.6	16	3.0%	-0.60 [-2.66, 1.46]
Ramachandran 2016	0.3	2.3	128	0.5	4.5	121	5.9%	-0.20 [-1.10, 0.70]
Schuster 2004	-1.4	1	45	1.4	0.8	81	7.2%	-2.80 [-3.14, -2.46]
Stakos 2005	2.2	3.4	59	-3.9	10.1	97	2.8%	6.10 [3.91, 8.29]
Torres 2009	-1.2	3.1	49	0.9	2.6	41	5.1%	-2.10 [-3.28, -0.92]
Walton 2019	-2.4	3.2	54	-1.6	3.8	55	4.7%	-0.80 [-2.12, 0.52]
Zhang 2009	-0.4	1.3	49	0.7	0.8	45	7.0%	-1.10 [-1.53, -0.67]
Total (95% CI)			**3676**			**3888**	**100.0%**	**-1.35 [-1.81, -0.88]**

Heterogeneity: Tau² = 0.75; Chi² = 170.39, df = 19 ($p < 0.00001$); I² = 89%

Test for overall effect: Z = 5.68 ($p < 0.00001$)

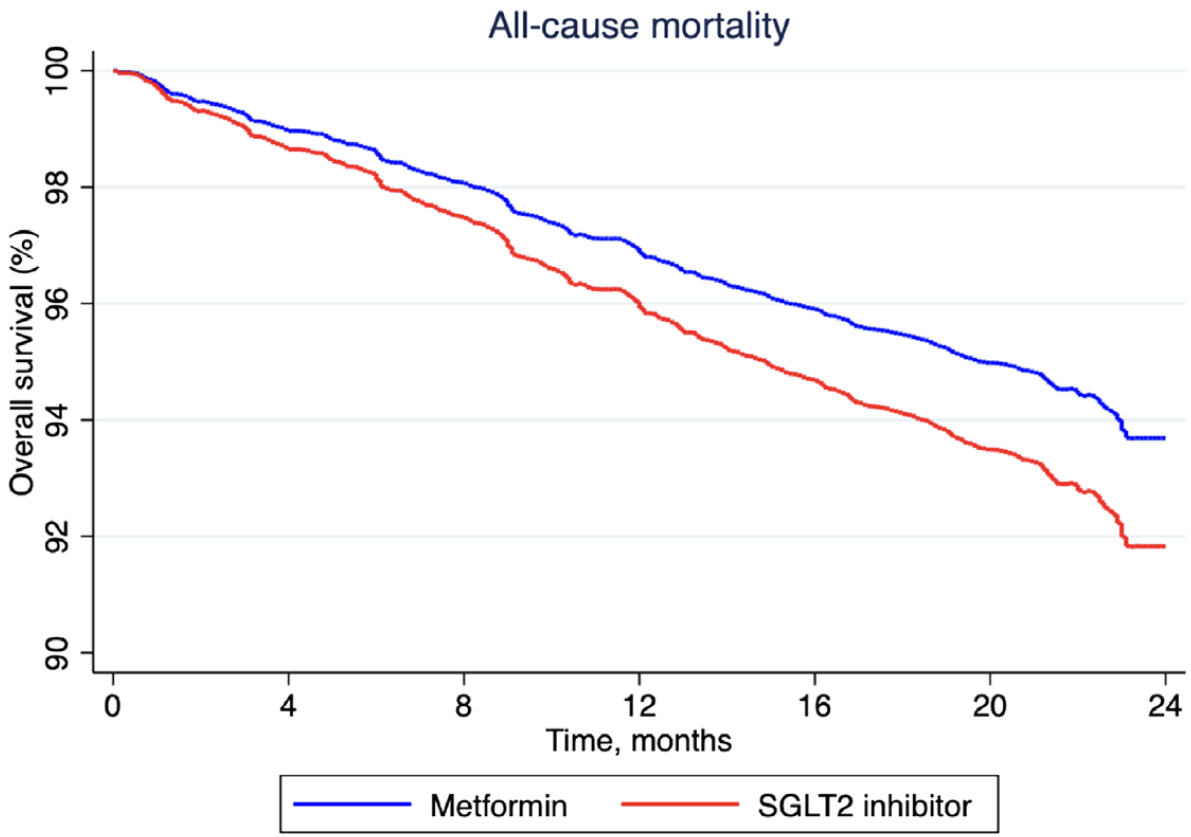


Metformin – weight loss T1D

29 placebo-controlled randomised controlled trials (RCTs) involving 2,051 T1D patients.

- **BMI reduction at 3 months**: −1.56 kg/m² (95% CI: −2.05, −1.08; p<0.001)
- **BMI reduction at 6 months**: −0.71 kg/m² (95% CI: −1.23, −0.19; p=0.01)
- **Total daily insulin dose (TIDD)**: −0.44 units/kg/day at 6 months (p<0.001)
- **HbA1c reduction**: −0.70% at 6 months (95% CI: −1.10, −0.30; p<0.001

Metformin – other benefits



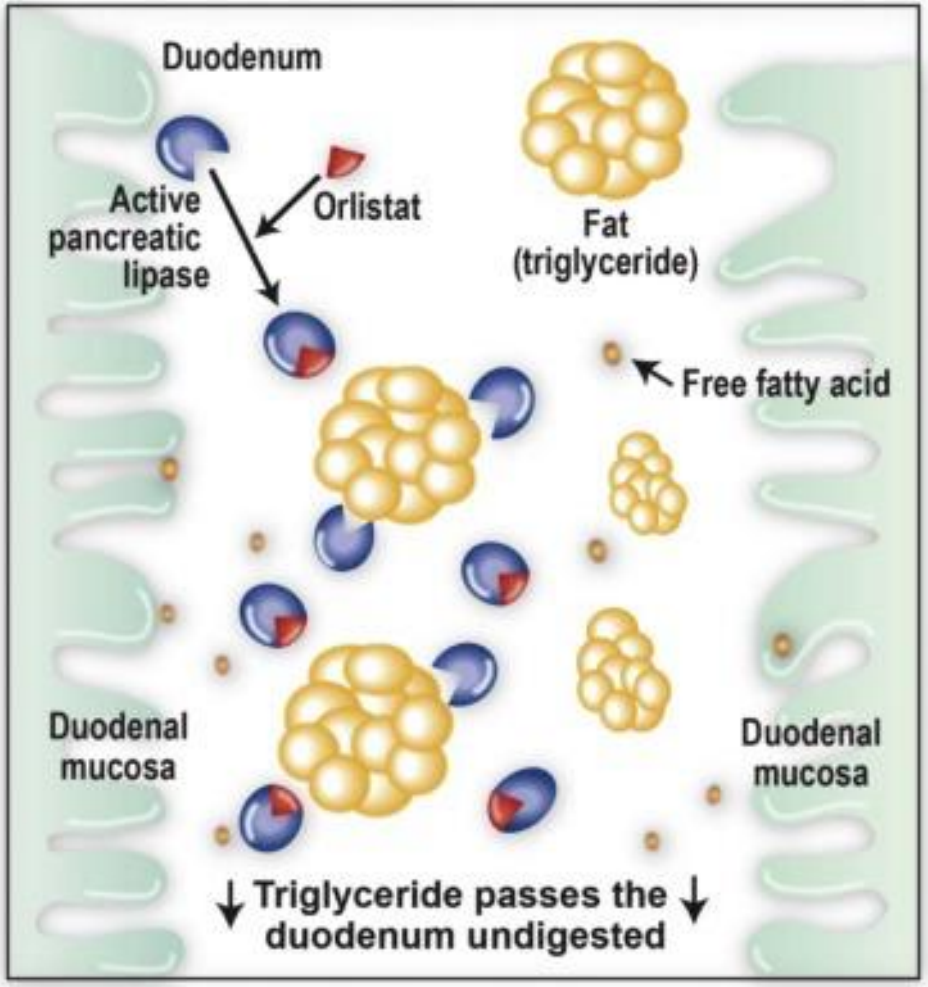
In people with T2DM is best drug for preventing death

Am J Cardiovasc Drugs **24**, 371–383 (2024).

Metformin – other benefits

- Reduces weight gain by 3-4 kg in people started on or changed to different antipsychotic medication (Ther Adv Psychopharmacol. 2024 May 30;14:20451253241255476).
- Helps improve menstrual regulation and fertility in people with PCOS (Diabetologia. 2017 Sep;60(9):1656-1661).
- Lowers the risk of cancer in persons with T2D. These include cancers of the breast, colon, and prostate (Care Diabetes. 2021 Feb;15(1):52-58).
- Lowers risks for dementia and stroke in people with T2D (J Alzheimers Dis. 2018;65(4):1225-1236.)

Orlistat - mechanism



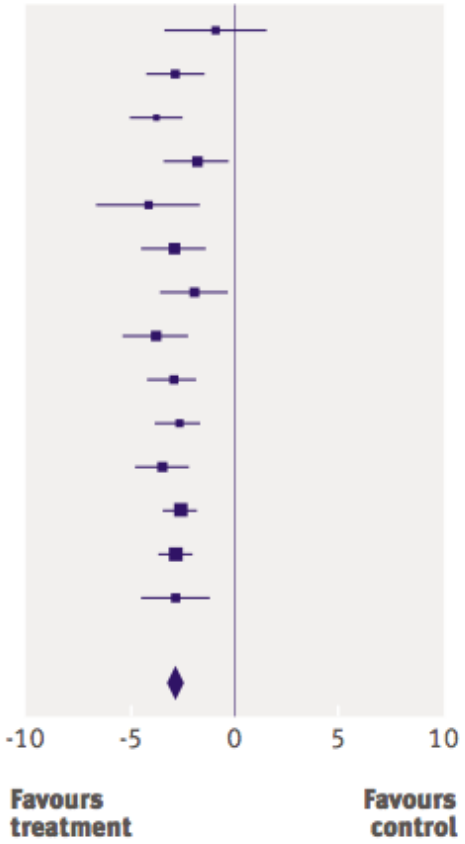
25-30% less
Fat absorbed

Orlistat - weight loss

Study or subcategory	N	Treatment mean (SD)	N	Control mean (SD)	Weighted mean difference (random) (95% CI)	Weight (%)	Weighted mean difference (random) (95% CI)
Derosa 2003[w5]	25	-8.60 (5.00)	23	-7.60 (3.36)		1.99	-1.00 (-3.39 to -1.39)
Krempf 2003[w10]	346	-5.30 (9.30)	350	-2.40 (9.35)		5.93	-2.90 (-4.29 to -1.51)
Swinburn 2005[w15]	170	-4.70 (7.70)	169	-0.90 (4.20)		6.54	-3.80 (-5.12 to -2.48)
Hollander 1998[w8]	163	-6.19 (6.51)	159	-4.31 (7.18)		5.07	-1.88 (-3.38 to -0.38)
Sjostrom 1998[w14]	343	-10.30 (16.61)	340	-6.10 (16.61)		1.83	-4.20 (-6.69 to -1.71)
Davidson 1999[w4]	657	-8.76 (9.48)	223	-5.81 (10.00)		5.06	-2.95 (-4.45 to -1.45)
Finer 2000[w6]	110	-3.29 (6.05)	108	-1.31 (6.05)		4.41	-1.98 (-3.59 to -0.37)
Hauptman 2000[w7]	210	-7.94 (8.26)	212	-4.14 (8.15)		4.64	-3.80 (-5.37 to -2.23)
Rossner 2000[w13]	242	-9.40 (6.40)	237	-6.40 (6.70)		8.26	-3.00 (-4.17 to -1.83)
Bakris 2002[w1]	267	-5.40 (6.40)	265	-2.70 (6.40)		9.62	-2.70 (-3.79 to -1.61)
Broom 2002[w3]	259	-5.80 (8.50)	263	-2.30 (6.40)		6.81	-3.50 (-4.79 to -2.21)
Kelley 2002[w9]	266	-3.89 (4.48)	269	-1.27 (4.59)		19.26	-2.62 (-3.39 to -1.85)
Miles 2002[w12]	250	-4.70 (4.74)	254	-1.80 (4.78)		16.47	-2.90 (-3.73 to -2.07)
XENDOS[w16]	1640	-5.80 (24.30)	1637	-3.00 (24.30)		4.11	-2.80 (-4.46 to -1.14)
Total (95% CI)	4948		4509			100.00	-2.87 (-3.21 to -2.53)

Test for heterogeneity: χ^2=11.05, df=13, P=0.61, I^2=0%

Test for overall effect: z=16.67, P<0.001



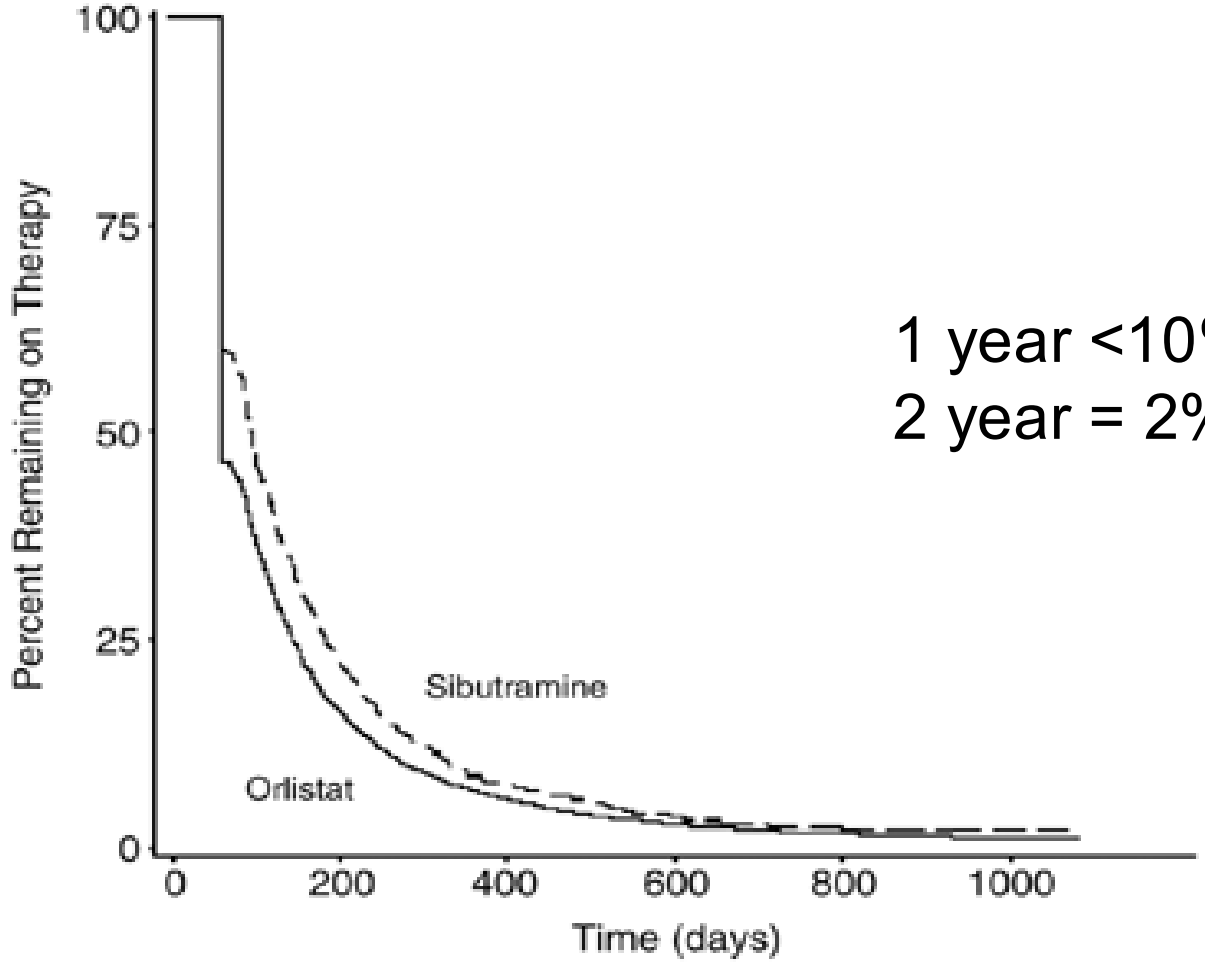
Rucker D et al. BMJ. 2007 Dec 8;335(7631):1194-9

Orlistat predictors

		12 week Weight loss < 5% n=116	12 week Weight loss > 5% n=104	P Value
Year 1	Kg	-6.6 ± 0.4	-14.1 ± 0.6	0.0001
	%	-6.9 ± 0.4	-14.5 ± 0.6	
Year 2	Kg	-4.5 ± 0.5	-11.6 ± 0.8	0.0001
	%	-4.7 ± 0.5	-11.9 ± 0.8	

Rissanen A et al. International Journal of obesity (2003), 27, 103-109

Orlistat - adherence



1 year <10% still on
2 year = 2% still on

Padwal R et al. International Journal of Obesity (2007) **31,** 1567–1570

How to improve compliance with orlistat

Recommendations

- Eat a lower fat diet
- Balance meals to ensure that the fat content is no greater than 30% of the meal or less than 15g of fat per meal when taking Orlistat or Xenical. That is 1 tbsp of Olive oil / or 1 tbsp of butter
- Avoid eating high fat foods
- Avoid adding butter, oils and cream based dressing to your meals
- Avoid snacking but if you really are hungry snack on fruit

Here are some simple food swaps to get you started...

Dairy	Swap to low fat options- Eat sparingly
Chicken, Turkey	Choose breast meat
Red meat	Eat a maximum of once a week
Beef	Beef mince - opt for 5% -10% fat content beef mince. Consider swapping to turkey mince. If roasting choose tenderloin / trim excess fat and slow roast
Lamb	Best options are tenderloin or lamb chops
Pork	Choose tenderloin
Sausages	Swap to Turkey Sausages or low fat options
Beans and Pulses, (kidney beans, black eyed bean, chickpeas, lentils)	Eat freely
Fruit	a great low fat option
Vegetables	Fill half your plate at every meal with a variety of vegetables
Nuts and seeds	Tend to be higher in fat - eat in moderation
Breads, Pasta, Rice, Couscous	Eat in moderation. Although low fat these are high in carbohydrates so may hinder weight loss

Metformin answers

Say whether these statements are true or false

1. The average weight loss with metformin is 3-4 kg for T2D. **False. 1-1.5 kg**
2. The average change in BMI is 0.7 kg/m^2 in T1D. **True**
3. Metformin in people with T2D is the best drug for preventing death. **True**
4. Metformin reduces weight gain by 3-4 kg in people started on or changes to different antipsychotic medication. **True**
5. Metformin lowers the risk of cancer in people with T2D. **True**
6. Metformin has no effect on risk of dementia in people with T2D. **False**

Orlistat answers

Say whether these statements are true or false

1. The average weight loss with orlistat is 3-4 kg in T2D. **False. 2-3 kg**
2. The average weight loss with orlistat is 2-3 kg in T1D. **False – no studies**
3. Weight loss at 12 weeks predicts weight loss at 1 and 2 years. **True**
4. In studies only 2% of people are still on orlistat at 2 years. **True**
5. Specific dietary advice can improve adherence. **True**
6. Is safe to use if trying to become pregnant. **True**

New weight loss drugs

Glucagon-like peptide 1 (GLP-1) – the good

GLP-1 the good questions

Say whether these statements are true or false

1. In doses for T2D management no one GLP-1 cause more weight loss than another.

2. High dose Liraglutide (saxenda) causes similar weight loss to 1 mg semaglutide in people with T2D.

3. High dose semaglutide (wegovy) causes a 12% weight loss in people with T2D.

4. Lirgalutide(diabetes dose), semaglutide (diabetes dose) and dulagatide have been shown to prevent CVD events.

5. Lirgalutide(diabetes dose) and semaglutide (diabetes dose) slow decline in GFR.

Types of GLP-1

Diabetes GLP-1s

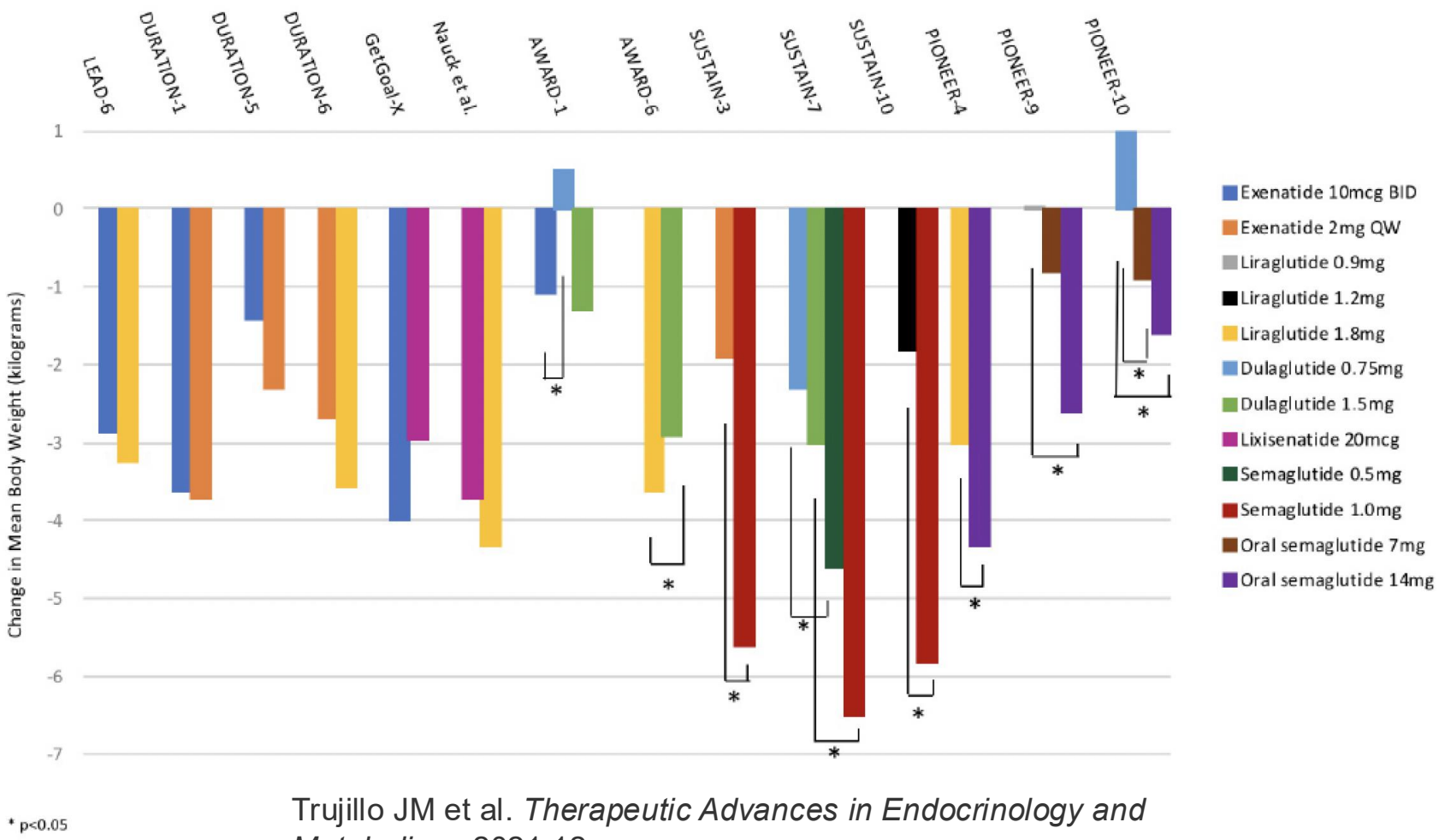
- Twice daily exenatide
- Once daily liraglutide (0.6-1.8mg)
- Once daily lixisenatide
- Once daily oral semaglutide
- Weekly exenatide
- Weekly albiglutide,
- Weekly dulaglutide
- Weekly semaglutide (0.25 mg -1 mg)

Used for both Tirzepatide (GLP-1 and GIP)
2.5 -15 mg s/c weekly

Weight loss GLP-1s

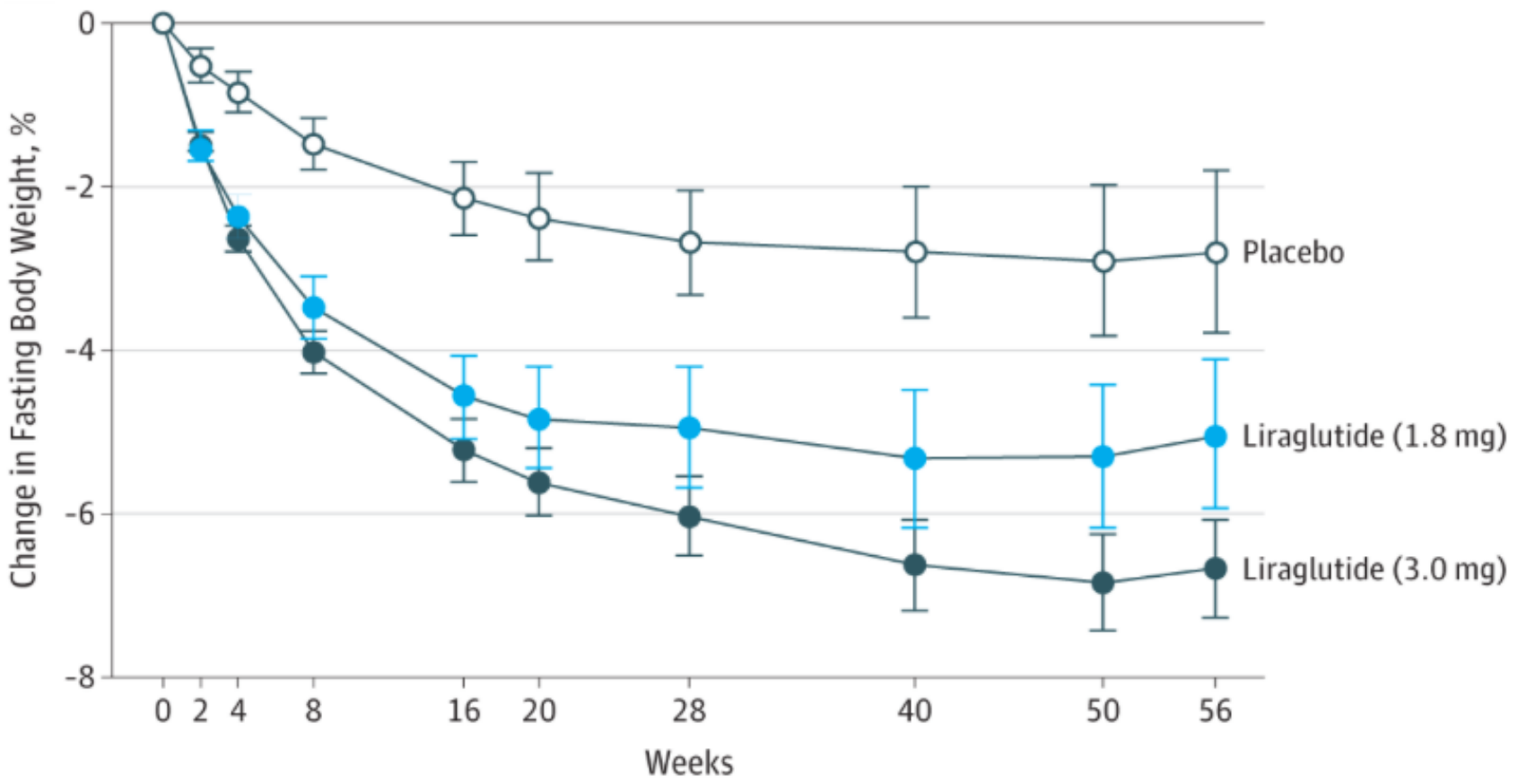
- Saxenda (liraglutide (0.6-3.0mg)
- Wegovy (semaglutide (0.25-2.4mg)

Weight lost with diabetes GLP-1s



Trujillo JM et al. *Therapeutic Advances in Endocrinology and Metabolism*. 2021;12.

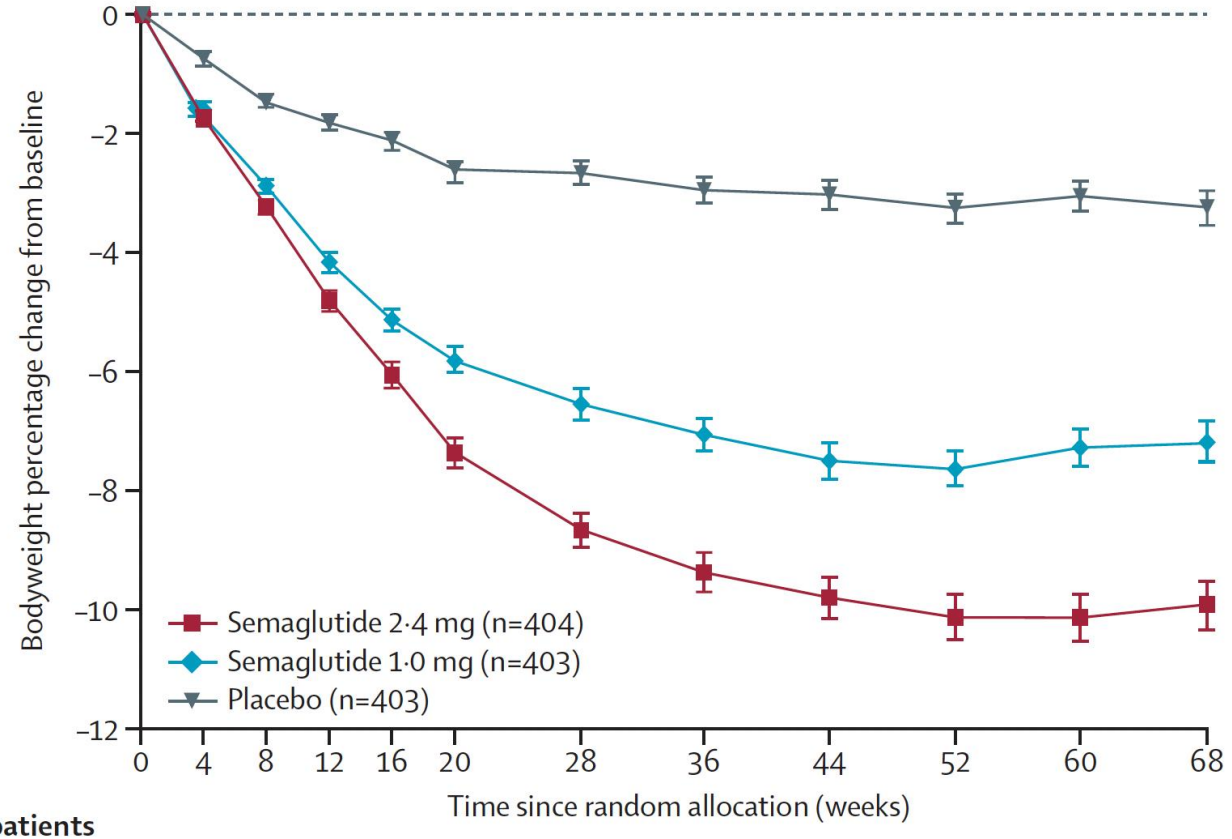
Saxenda – weight loss in people with T2D



Appears to be no better than 1.0 mg semaglutide

JAMA. 2015;314(7):687–699.

Wegovy – weight loss in people with T2D



Number of patients

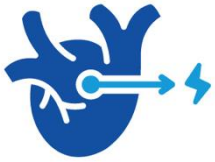
Semaglutide 2·4 mg	404	395	397	390	388	392	386	383	381	381	378	388
Semaglutide 1·0 mg	403	394	392	385	383	383	378	377	373	370	374	380
Placebo	403	398	394	389	387	383	381	377	371	367	366	376

NHS
St George's University Hospital
NHS Foundation Trust

Lancet. 2021 Mar 13;397(10278):971-984.

NHS
Somerset
NHS Foundation Trust

GLP-1 and cardiovascular disease



INFARCTION

People with diabetes high CV risk or had CVD event
Liraglutide reduced risk of events in people with past stroke or MI (Hazard ratio 0.85) and people with established atherosclerosis – Circulation Volume 138, Number 25

HEART FAILURE

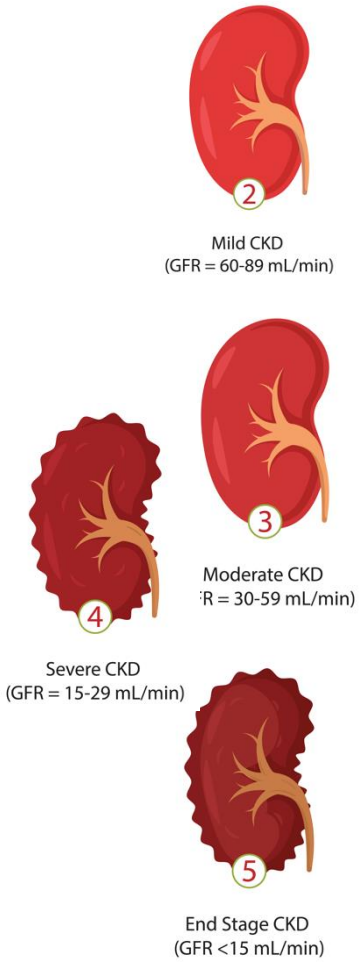
Semaglutide 1.0 mg found reduction in MACE and strokes - N Engl J Med 2016;375:1834–44.

Dulagatide reduced strokes and Albiglutide reduced MACE and heart attacks - Front Clin Diabetes Healthc. 2023 Dec 8;4

STROKE

People without diabetes
In people over the age of 45 and with established CV disease high dose semaglutide reduced event rate (hazard rate 0.80) - N Engl J Med 2023;389:2221-2232

GLP-1 and Kidney



People with diabetes high CV risk or had CVD event
Slower decline in GFR in people on liraglutide - Kidney Int2023 Apr;103(4):772-781

Semaglutide 1.0 mg found reduction in decline in renal fucntion- Kidney Int 2023 Apr;103(4):772-781

GLP-1 the good answers

Say whether these statements are true or false

1. In doses for T2D management no one GLP-1 cause more weight loss than another. **False, semaglutide has greatest weight loss**

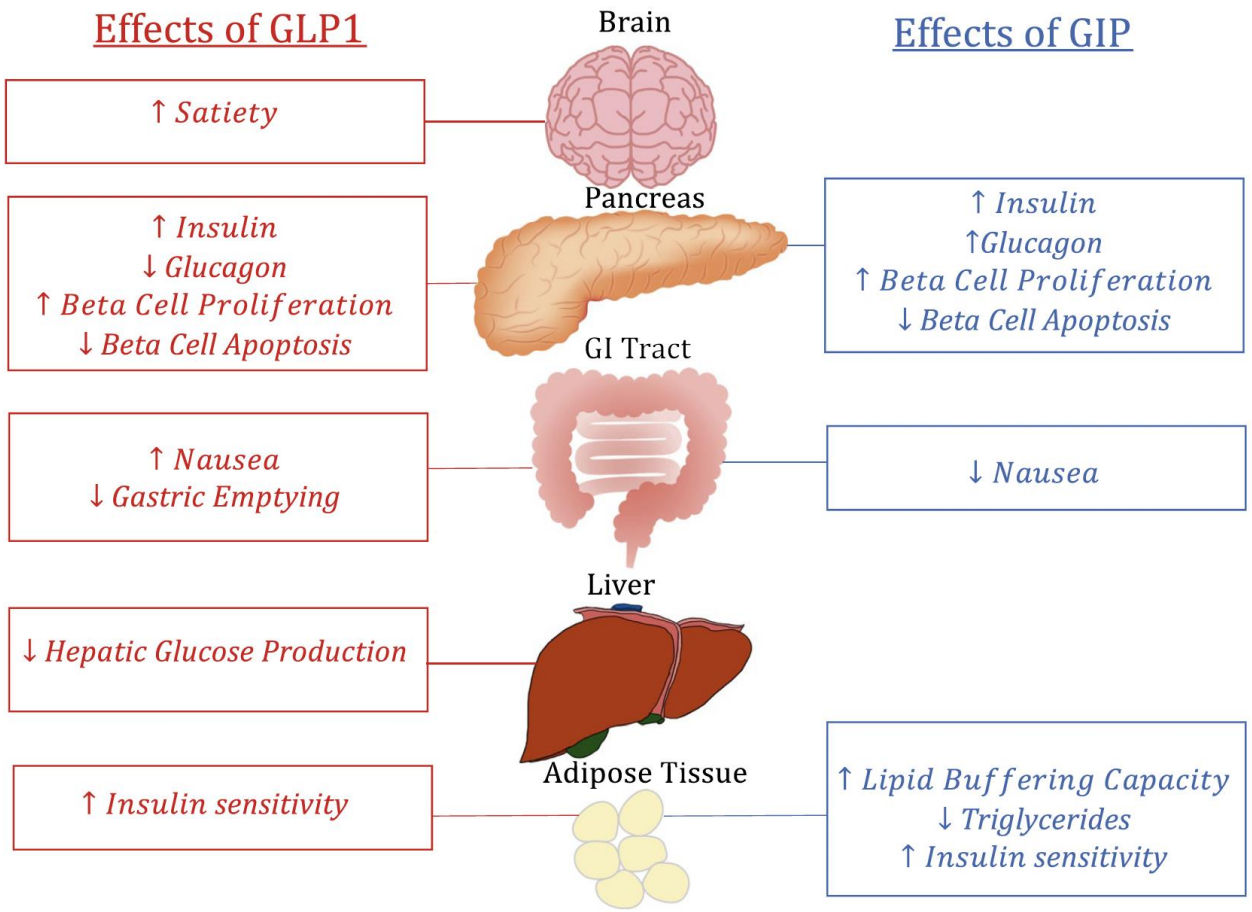
2. High dose Liraglutide (saxenda) causes similar weight loss to 1 mg semaglutide in people with T2D. **True**

3. High dose semaglutide (wegovy) causes a 12% weight loss in people with T2D. **False, 8%**

4. Lirgalutide(diabetes dose), semaglutide (diabetes dose) and dulagatide have been shown to prevent CVD events. **True**

5. Lirgalutide(diabetes dose) and semaglutide (diabetes dose) slow decline in GFR. **True**

Tirzepatide – the good effects



Tirzepatide the good questions

Say whether these statements are true or false

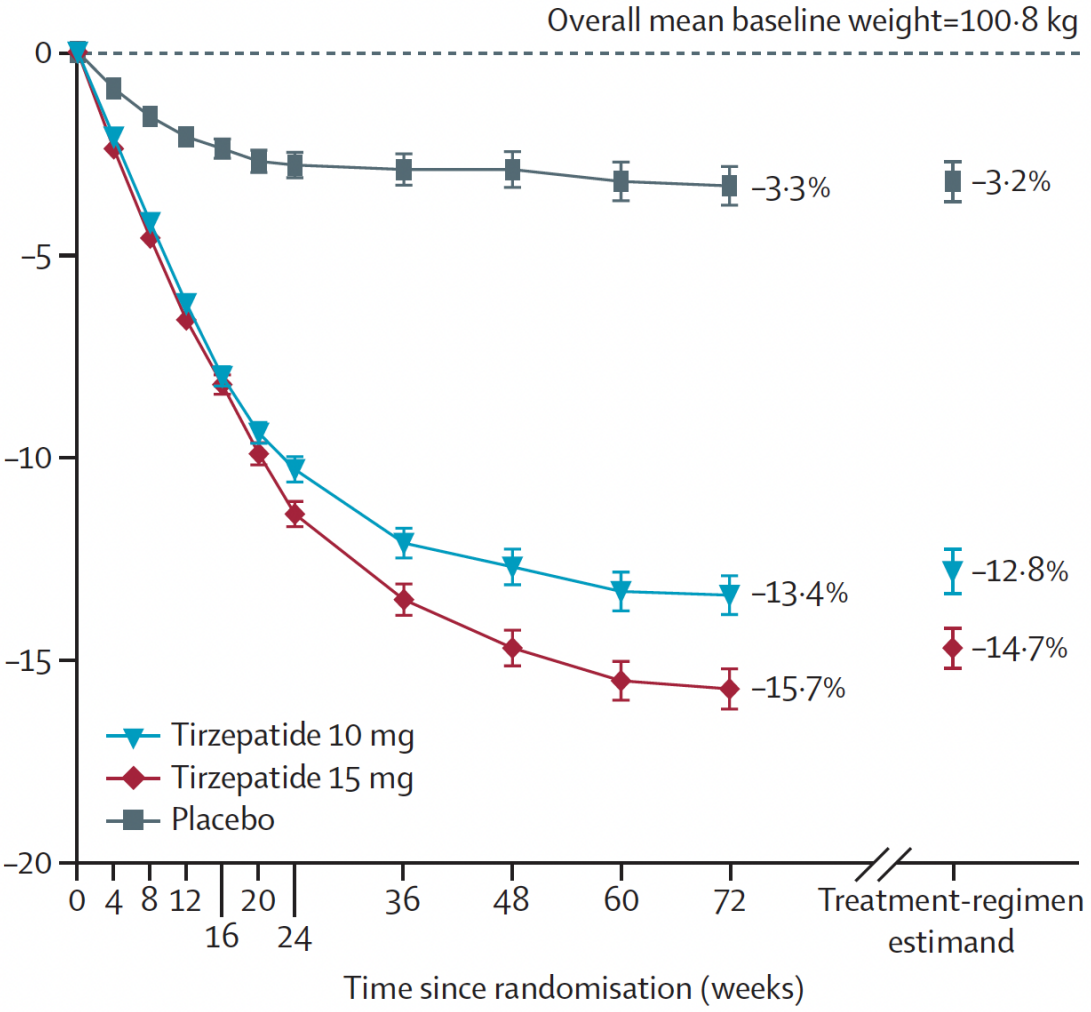
1. In people with T2D tirzepatide reduces weight by 11%.

2. In early studies the cardiovascular protection effects of tirzapatide in people with T2D seems to be less than semaglutide.

3. In people with T2D tirzepatide protects against increase in UACR and fall in eGFR.

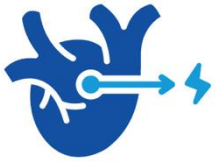
4. Access to tirzepatide for both Hba1c treatment and weight loss for people with T2D is relatively easy.

Weight loss in people with diabetes



Lancet. 2023 Aug 19;402(10402):613-626

Tirzepatide and cardiovascular disease



INFARCTION

HEART FAILURE

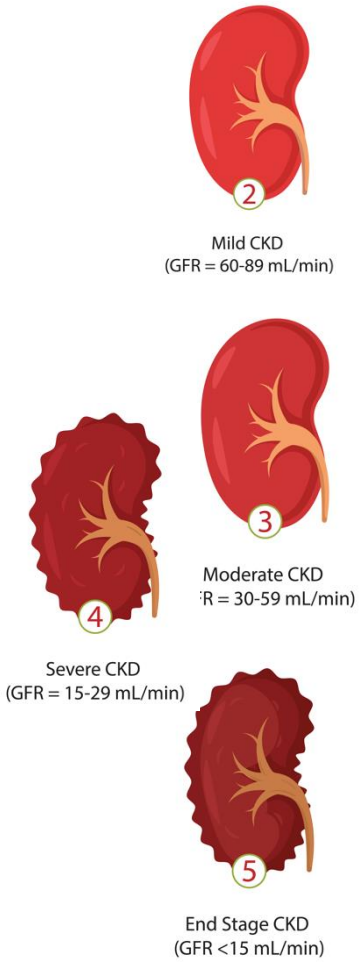
STROKE

People with diabetes

Metanalysis of people in Surpass studies (1-5) found no protective effect of tirzepatide. Only surpass 4 had people with CVD disease. Nat Med. 2022 Mar;28(3):591-598.

Tirzepatide vs dulaglutide for CVD in T2D, no difference. N Engl J Med 2025;393:2409-2420. Note dulaglutide caused 12% reduction of events. The Lancet, Volume 394, Issue 10193, 121 – 130.

Tirzepatide and Kidney



In people with T2D –Meta-analysis shows that Tirzepatide reduces UACR but little effect on eGFR.

World J Diabetes. 2025 Feb 15;16(2):101282.

NICE guidelines for Tirzepatide

For diabetes

- Triple therapy fails: Metformin + 2 other oral antidiabetic drugs are ineffective, not tolerated, or contraindicated and
  BMI requirements:
  - BMI ≥35 kg/m² with obesity-related psychological/medical complications
    OR
  - BMI <35 kg/m² if either:
    - Insulin therapy poses occupational risks
    - Weight loss would improve obesity-related complications

For weight loss

BMI ≥35 kg/m²and

≥1 weight-related comorbidity (e.g., type 2 diabetes, prediabetes, hypertension

Is limited access to tirzepatide

Is centrally funded with money for support but

- Rollout is over 8 years
- This year's criteria is really tight as must have BMI> 40 and 4 of five of these, diabetes, stablished atherosclerotic CVD, sleep apnoea, hypertension and dyslipidaemia.
- In our area this is 356 patients.

Tirzepatide the good answers

Say whether these statements are true or false

1. In people with T2D tirzepatide reduces weight by 11%. **True**

2. In early studies the cardiovascular protection effects of tirzapatide in people with T2D seems to be less than semaglutide. **True**

3. In people with T2D tirzepatide protects against increase in UACR and fall in eGFR. **False only effects UACR**

4. Access to tirzepatide for both Hba1c treatment and weight loss for people with T2D is relatively easy. **False, tight restrictions**

Bad effects of GLP-1 analogues and tirzepatide

GLP-1 and Tirzepatide the bad questions

Say whether these statements are true or false

1. Diarrhoea is very common and effect 20% of people and is a common reason for coming off the drugs.

2. There are good documents for supporting compliance and dealing with common problems.

3. Last year more than 82 people died from GLP-1 use.

4. 10% of the weight loss is muscle.

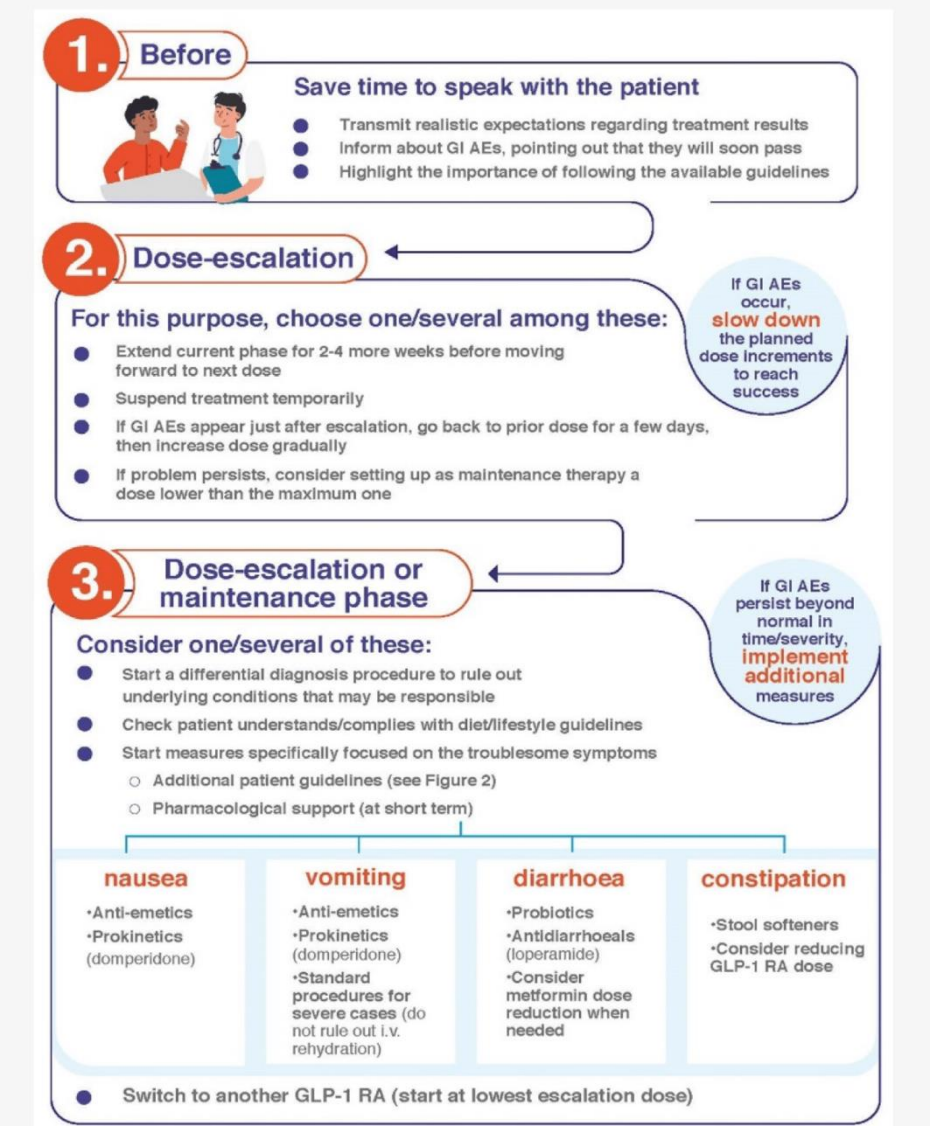
5. People on GLP-1 do not have an increased risk of depression.

6. People on GLP-1 have 44% increase in pancreatitis and 200% increased risk in pancreatic ductal adenocarcinoma.

GLP-1s - common side effects

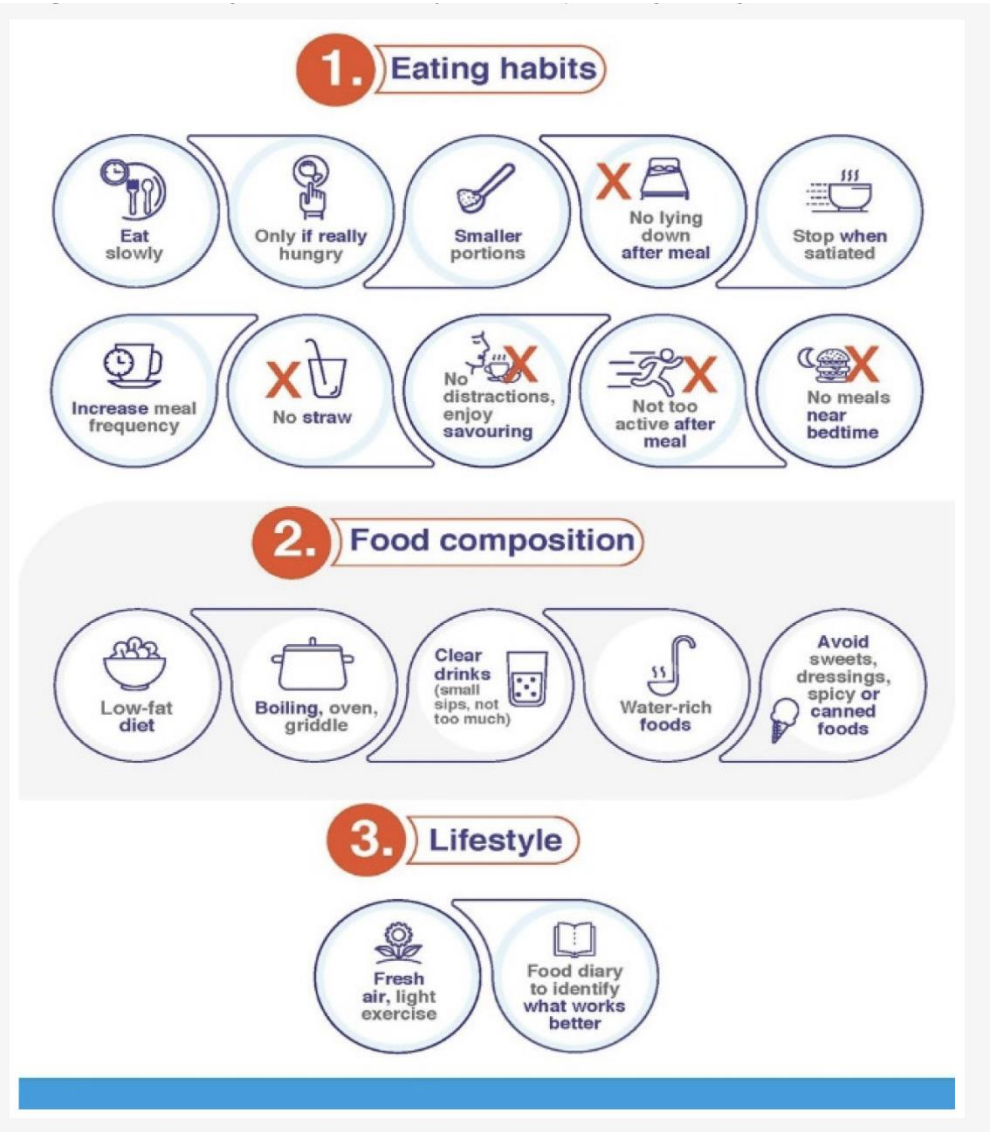
 Nausea	Very common, decreases with time.
 Decreased appetite	Very common, decreases with time. Some people do not like this.
 Diarrhoea	20% of people, common reason for coming off drug.

How to improve compliance with GLP-1 inhibitors



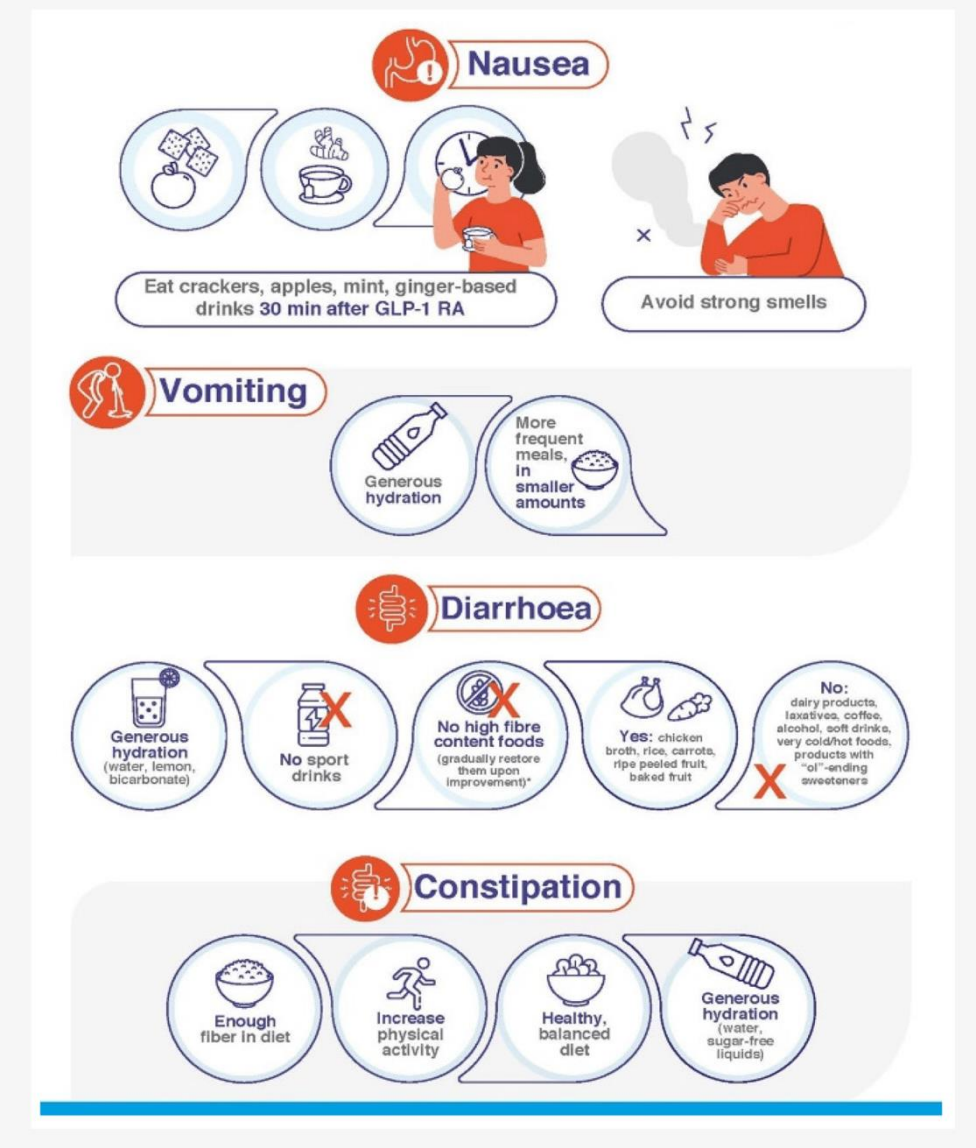
Journal of Clinical Medicine. 2023; 12(1):145.

How to improve compliance with GLP-1 inhibitors



Journal of Clinical Medicine. 2023; 12(1):145.

How to improve compliance with GLP-1 inhibitors



Journal of Clinical Medicine. 2023; 12(1):145.

NHS
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Somerset
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Serious complications -1

MORTALITY

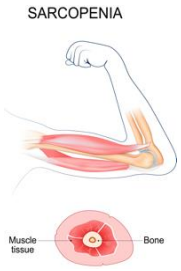
DEATH

82 death

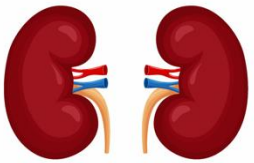
22 deaths from adverse reactions associated with use of GLP-1 agonists for weight loss and 60 linked to use for treating type 2 diabetes.

Link to paper here

Serious complications - 2



Meta-analysis shows the reduction in lean mass comprised 30.8% of total mass lost with GLP-1 therapy - paper



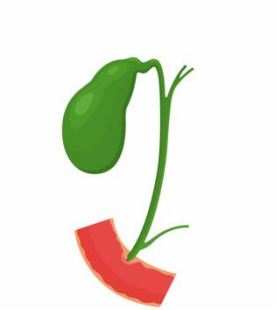
Are case reports of people on GLP-1 getting acute renal injury mainly due to dehydration. Increased rates not seen in RCTS.

DEPRESSION

SUICIDAL THOUGHTS

Patients on GLP-1 RAs exhibited a 195% higher risk of major depression, a 108% increased risk for anxiety, and a 106% elevated risk for suicidal behavior - paper

Serious complications - 3



Use of GLP-1 RAs was also associated with increased risk of gallbladder or biliary diseases in trials for weight loss (n = 13; RR, 2.29; 95% CI, 1.64-3.18) and for type 2 diabetes or other diseases (n = 63; RR, 1.27; 95% CI, 1.14-1.43; P <.001 for interaction) - paper

Study of 992, 901 patients found increased risk for chronic pancreatitis (hazard ratio 1.44) and increased risk of pancreatic ductal adenocarcinoma (hazard ratio 2.04) but absolute risk low - paper

GLP-1 and Tirzepatide the bad answers

Say whether these statements are true or false

1. Diarrhoea is very common and effect 20% of people and is a common reason for coming off the drugs. **True**
2. There are good documents for supporting compliance and dealing with common problems. **True** **True**
3. Last year more than 82 people died from GLP-1 use. **True**
4. 10% of the weight loss is muscle. **False, 1/3 of weight loss**
5. People on GLP-1 do not have an increased risk of depression. **True**
6. People on GLP-1 have 44% increase in pancreatitis and 200% increased risk in pancreatic ductal adenocarcinoma. **True**

Bariatric surgery

Bariatric (Metabolic) Surgery

- Demystify surgery
- Clarify who benefits
- Make referral decisions easier and safer.

Bariatric Surgery (T &F)

1. Bariatric surgery is a last resort after all medical therapy.

2. Bariatric surgery cures Type 1 diabetes.

3. The weight loss similar in T1D and T2D on insulin.

4. Sleeve gastrectomy has no nutritional risks.

5. BMI alone determines suitability for surgery.

6. Long-term follow-up is unnecessary after surgery.

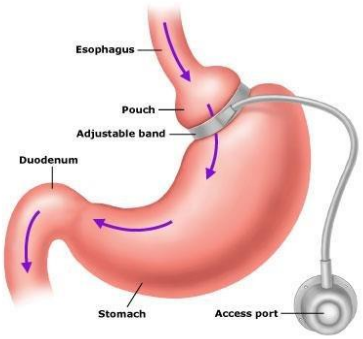
What do we mean by Bariatric (metabolic) surgery?

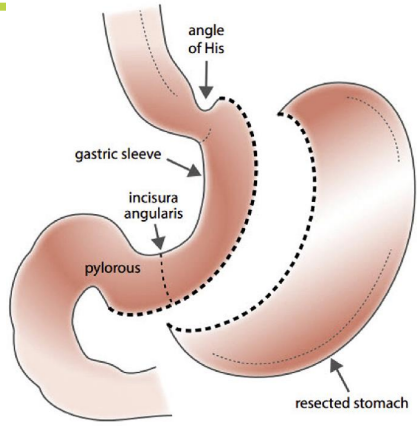
- Bariatric surgery = **surgical treatment of obesity** with metabolic benefits
- Now widely referred to as **metabolic surgery** because of:
  - Glycaemic improvement
  - Reduction in cardiovascular risk
  - Impact beyond weight loss alone
- Evidence base strongest in **Type 2 diabetes**, but important considerations in **Type 1 diabetes**
- **Key message:** This is not "last resort cosmetic surgery" – it is evidence-based disease modification.

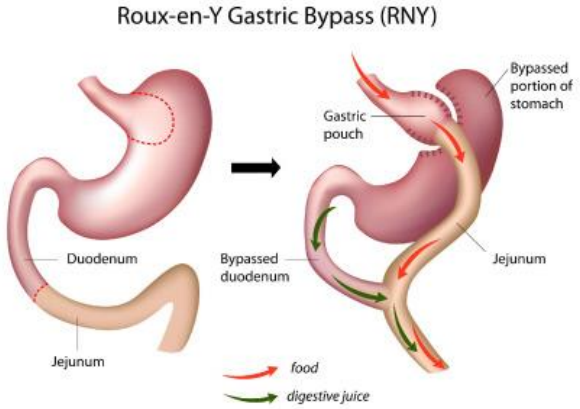
Common procedures

- **Roux-en-Y gastric bypass (RYGB)**
  - Restrictive + malabsorptive
  - Strong metabolic effect
- **Sleeve gastrectomy (LBG)**
  - Restrictive, hormonal effects
  - Most commonly performed in the UK
- **Adjustable gastric band**
  - Much less commonly used now
- **Biliopancreatic diversion / duodenal switch**
  - Powerful but higher nutritional risk (specialist centres)

Clinical framing: Procedures differ in **risk, durability, nutritional consequences**, not just weight loss.

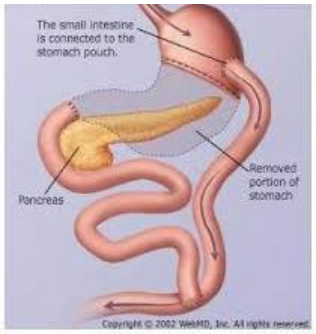




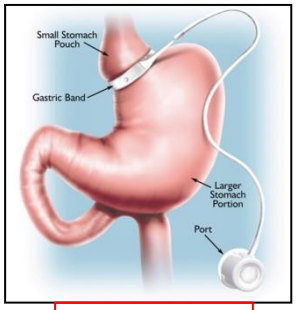


LBG & RYGB: Common in NHS & private sector; 'Gold-standard' for weight loss >30%

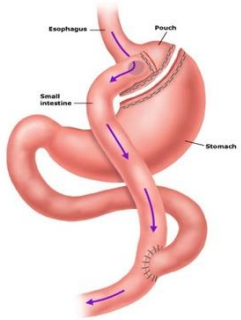
Past and present



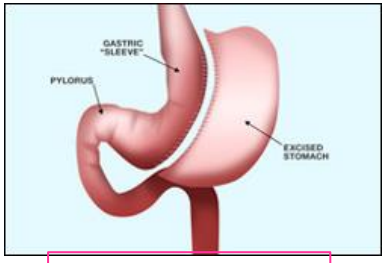
Biliopancreatic Diversion



Gastric band



Roux-en-Y-Bypass



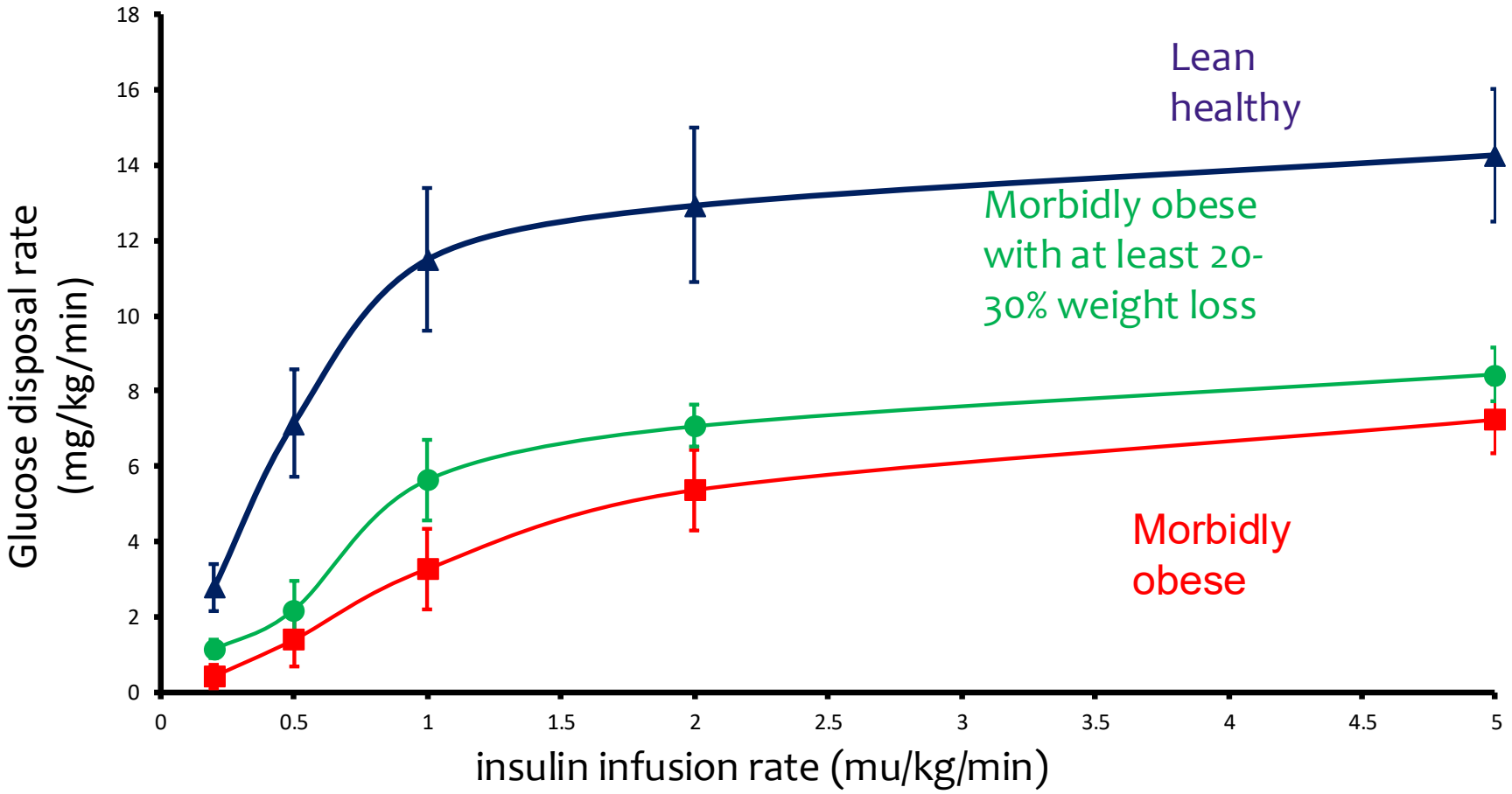
Sleeve Gastrectomy

EndoBarrier

Benefits – what does surgery actually deliver?

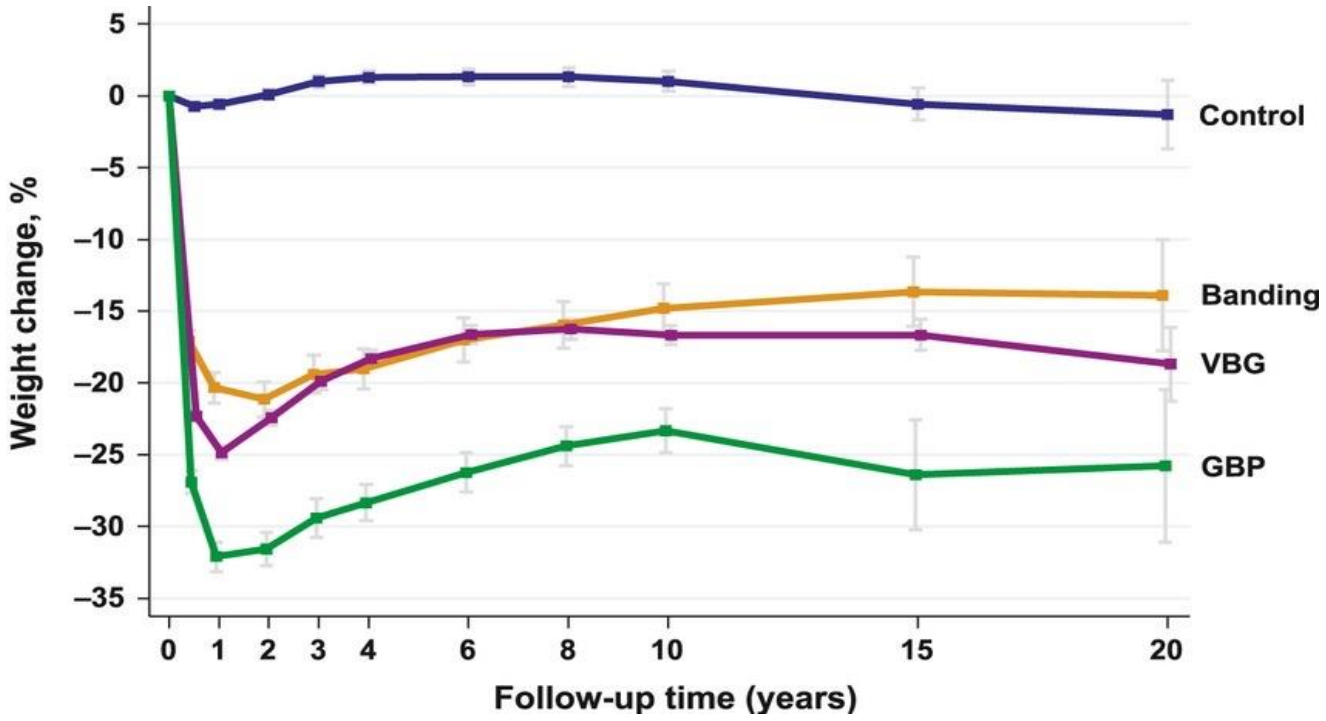
- **Weight loss**
  - Typically 20–35% total body weight (procedure-dependent)
- **Type 2 diabetes**
  - High rates of remission or major glycaemic improvement
  - Reduced need for glucose-lowering therapies
- **Cardiometabolic outcomes**
  - Improved BP, lipids
  - Reduced cardiovascular events and mortality (long-term data)
- **Quality of life**
  - Mobility, pain, sleep apnoea, fertility
- **Key message:** Benefits are **durable** when patients are **well selected** and followed up.

Insulin sensitivity can be modified



Weight loss mediated by bariatric surgery in morbidly obese insulin resistant individuals leads to improvements in insulin signalling. PLoS One. 2015 Apr 13;10(4). Chen M *et al*

Weight loss with Bariatric surgery



+ Live longer

Journal of Internal Medicine, Volume: 273, Issue: 3, Pages: 219-234

Type 1 vs Type 2 diabetes – critical distinctions

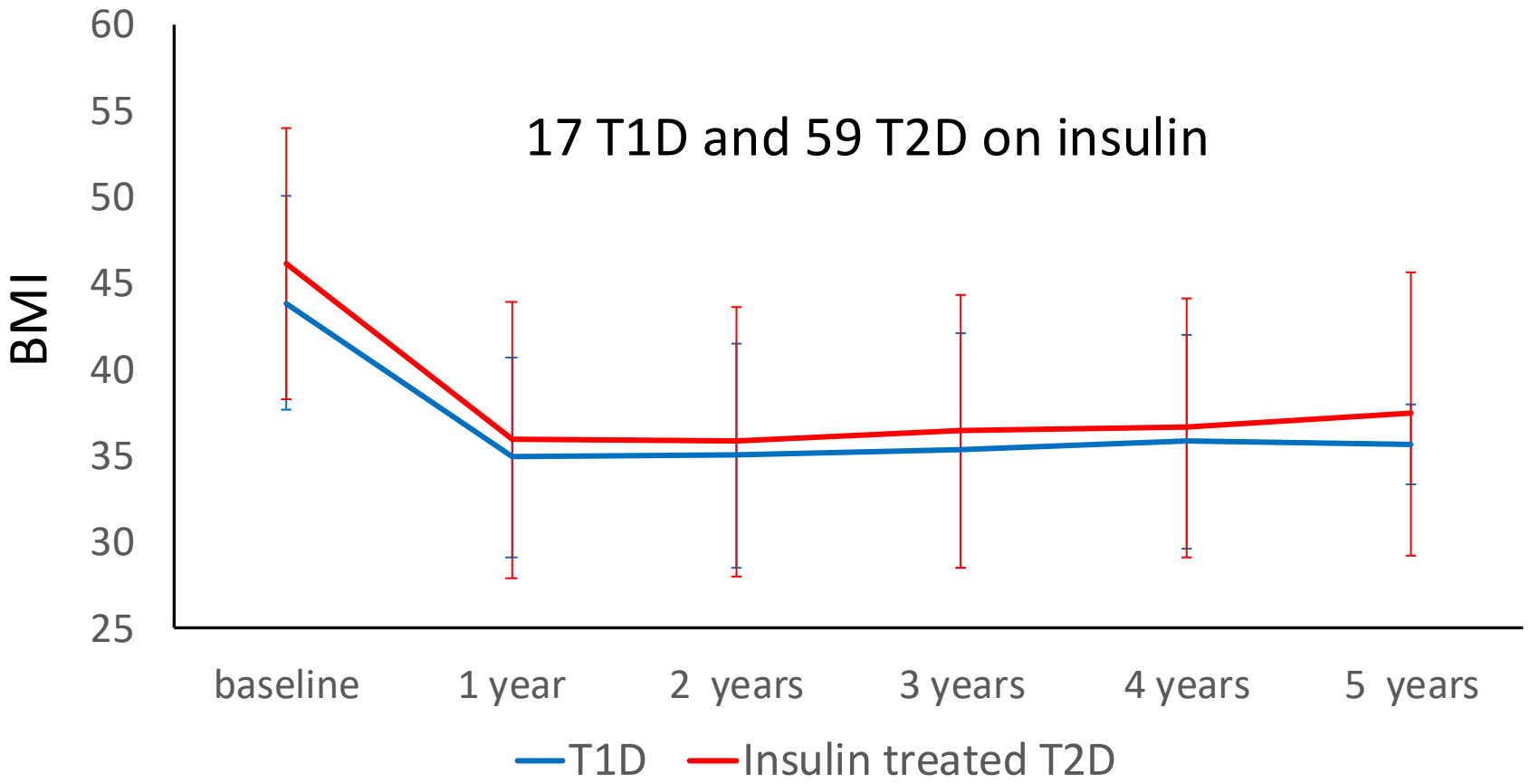
Type 2 diabetes

- Clear evidence base
- Metabolic benefit independent of weight loss alone
- Earlier referral = greater chance of remission

Type 1 diabetes

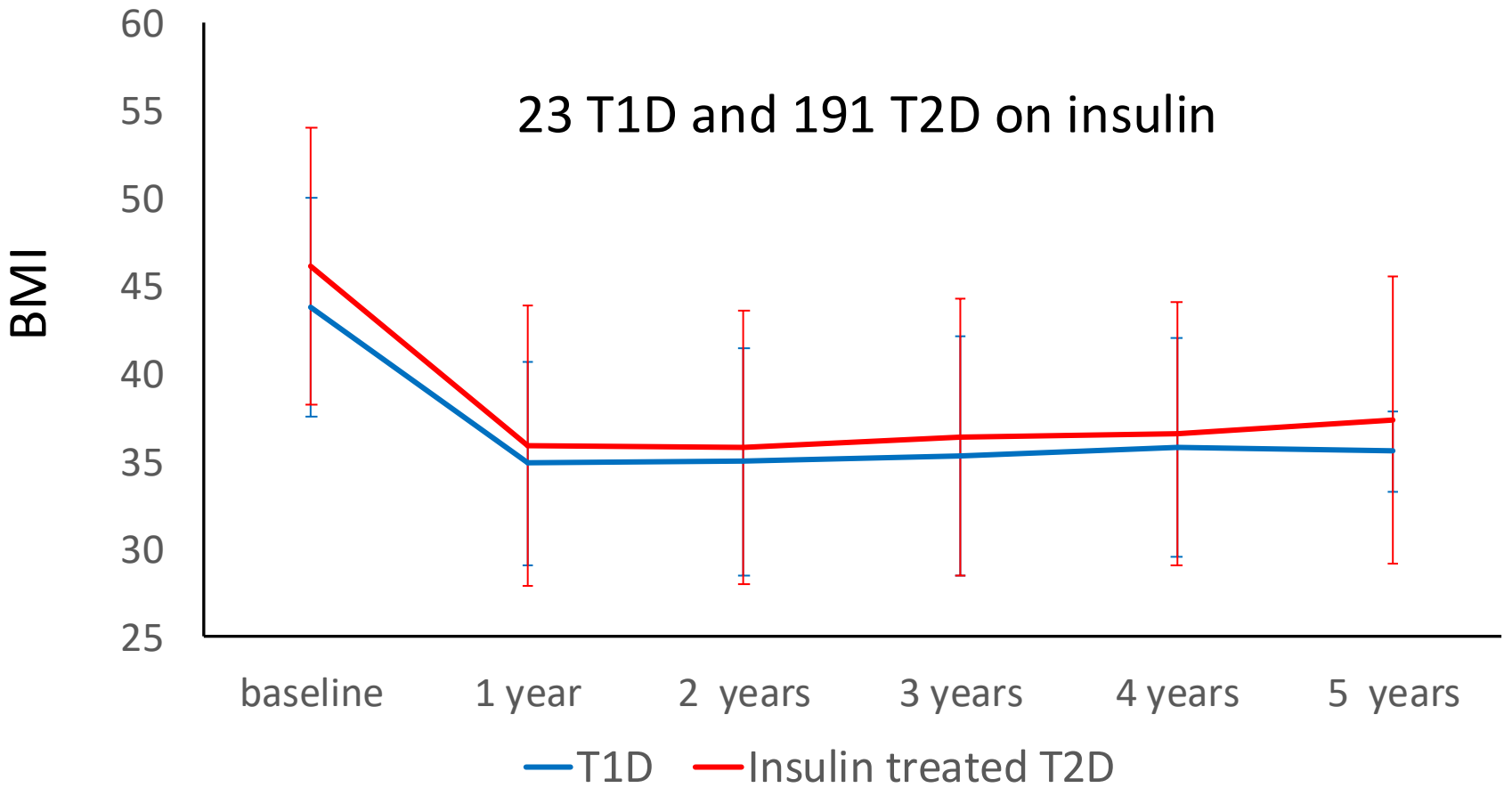
- **Not a cure for T1D**
- Benefits:
  - Weight reduction
  - Reduced insulin requirements
  - Improved insulin sensitivity
- Risks:
  - Hypoglycaemia
  - DKA
- Requires **highly specialist MDT input**
- **Teaching point:** Surgery may help **weight and insulin burden** in T1D, not "cure" diabetes.

Weight loss with sleeve T1D vs T2D



Clin Obes. 2024 Dec;14(6):e12689.

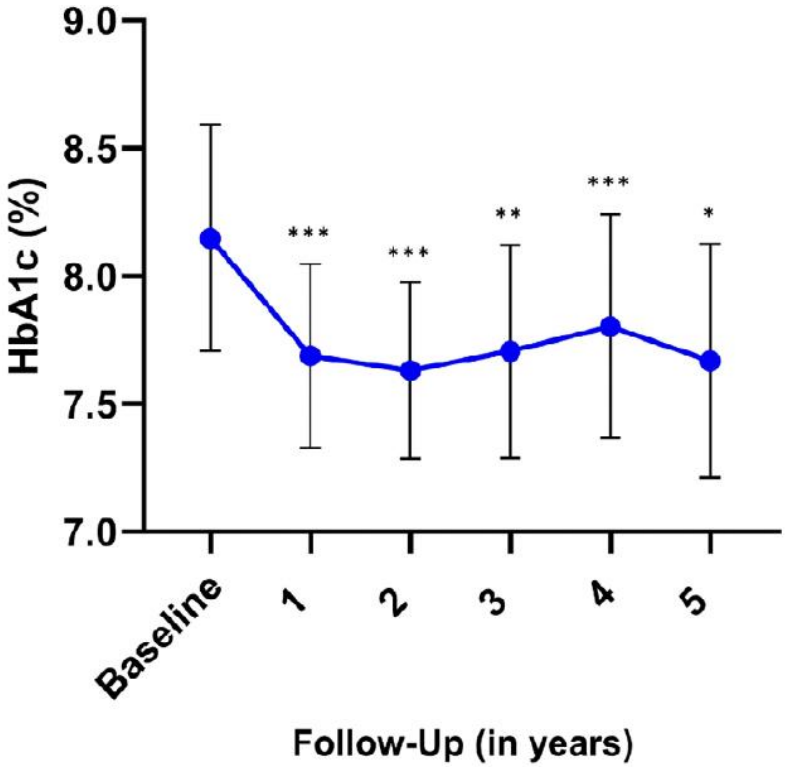
Weight loss with Bypass T1D vs T2D



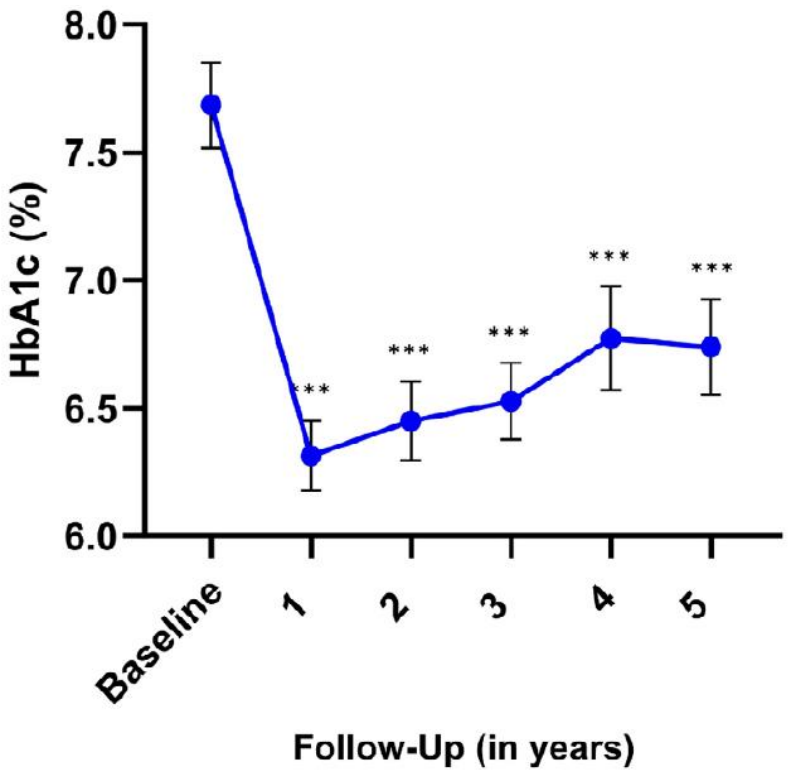
Clin Obes. 2024 Dec;14(6):e12689.

Change in HbA1c post sleeve & bypass T1D vs T2D

T1DM



Insulin treated T2DM



Clin Obes. 2024 Dec;14(6):e12689.

A cohort study of Bypass in T1D

RESEARCH DESIGN AND METHODS

- In this register-based nationwide cohort study, we compared individuals with T1D and obesity who underwent Roux-en-Y gastric bypass (RYGB) surgery with patients with T1D and obesity matched for age, sex, BMI, and calendar time that did not undergo surgery. Outcomes examined included all-cause mortality, cardiovascular disease, stroke, heart failure, and hospitalization for serious hypo- or hyperglycemic events, amputation, psychiatric disorders, changes in kidney function, and substance abuse.

RESULTS

- We identified 387 individuals who had undergone RYGB and 387 control patients. Follow-up for hospitalization was up to 9 years. Analysis showed lower risk for cardiovascular disease (hazard ratio [HR] 0.43; 95% CI 0.20–0.9), cardiovascular death (HR 0.15; 95% CI 0.03–0.68), hospitalization for heart failure (HR 0.32; 95% CI 0.15–0.67), and stroke (HR 0.18; 95% CI 0.04–0.82) for the RYGB group. There was a higher risk for serious hyperglycemic events (HR 1.99; 95% CI 1.07–3.72) and substance abuse (HR 3.71; 95% CI 1.03–3.29) after surgery.

Diabetes Care 1. 12. 2020; 43 (12): 3079–3085

Who should be referred? (UK-aligned criteria)

General principles (simplified):

- BMI ≥40 kg/m²
- BMI ≥35 kg/m² **with obesity-related complications** (e.g. T2D, OSA, hypertension, CAD, dyslipidaemia)
- Lower BMI thresholds may apply in:
  - People with Type 2 diabetes
  - Certain ethnic groups

Equally important as BMI

- Previous structured weight-management attempts
- Psychological readiness
- Ability to engage in **long-term follow-up**

Key message: Referral is about **appropriateness**, not just BMI.

When should you think about referral?

- Failure to achieve or maintain weight loss with non-surgical approaches
- **Early Type 2 diabetes** with poor control despite optimal medical therapy
- Rapid escalation of glucose-lowering drugs or insulin
- Significant obesity-related complications affecting quality of life

Reframe for clinicians:
Think of surgery as a **timely escalation**, not a last-ditch option.

What surgery is NOT

- Not a “quick fix”
- Not risk-free
- Not suitable for everyone
- Not the end of medical care

Requires:

- Lifelong nutritional monitoring
- Micronutrient supplementation
- Ongoing diabetes and metabolic review

After surgery – what should clinician monitor?

- Weight trajectory
- Glycaemic control (risk of hypoglycaemia)
- Nutritional deficiencies:
  - Iron, B12, folate
  - Vitamin D, calcium
- Bone health
- Mental health and eating behaviours

Key message: Surgery transfers patients from **weight management** to **long-term metabolic follow-up**.

Remember Bariatric surgery won't work without lifestyle adherence

"You have many weight-loss options: gastric bypass, donut shop bypass, pizza parlor bypass, buffet bypass..."

Bariatric Surgery

1. **“Bariatric surgery should only be considered after all medical therapies have failed.”**
   → False
   Earlier referral often leads to better outcomes.

2. **“Bariatric surgery can cure Type 1 diabetes.”**
   → False
   It may reduce insulin requirements but does not reverse T1D.

3. **“The weight loss similar in T1D and T2D on insulin.” → True**

4. **“Sleeve gastrectomy has no long-term nutritional risks.”**
   → False
   All procedures require lifelong nutritional monitoring.

5. **“BMI alone is sufficient to decide whether someone should be referred for surgery.”**
   → False
   Readiness, comorbidities, and engagement matter.

6. **“Patients no longer need specialist follow-up after bariatric surgery.” → False**
   Follow-up is lifelong.

Key take-home messages

- Bariatric surgery is **effective, evidence-based metabolic therapy**
- It should be considered **earlier** in selected patients with Type 2 diabetes
- Type 1 diabetes requires **specialist assessment**
- Referral is about **right patient, right time, right pathway**
- Surgery is the **start of long-term care**, not the end

Emails
R.C.Andrews@exeter.ac.uk
Mimi.Chen@stgeorges.nhs.uk

GLP-1 and Tirzepatide in T1D

GLP-1 and Tirzepatide in T1D questions

Say whether these statements are true or false

1. The studies in this area tend to be pilot or observation studies.

2. Tirzepatide over 12 weeks causes a 8.8% loss in weight in adults with T1D.

3. In people with T1D on closed loop systems and BMI>30, semaglutide got 1/3 to 70% time in range and a weight loss of 8.8 Kg over 6 months.

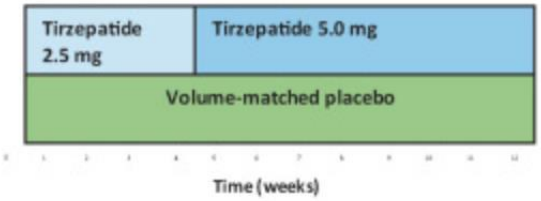
4. Over 6 months – GLP-1 + SGLT2 + lifestyle causes a 10.9% loss in weight in adults with T1D.

Tirzepatide in T1D

Tirzepatide in Adults With Type 1 Diabetes: A Phase 2 Randomized Placebo-Controlled Clinical Trial

Background

- Overweight and obesity are prevalent in type 1 diabetes and contribute to cardiovascular risk.
- Tirzepatide has not been studied in type 1 diabetes.



Study design (*n* = 24)

- TIRTLE1 trial: phase 2, 12-week, double-blinded, placebo-controlled trial
- Participants: adults with type 1 diabetes and BMI greater than 30 kg/m^2.
- Randomized 1:1 to once-weekly subcutaneous tirzepatide (2.5 mg for 4 weeks, 5.0 mg for 8 weeks) or placebo injection.
- Primary end point: change in body weight at 12 weeks.

Results

After 12 weeks, adjunctive tirzepatide vs. placebo:

Weight ↓ 8.7 kg (8.8% weight loss)

HbA_{1c} ↓ 0.4%
Total insulin use ↓ 35.1%
Bolus insulin ↓ 49%
Basal insulin ↓ 25%

No significant adverse events

Conclusion: Among adults with type 1 diabetes and obesity, tirzepatide was superior to placebo for weight loss over 12 weeks.

TIRTLE1, Tirzepatide in Type 1 Diabetes: Cardiometabolic Effects.

Diabetes Care. 2025 Nov 20;49(1):161–170

Semaglutide in T1D

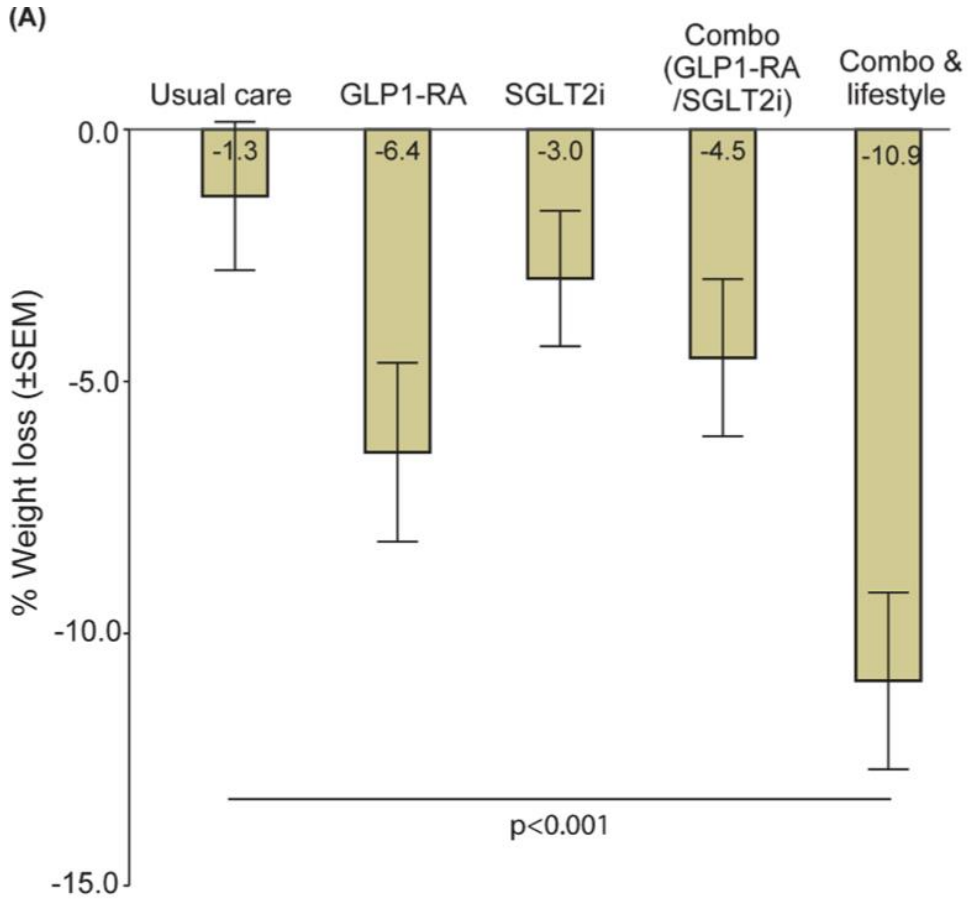
Methods: In this 26-week, double-blind trial, we randomly assigned 72 adults with type 1 diabetes using an automated insulin delivery (AID) system and with a body mass index of 30 or higher in a 1:1 ratio to receive once-weekly semaglutide up to 1 mg or placebo. The primary composite end point consisted of achieving all of the following elements: continuous glucose monitoring (CGM)-based time between 70 and 180 mg/dl of greater than 70% and time below 70 mg/dl of less than 4%; and weight reduction of at least 5%.

Results: A significantly greater percentage of patients in the semaglutide group than in the placebo group achieved the primary composite outcome (36% vs. 0%; between-group difference, 36 percentage points; 95% confidence interval [CI], 20.6 to 52.2; P<0.001). **Body weight it was -8.8 kg (95% CI, -10.6 to -7.0).** There were two severe hypoglycemia events in each group.

NEJM Evid. 2025 Aug;4(8), doi: 10.1056/EVIDoa2500173

GLP-1 + SGLT2 and T1D

Randomised 60 participants to usual care, GLP-1, SGLT2i, GLP-1 + SGLT2i, or GLP-1 + SGLT2i + lifestyle modification for 6 month.



St George's University Hospitals NHS Foundation Trust

Somerset NHS Foundation Trust

GLP-1 and Tirzepatide in T1D answers

Say whether these statements are true or false

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2. Tirzepatide over 12 weeks causes a 8.8% loss in weight in adults with T1D. **True**

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4. Over 6 months – GLP-1 + SGLT2 + lifestyle causes a 10.9% loss in weight in adults with T1D. **True**