WELCOME to the *Obesity Care in All Ages ECHO*

Session 1, Why Obesity is a Disease, May 13, 2025

This ECHO is supported by the Walter and Carole Young Center for Digestive Health

Series Learning Objectives

- Describe obesity as a chronic disease, including evidence-based methods for evaluation and treatment
- Effectively communicate with patients about the health implications of obesity and its available treatment options
- Cultivate skills to effectively assess and treat patients with obesity in various care settings
- Identify when and how to refer patients to appropriate specialized obesity care services

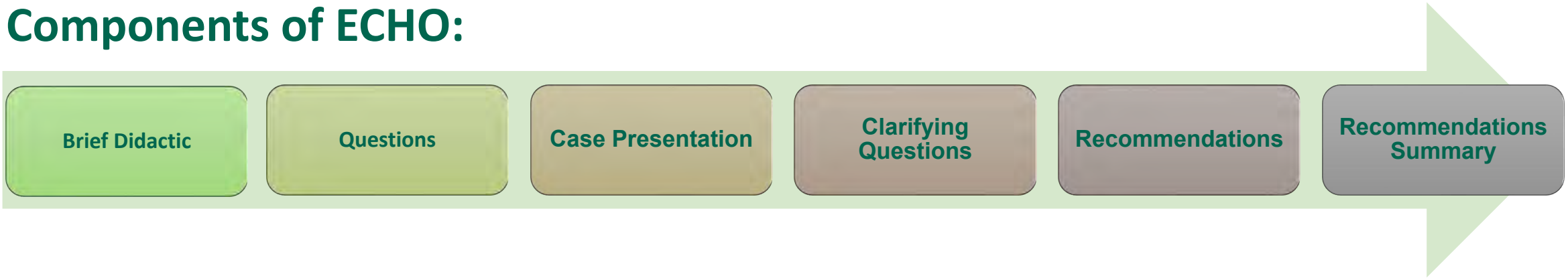
Series Sessions

Date	Session Title
5/13/2025	Why Obesity is a Disease
6/10/2025	Approach to the Patient with Obesity
7/8/2025	Optimizing the Use of Lifestyle-based Obesity Care
8/12/2025	How to Use Anti-Obesity Medications Effectively (GLP-1 agonist)
9/9/2025	How to Use Anti-Obesity Medications Effectively (Non GLP-1 agonist)
9/23/2025	Approach to the Pediatric Patient with Obesity – AAP Clinical Practice Guidelines
10/7/2025	How to Use Endoscopic Therapy Effectively
10/21/2025	Pediatric Anti-Obesity Medications and Bariatric Surgery
11/4/2025	Metabolic-Bariatric Surgery: Who, When, Why, and Which One
11/18/2025	Improving Equitable Access to Obesity Care

Project ECHO (Extension for Community Healthcare Outcomes)

- All teach, all learn.
- ECHO is a telementoring model that uses virtual technology to support case-based learning and to engage the wisdom and experience of all attending.
- Highly Interactive.

Components of ECHO:



Today's Program

- Brief housekeeping
- Didactic: Why Obesity is a Disease – Elizabeth Honigsberg, MD, MPH
- Role Play: Sarah Finn, MD and Abbey Berge-Clogston
- Discussion
- Summary
- Up Next

Housekeeping Notes

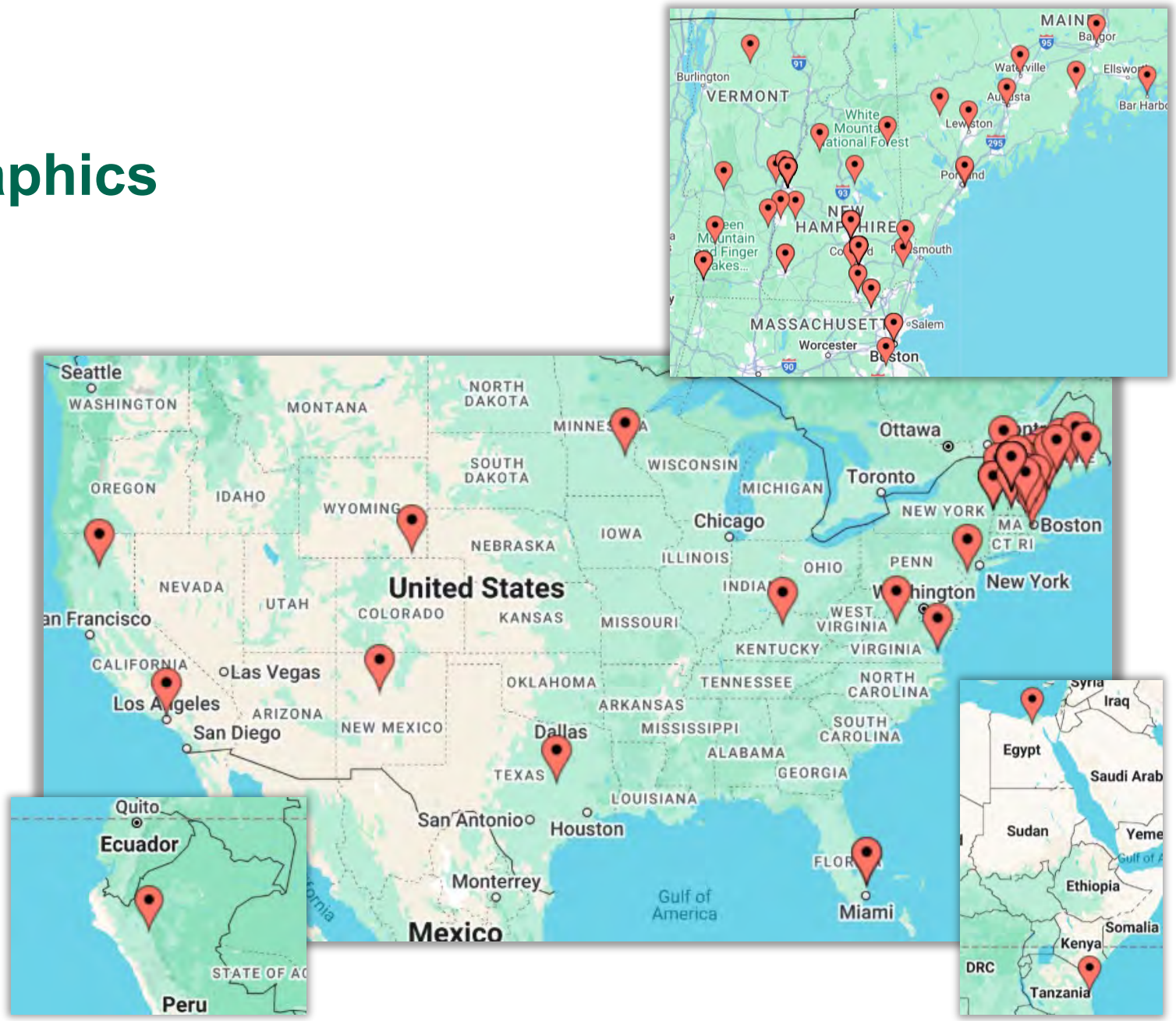
- Pre course survey: https://redcap.hitchcock.org/redcap/surveys/?s=EA47L8LEDJ43JTDN
- Raise virtual hand or enter comments in chat at any time. We will call on you when it works. Please mute otherwise.
- To protect individual privacy, please use non-identifying information when discussing cases.
- We will be recording the didactic part of these sessions. *Participating in these session is understood as consent to be recorded. Thank you!*
- Closed Captioning will be enabled during sessions
- Questions to ECHO Tech Support thru personal CHAT or ECHO@hitchcock.org

CME/CNE

- One hour of free CME/CNE is available for every session attended, up to 10 sessions.
- Track participation via DH iECHO site
- A link will be provided at the end of the course to submit your attendance and claim your CME/CNE

ECHO Participant Demographics
Total Registrants: 193

Professional Identities	
Nurse	62
Physician	44
Dietitians and Nutritionists	26
Administrator	9
Behavioral Health Professional	8
Physician Assistant/Medical Assistant	10
Other healthcare professional	16
Pharmacist	4
Patient navigator/healthcare educator	5
Child Development	2



Core Panel

- Abigail Berge-Clogston – Program Manager
- Amanda Boyd, MPH – Health Coach, Certified Personal Trainer
- Auden McClure, MD, MPH – Staff Physician, Pediatric Weight Center
- Charles Brackett, MD, MPH – Staff Physician, General Internal Medicine
- Elaine Banerjee, MD, MPH – Staff Physician, DH Weight Center
- Elizabeth Honigsberg, MD, MPH – Staff Physician, DH Weight Center
- Hannah Brilling, RDN, LD – Clinical Dietician
- Kimberly Dovin, MD – Staff Physician, DH Weight Center
- Kristin Wheeler, RN – Nurse, Weight Center
- Sarah Finn, MD – Interim Section Chief, DH Weight Center

Echo Session 1
Why Obesity is a Disease.

Elizabeth Honigsberg MD MPH FACS DABOM

May 13th, 2025

I have no financial interests or relationships to disclose.

There are four main objectives for today's discussion.

ASSESS	The current state of the obesity pandemic worldwide
UNDERSTAND	Obesity as a neurobiological/neuroendocrine disease
APPRECIATE	The multitude of factors that lead to the development of obesity
REVIEW	The various criteria for diagnosing the disease of obesity

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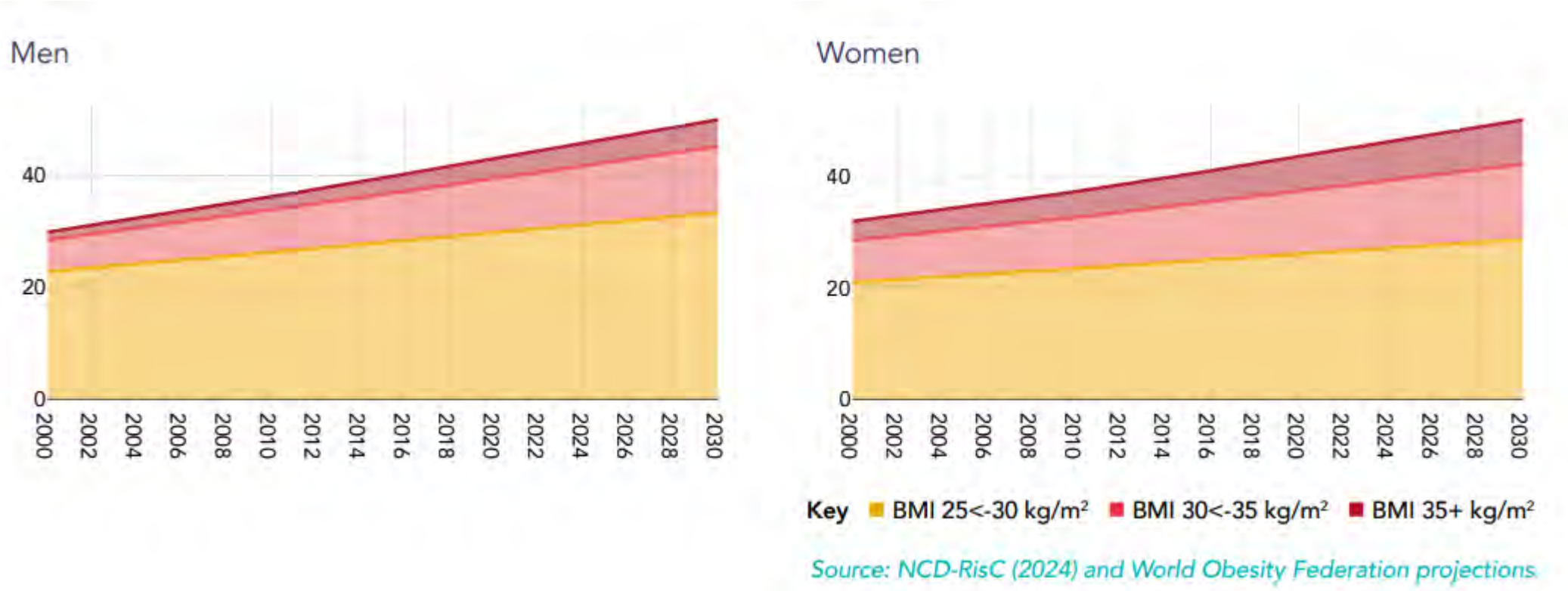
The current state of obesity worldwide.

Rates of men and women (20 years +) living with “high BMI” are increasing worldwide.



World Obesity Atlas 2025

By 2030, THREE BILLION adults will have “high BMI”, with 17% of men and 22% of women estimated to have BMI > 30 kg/m^2 (*and the world is NOT prepared*).

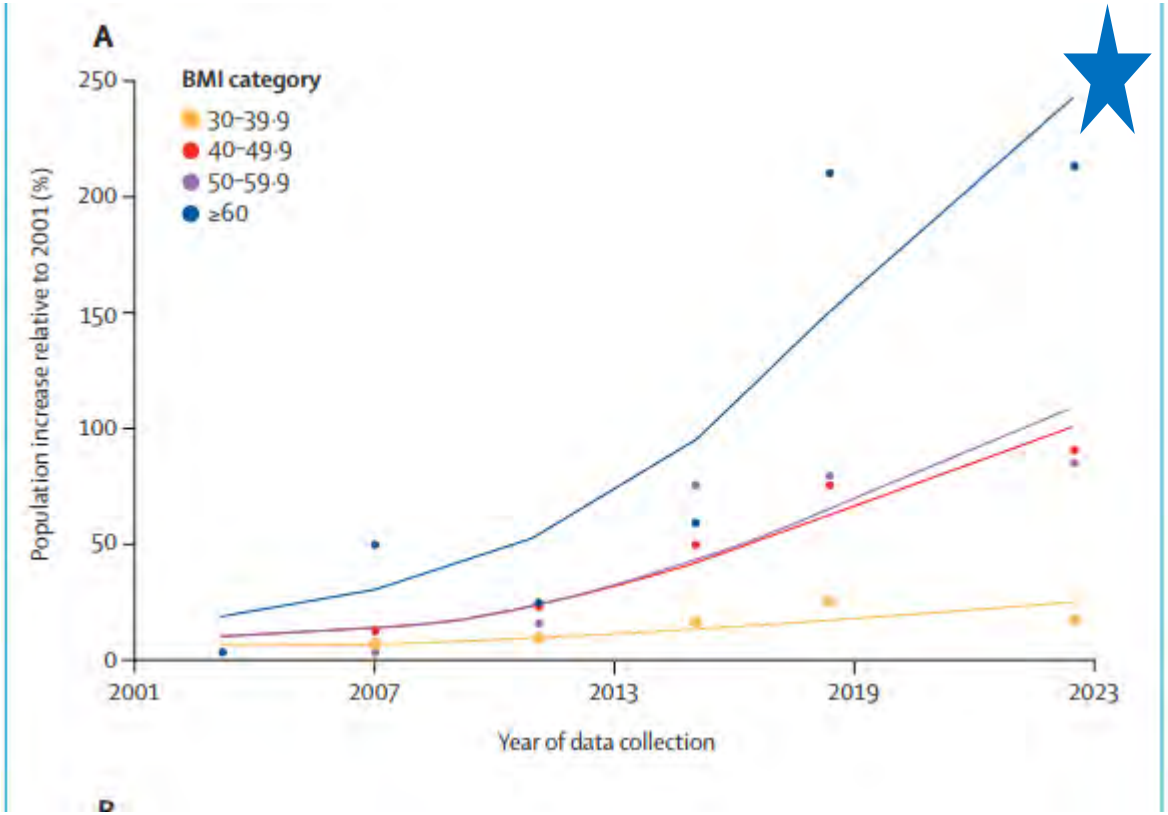
Yearly: 5 million/41 million adult deaths due to NCDs related to high BMIs.

4 million deaths from T2DM, CVA, CAD, CA.

Obesity rates are doubling across the globe, TRIPLING in low-income countries.

World Obesity Atlas 2024,2025

In the United States, the prevalence of “normal” weight and overweight has declined since 2001, while all obesity categories have increased over this timeframe.



The largest relative increase of > 200%!

Kachmar M et al. *The Lancet Diabetes Endocrinol 2025;* online April 24

This global systemic failure to slow the obesity pandemic must end.

- To do so, we must end:
  - The misunderstanding
  - The underinvestment
  - The fragmentation
  - The stigmatization

State of Obesity 2024: Better Policies for A Healthier America

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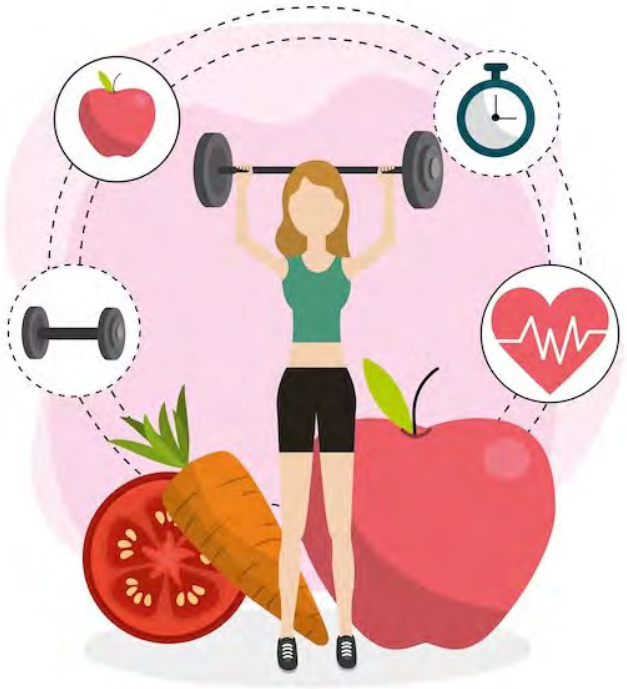
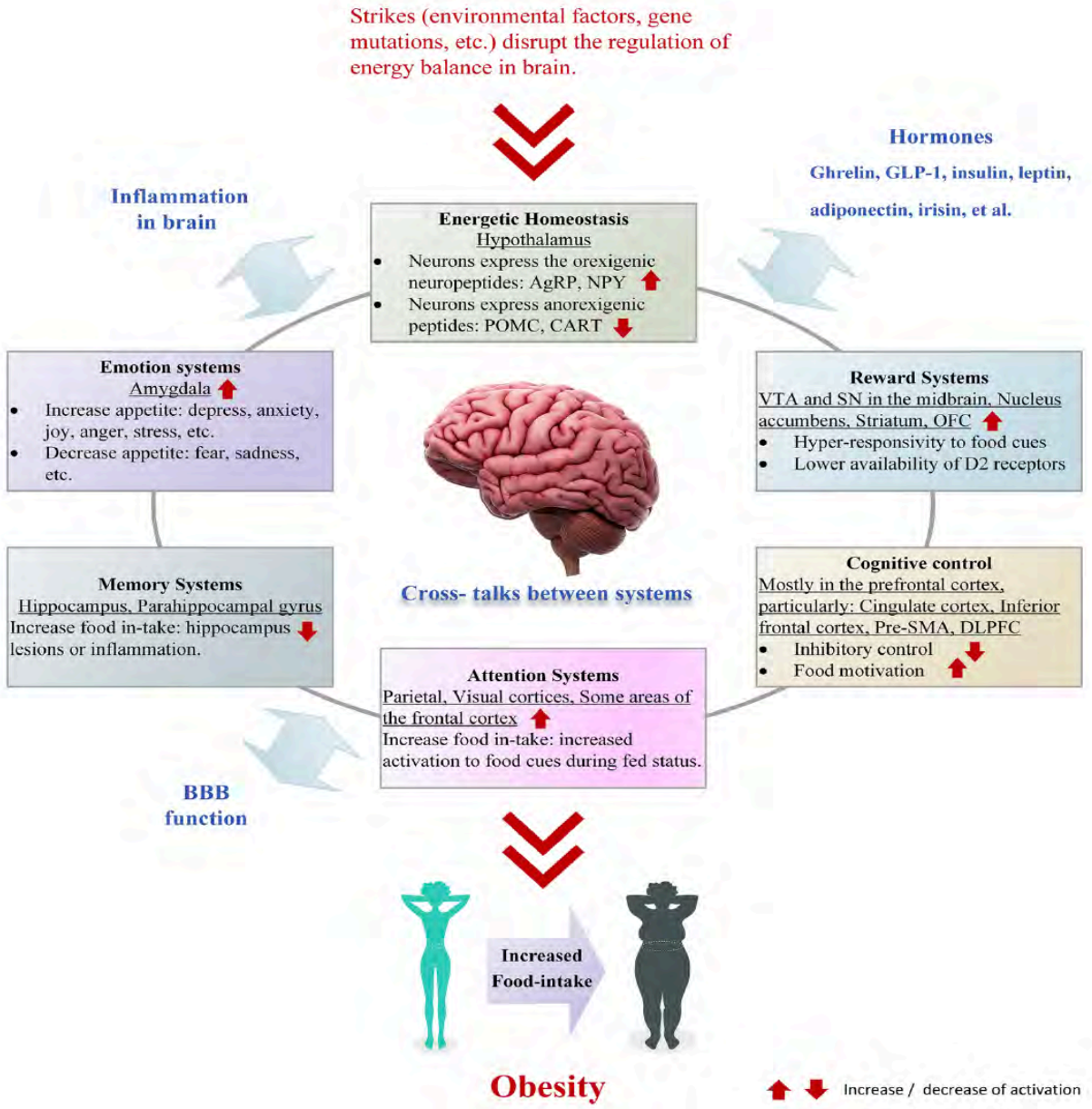
There is a fundamental misunderstanding about obesity…

THIS DOES NOT CAUSE OBESITY



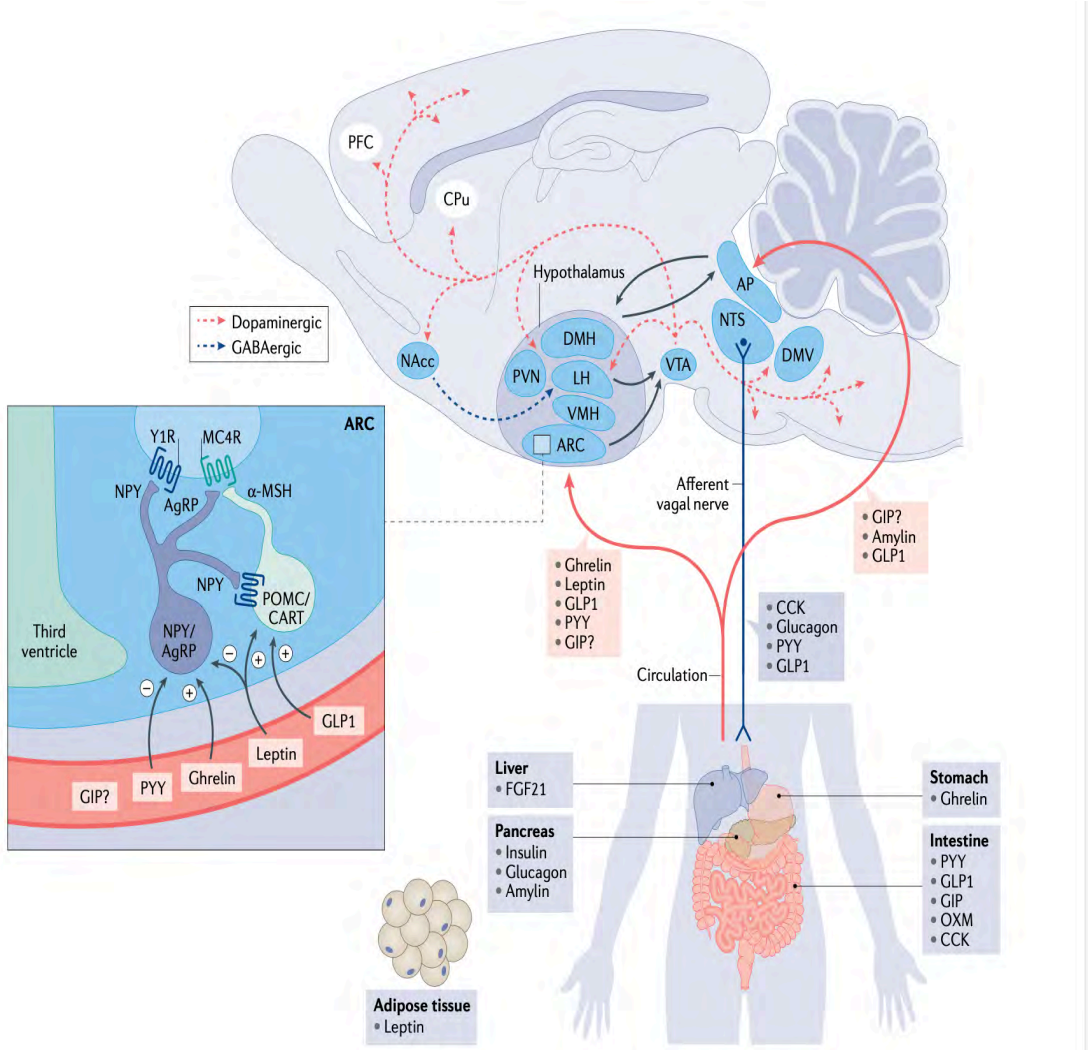
THIS DOES NOT TREAT OBESITY

Both food intake and fat mass/set point are highly regulated by the brain.



Qu et al. *Obesity Surgery*. 2020; 30:1988–2002.

Various hunger and satiety hormones signal to the brain to affect food intake.



Muller et al. *Nature Reviews* 2022; 21:201-223

The brain sets AND defends a fat mass (set point) for everyone.

Genetics

Obesogenic medications

Sedentary lifestyle

Circadian disruption/sleep disruption

Chronic stress

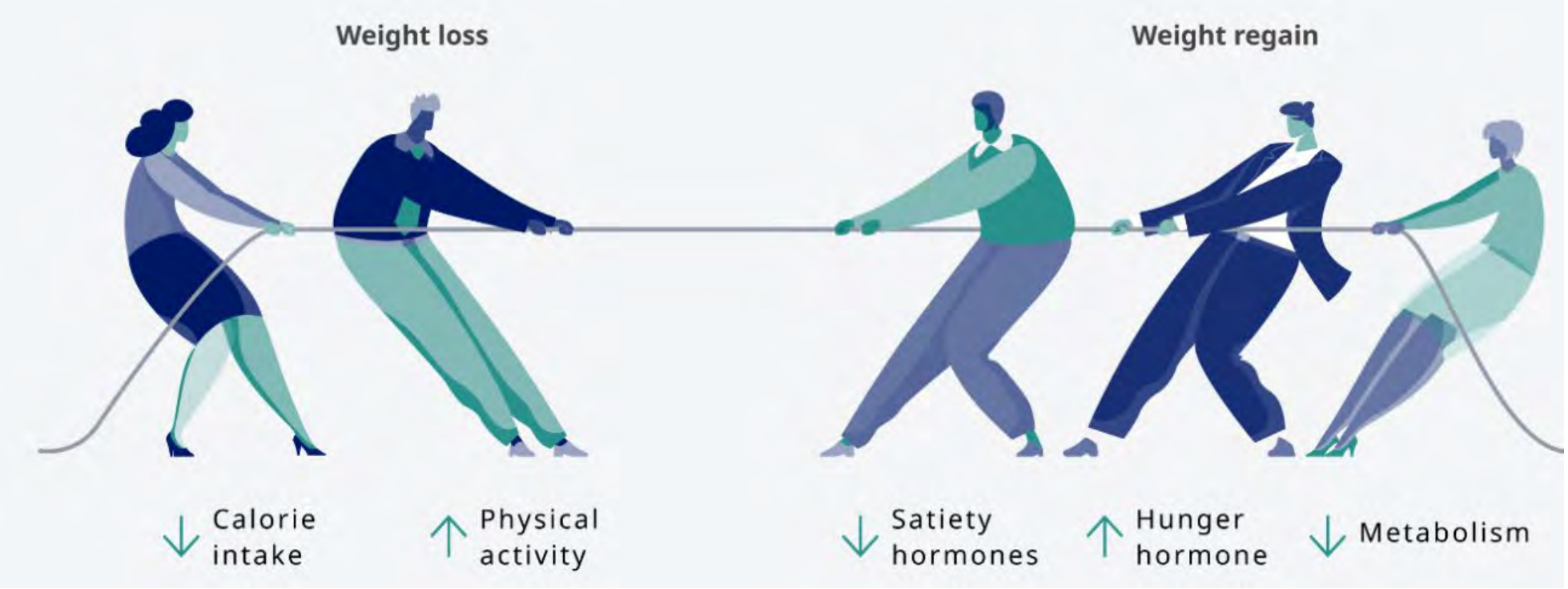
Social determinants of health

Altered food supply

In obesity, that fat mass/set point is abnormally high.

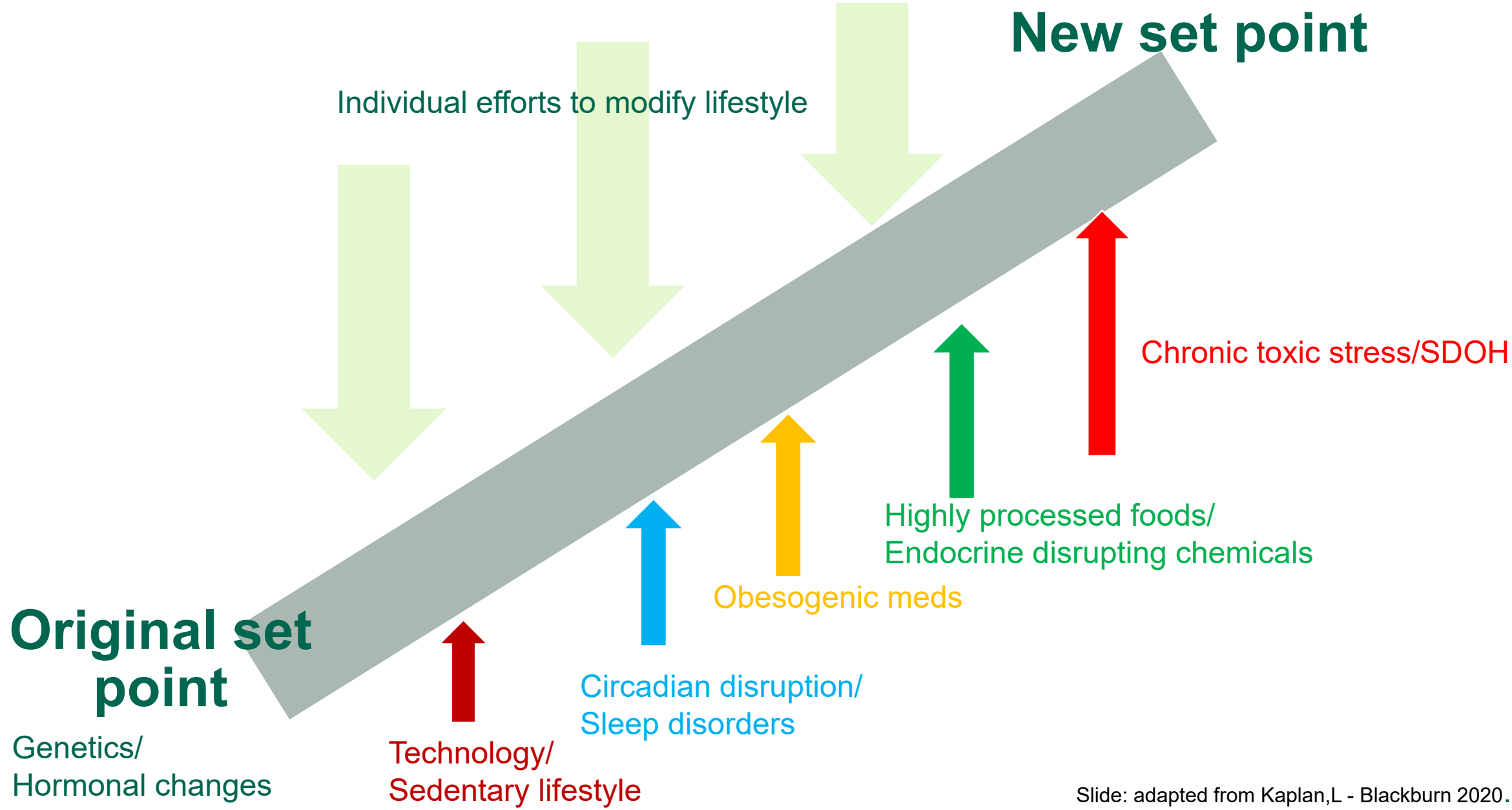
Slide: adapted from Kaplan,L - Blackburn 2020.

We have metabolically adapted to defend our fat mass.



www.rethinkobesity.com/metabolic-adaptation.html

What drives the development of obesity?



Slide: adapted from Kaplan,L - Blackburn 2020.

The definition of obesity is evolving as is the diagnostic criteria.

WHO: abnormal or excessive fat accumulation that presents a risk to health.

CDC: BMI > 30 kg/m^2

Obesity Medicine Association: A chronic, relapsing multi-factorial, neurobehavioral disease, wherein an increase in body fat promotes adipose tissue dysfunction and abnormal fat mass physical forces, resulting in adverse metabolic, biomechanical, and psychosocial health consequences.

The Lancet Commission 2025: provided explicit characterization of the illness intrinsically caused by excess adiposity and establish objective criteria for diagnosis.

Christensen et al. *Obesity Pillars 4.* 2022;100041
Rubino et al. *Lancet Diabetes Endocrinol;* 2025

OBESITY

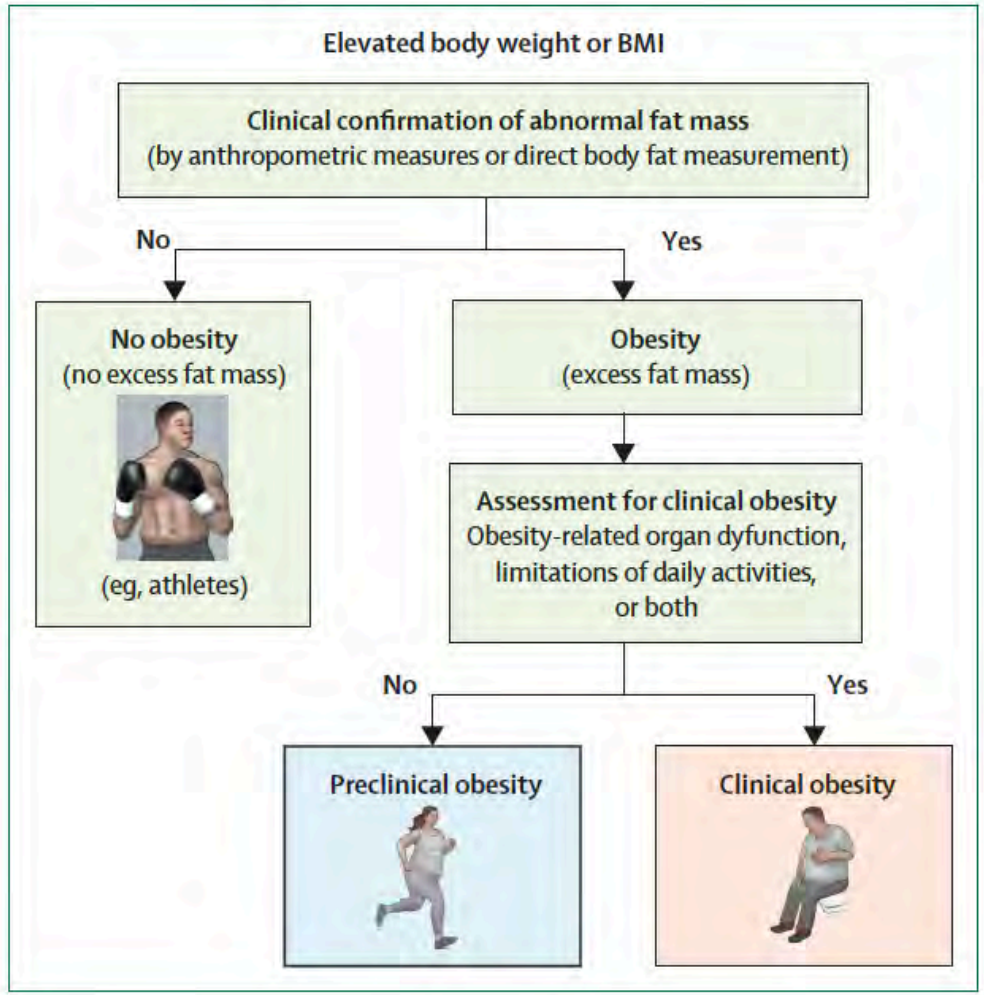
Excess fat mass +/- abnormal distribution or function

PRECLINICAL OBESITY

At increased risk of developing obesity related organ dysfunction, limitation of daily activities, or both

CLINCAL OBESITY

Chronic systemic illness with dysfunction of the tissues, organs, the entire individual



Rubino et al. *Lancet Diabetes Endocrinol;* 2025

The objectives for today's session.

ASSESS	The worldwide pandemic of obesity continues to worsen and low and middle income countries are least prepared.
UNDERSTAND	Obesity is a chronic, relapsing neurobiological and neurohormal disease whereby the affected individual CANNOT lower the set point with diet and exercise alone.
APPRECIATE	Both internal and external factors contribute to the development of obesity
REVIEW	Diagnosis still largely relies on BMI, however criteria is changing to reflect the greater importance of metabolic/orthopedic/psychosocial health than BMI alone.

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THANK YOU!

Role Play

WELCOME to the *Obesity Care in All Ages ECHO*

Session 2, Approach to the Patient with Obesity*, June 10th, 2025*

This ECHO is supported by the Walter and Carole Young Center for Digestive Health

Today's Program

- Brief housekeeping
- Didactic: Approach to the Patient with Obesity – Kimberly Dovin, MD
- Case Discussion
- Summary
- Up Next

APPROACH TO THE PATIENT WITH OBESITY

Kimberly Dovin, MD

Echo Series: Obesity Care in All Ages

Session #2

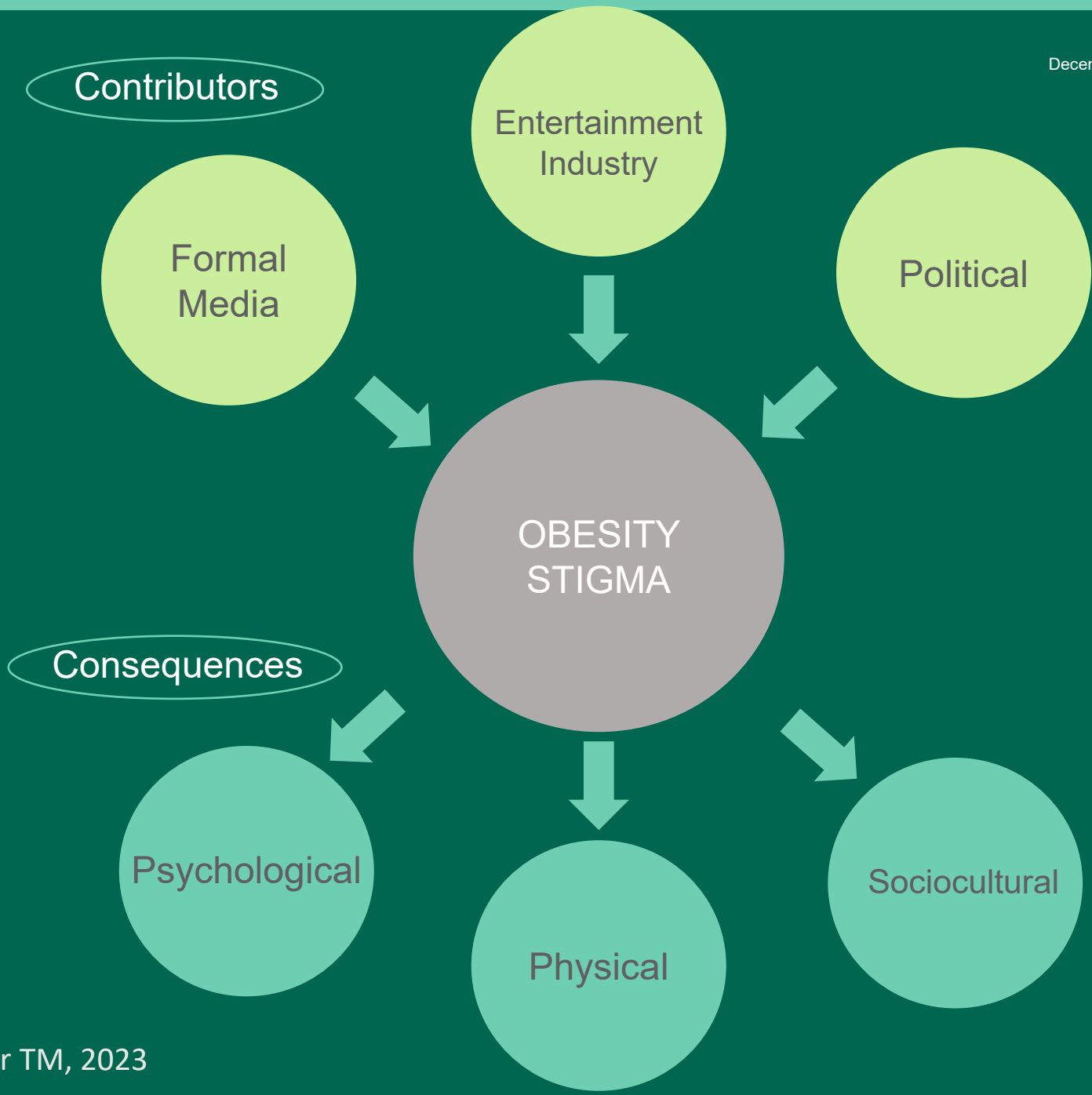
June 10, 2025

Goals

- How to talk to patients about weight
- Learn to take an obesity specific history
- Understand the evaluation of obesity to identify complications

Obesity Stigma and Bias

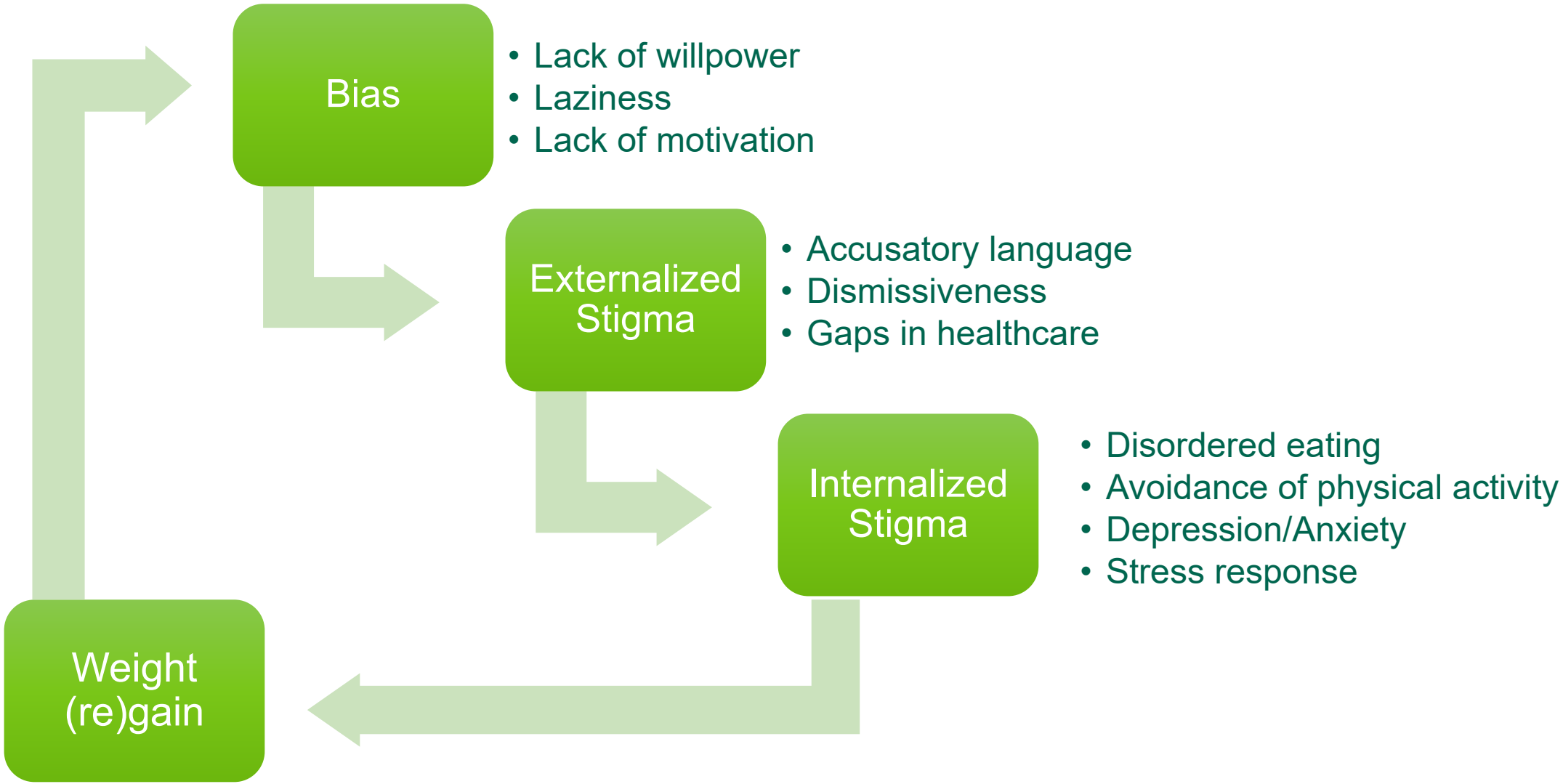
"Society regularly regards [persons with obesity] not as innocent victims, but as architects of their own ill health, personally responsible for their weight problems because of laziness and overeating."
-Rebecca Puhl and Chelsea Heuer



Westbury S, Oyebode O, van Rens T, Barber TM, 2023

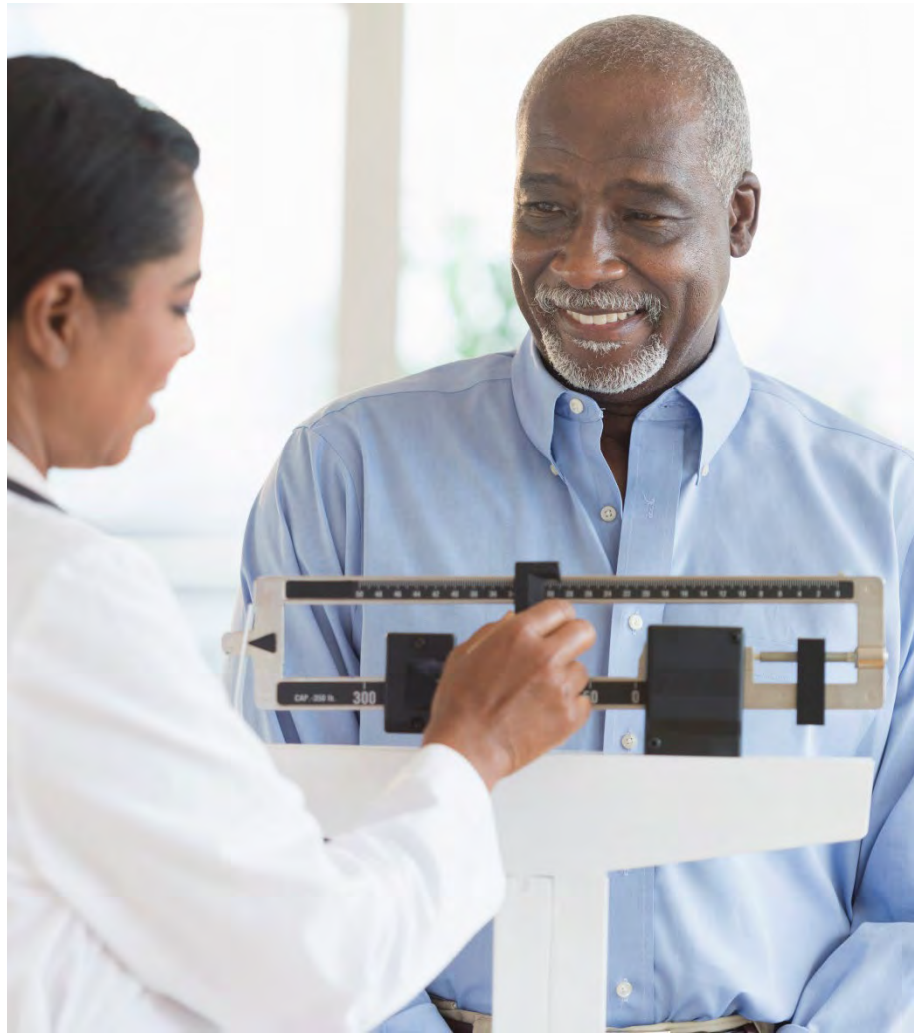
Obesity Stigma - **Medicine**

- 2nd only to family in perceived bias
- Less time/discussion
- Less evaluation/screening


Bias
• Lack of willpower
• Laziness
• Lack of motivation
Externalized Stigma
• Accusatory language
• Dismissiveness
• Gaps in healthcare
Internalized Stigma
• Disordered eating
• Avoidance of physical activity
• Depression/Anxiety
• Stress response
Weight (re)gain

Evaluation

- Starting the Conversation
- Take a weight history
- Assess symptoms and signs
- Set Goals
- (Re-)educate



Weight History

- “What is the story of your weight”
  - Did they have early childhood obesity (<5yo)
  - Stable adult weight?
  - Did they have any large gains and what might have been happening at that time?
  - Has it been gradual through adulthood?
  - How has excess weight impacted their life?

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Symptoms of Obesity

- Pervasive thoughts of food
- Excess or no hunger
- Abnormal satiation/satiety
- Craving
- Pain or discomfort
- Difficulty with daily activities due to size
- Fatigue
- SOB
- Low body image

Evaluation

Physical Exam

- Gen: central, gynecoid, generalized adiposity.
- VS, Waist and Neck circumference
- HEENT: Mallampati? Moon facies?
- Neck: buffalo hump,thyroid?
- CV: evidence of arrythmia?
- Abd: hepatomegaly?
- Ext: edema, cuffing?
- Gait: antalgic?
- Skin: acanthosis, hidradenitis, acne, hirsutism, abdominal striae, tender subcutaneous nodules, intertrigo

Evaluation (continued)

Laboratory evaluation

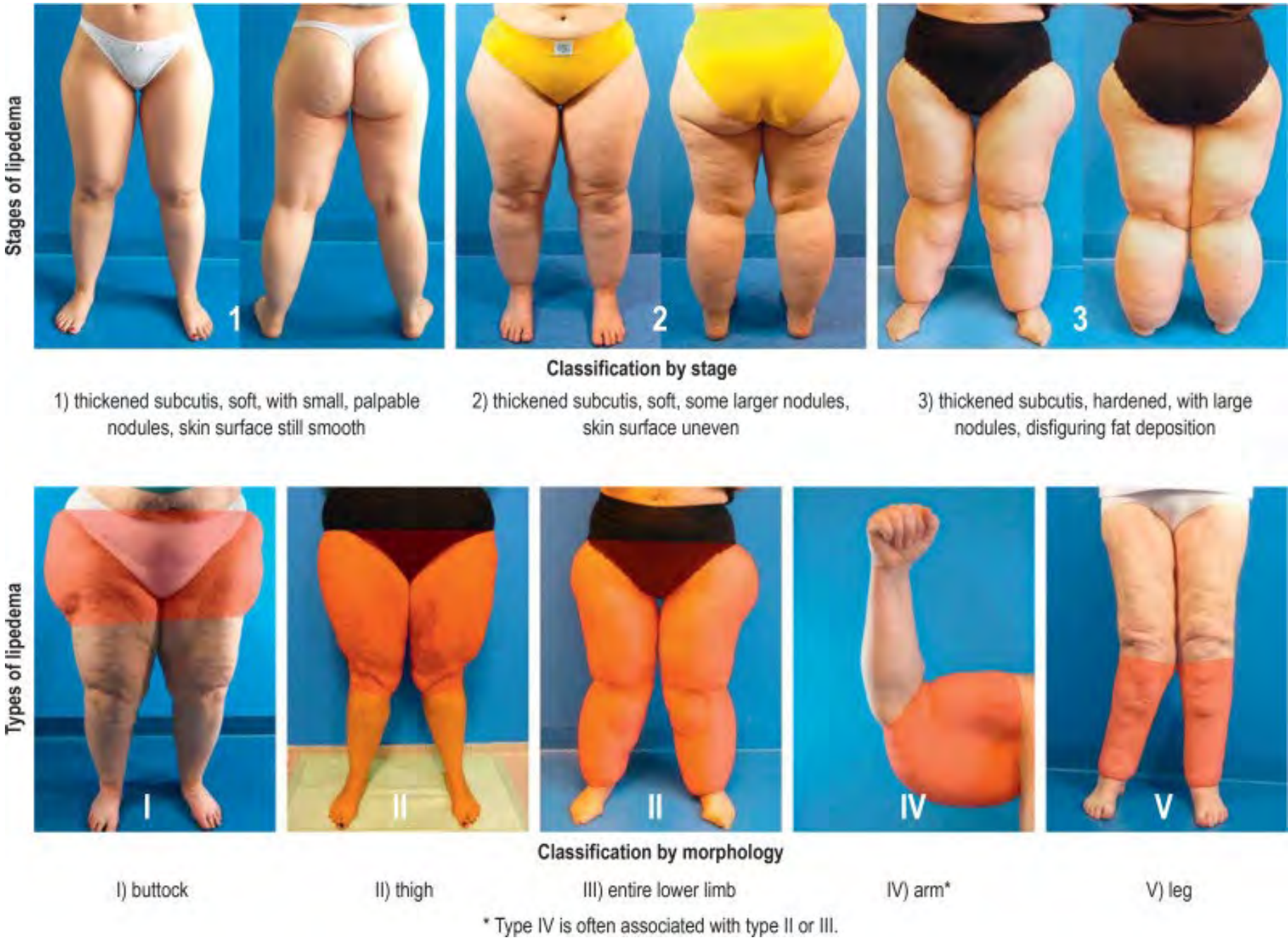
- CBC, CMP
- TSH
- Lipid panel
- FBS, A1c
- Vitamin D

Complications

- Obesogenic medications
- MASLD/MASH – Fib4 calculation
- OSA
- Eating disorders
- Contraindications to AOMs

Lipedema

Kruppa P, Georgiou I, et al PMID: 32762835; PMCID: PMC7465366.



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Goals of Treatment

- ~~BMI < 25~~
- Improvement in complications
- Symptom Resolution
- QOL
- BMI <30?
- BMI >= 23

Summary – Evaluating the Patient with Obesity

Approach patients with compassion

Take a disease-specific H&P

Set non-scale goals for treatment

- Kruppa P, Georgiou I, Biermann N, Prantl L, Klein-Weigel P, Ghods M. Lipedema-Pathogenesis, Diagnosis, and Treatment Options. Dtsch Arztebl Int. 2020 Jun 1;117(22-23):396-403. doi: 10.3238/arztebl.2020.0396. PMID: 32762835; PMCID: PMC7465366.
- Obesity Medicine Association. Pediatric Obesity Algorithm. https://obesitymedicine.org/resources/obesity-algorithm/. (Accessed = May 31, 2025)
- Pearl RL, Puhl RM, Himmelstein MS, Pinto AM, Foster GD. Weight Stigma and Weight-Related Health: Associations of Self-Report Measures Among Adults in Weight Management. Ann Behav Med. 2020 Nov 1;54(11):904-914. doi: 10.1093/abm/kaaa026. PMID: 32333673; PMCID: PMC7646152.
- Puhl RM, Brownell KD. Confronting and coping with weight stigma: an investigation of overweight and obese adults. Obesity (Silver Spring). 2006 Oct;14(10):1802-15. doi: 10.1038/oby.2006.208. PMID: 17062811.
- Puhl RM, Heuer CA. The stigma of obesity: a review and update. Obesity (Silver Spring). 2009 May;17(5):941-64. doi: 10.1038/oby.2008.636. Epub 2009 Jan 22. PMID: 19165161.
- Westbury, S., Oyebode, O., van Rens, T. *et al.* Obesity Stigma: Causes, Consequences, and Potential Solutions. *Curr Obes Rep* **12**, 10–23 (2023). https://doi.org/10.1007/s13679-023-00495-3

WELCOME to the *Obesity Care in All Ages ECHO*

Session 3, Optimizing the Use of Lifestyle-based Obesity Care*, July 8th, 2025*

This ECHO is supported by the Walter and Carole Young Center for Digestive Health

Today's Program

- Brief housekeeping
- Didactic: Optimizing the Use of Lifestyle-based Obesity Care – Shelby Sullivan, MD, FACG, FACG, DABOM
- Case Discussion
- Summary
- Up Next

Optimizing the use of Lifestyle-Based Obesity Care

Shelby Sullivan MD, FACG, FACG, DABOM

Director, Endoscopic Bariatric and Metabolic Program

Dartmouth-Hitchcock Medical Center and Geisel School of Medicine

Disclosure

The following planning committee member(s), speaker(s), author(s) or anyone in a position to control the content for this activity have reported the following financial relationship(s) with ineligible company(ies). All of the relevant financial relationships listed for these individuals have been mitigated.

Sarah Finn, MD ~ was a consultant to Harbor Capital (relationship has ended).

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Disclosure:

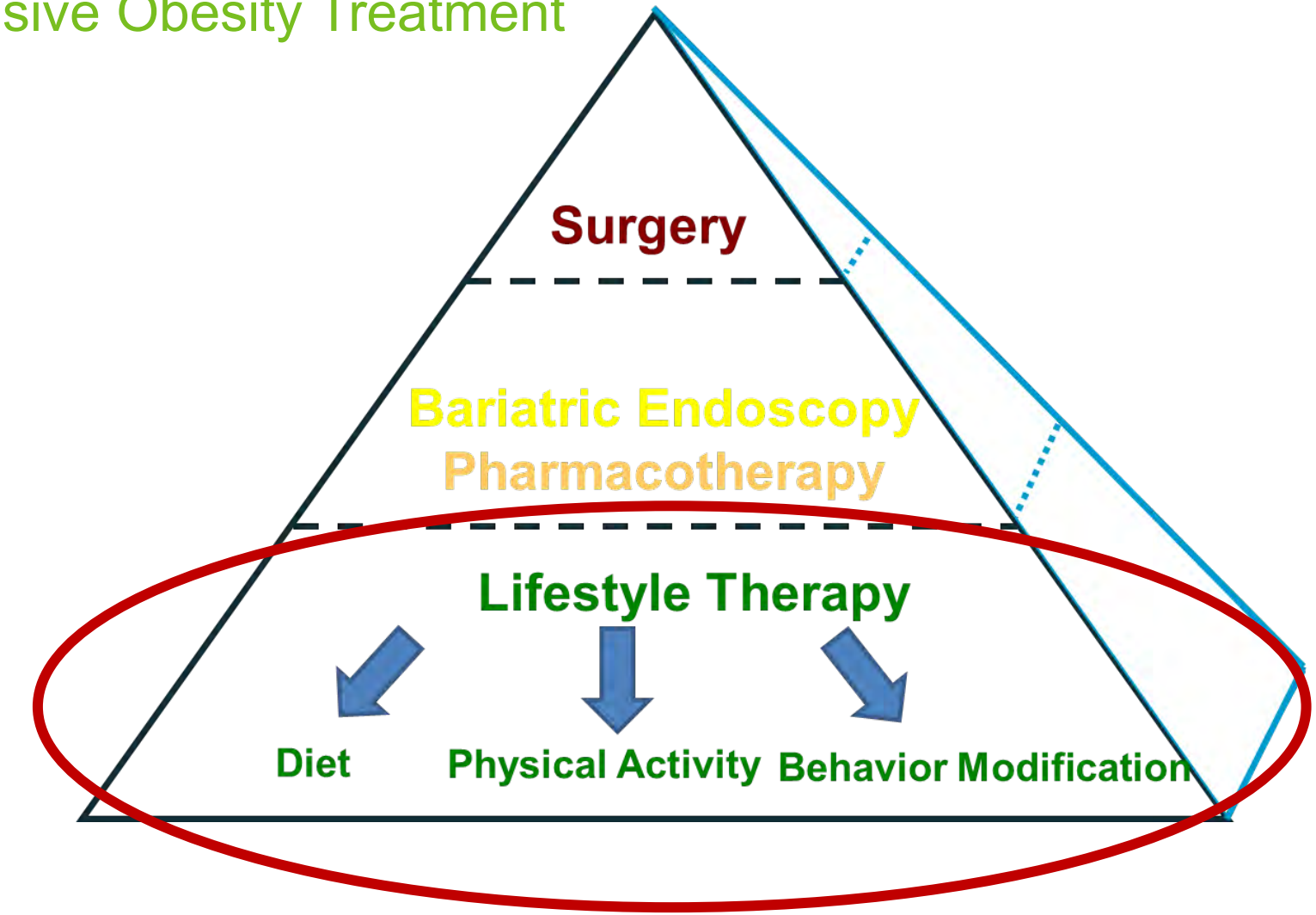
Shelby Sullivan, MD ~ is a consultant to Allurion, Bioling, Pentax Medical, and Olympus Corporation. She also has grant/research support from Fractyl. Dr. Sullivan was a consultant to Fractyl (relationship has ended) and had grant/research support from Allurion (relationship has ended).

Other planning committee member(s), speaker(s), activity director(s), author(s) or anyone in a position to control the content for this activity have no relevant financial relationship(s) with any ineligible company(ies) to disclose.

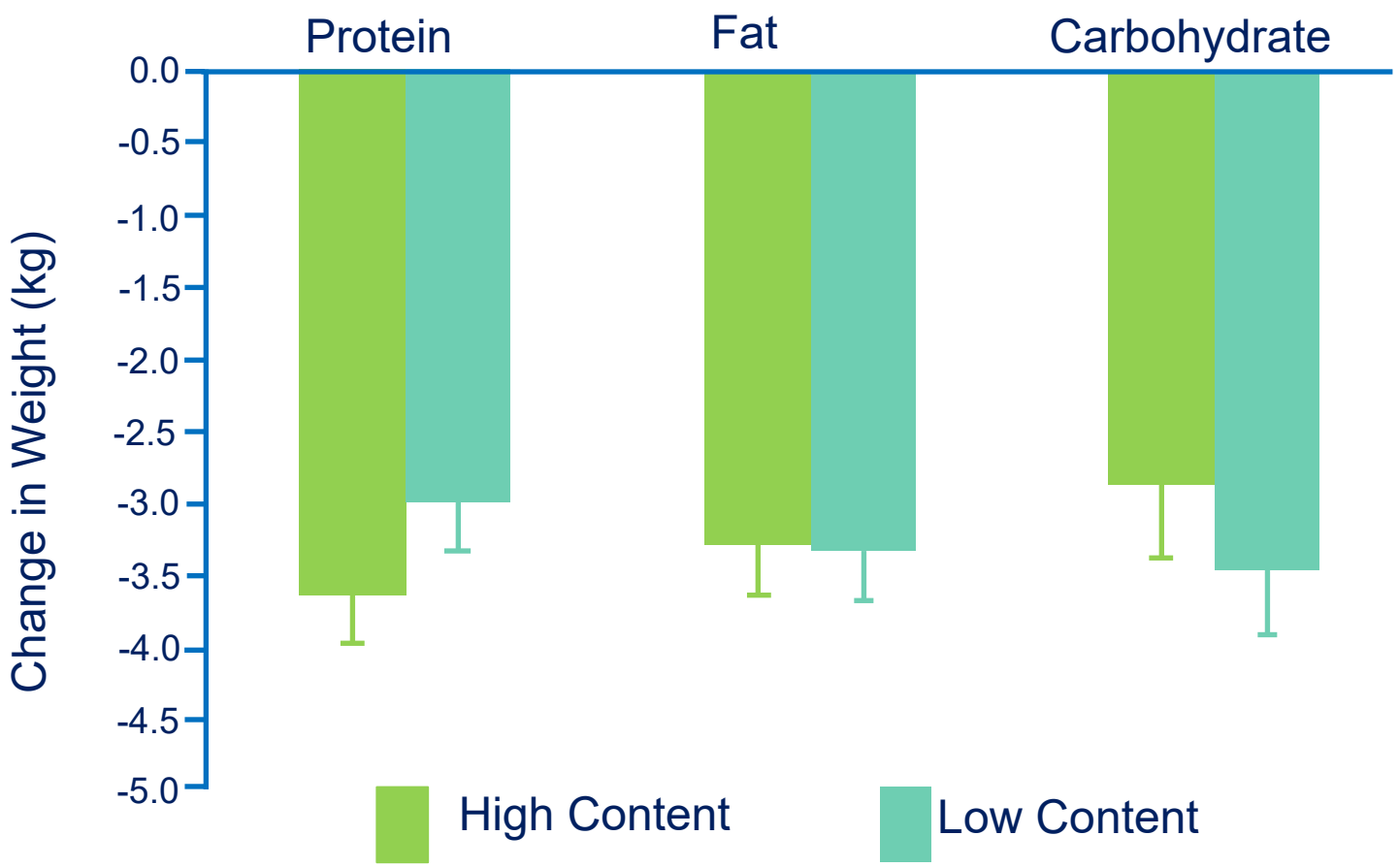
Disclosures

- Shelby Sullivan, M.D. has financial interests to disclose.
- Research Support / Grants Last 24 Months
  - Allurion Technologies, Fractyl Laboratories
- Consulting / Employment Last 24 Months
  - Allurion Technologies, Fractyl Laboratories, Biolinq, Pentax , Olympus
    - Notes

Comprehensive Obesity Treatment



Comparison of Varying Macronutrient Composition: Pounds Lost Study

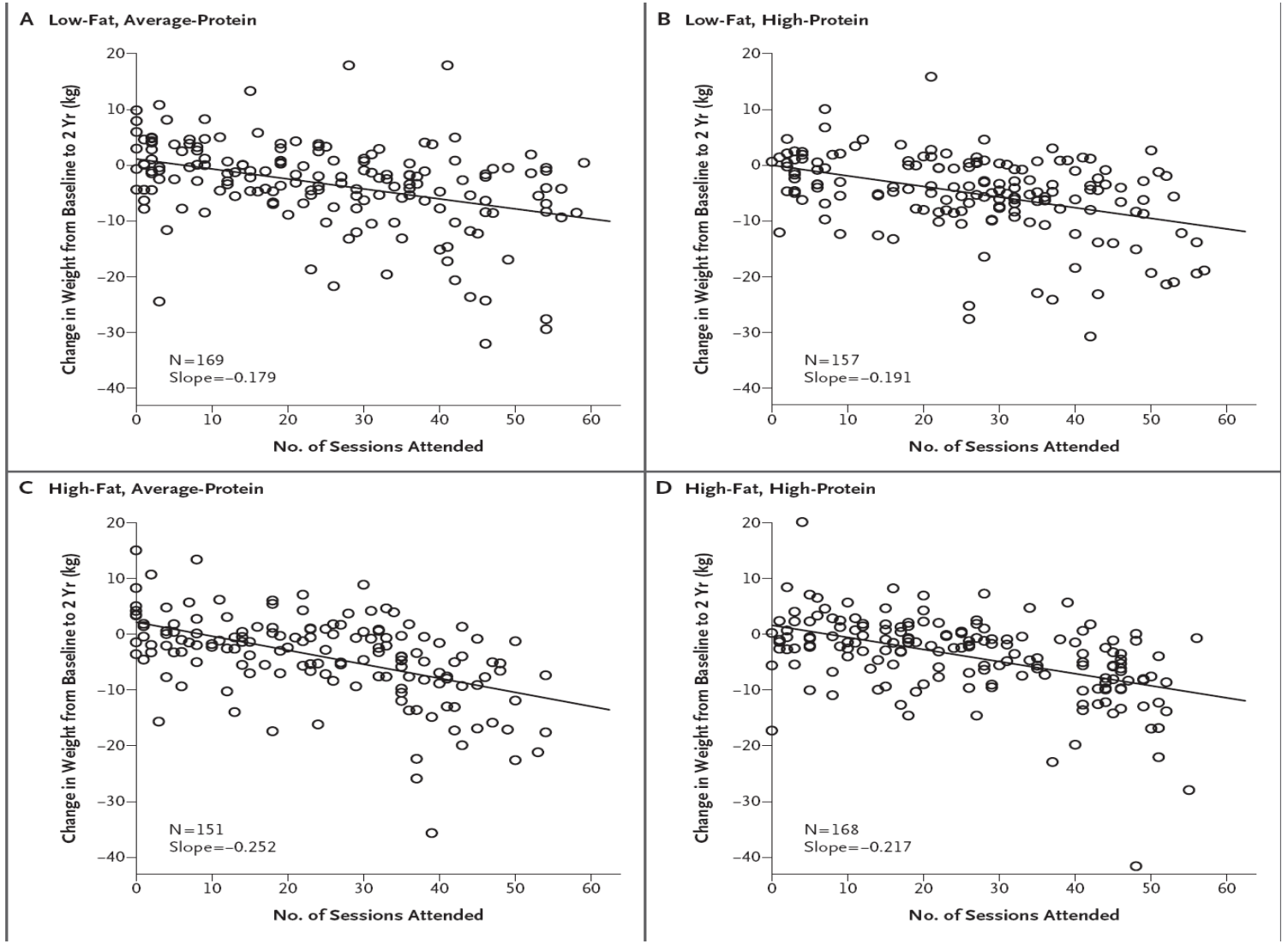


Differing macronutrient composition of the diet did not affect overall weight loss

Sacks F et al. N Engl J Med 2009;360:859-873

Comparison of Varying Macronutrient Composition: Pounds Lost Study

The number of visits with the study team for lifestyle therapy was directly correlated with weight los



Sacks F et al. N Engl J Med 2009;360:859-873

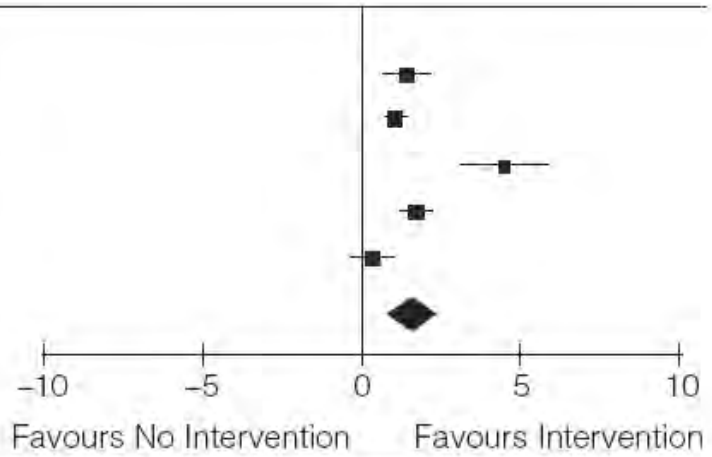
Lifestyle Therapy after Bariatric Surgery

Table 3 Forest plot of standardized mean differences in a random-effects model for percentage of excess weight loss in treatment and control group patients 6–12 months after start of the intervention

Study or subgroup	Intervention			No intervention			Weight	Standardized mean differences IV, random, 95% CI
	M	SD	Total	M	SD	N		
Kalarchian *et al.* (2011) (44)	5.8	3.5	18	0.9	3.2	18	20.1%	1.43 (0.69, 2.17)
Nijamkin *et al.* (2012) (38)	79.6	15.5	72	63.8	14.2	72	23.5%	1.06 (0.71, 1.41)
Papalazarou *et al.* (2010) (41)	76.4	4.1	15	57.5	4.1	15	13.6%	4.49 (3.07, 5.90)
Sarwer *et al.* (2012) (47)	26.1	1.5	41	23.5	1.5	43	22.3%	1.72 (1.21, 2.22)
Tucker *et al.* (1991) (46)	55	15.9	17	48.8	17.9	15	20.5%	0.36 (–0.34, 1.06)
Total (95% CI)			163			163	100.0%	1.60 (0.82, 2.38)

Heterogeneity: $Tau^2 = 0.64$; $Chi^2 = 31.04$, df = 4 ($P < 0.00001$); $I^2 = 87\%$

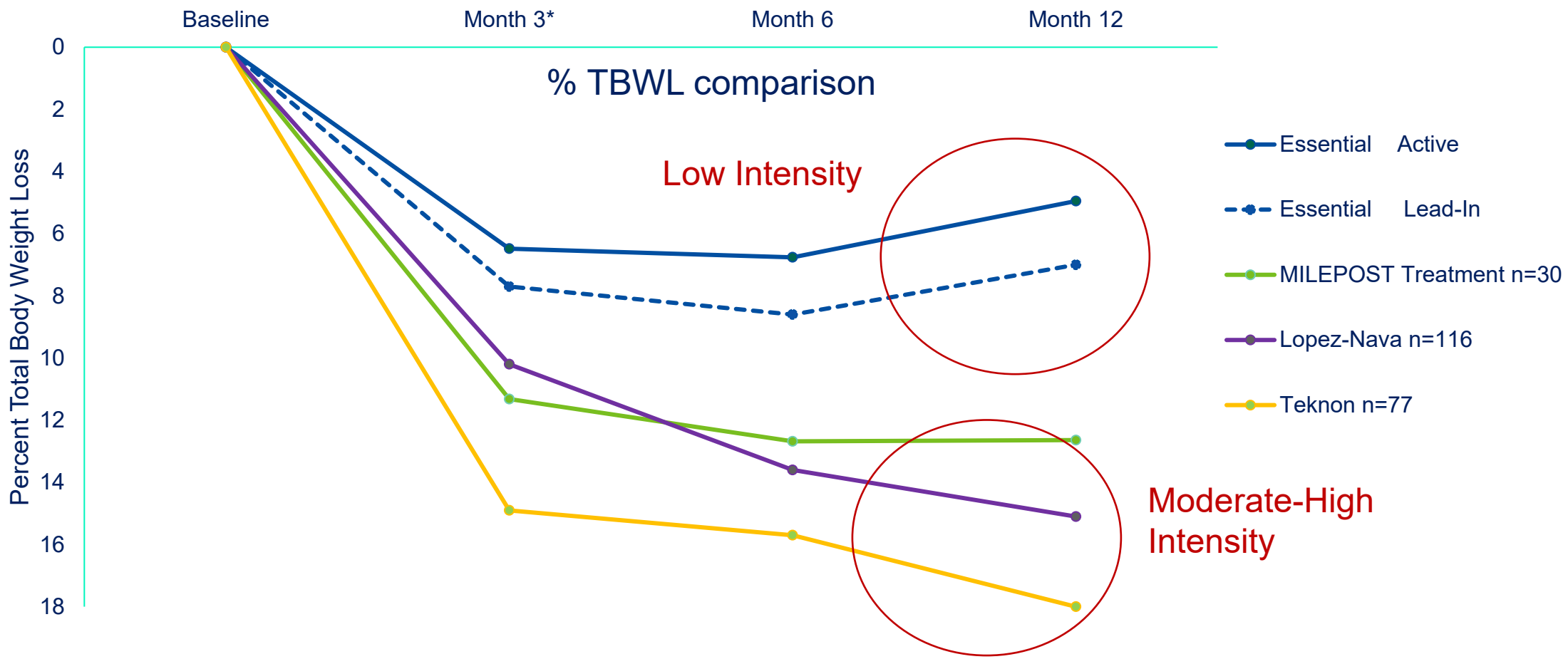
Test for overall effect: $Z = 4.04$ ($P < 0.0001$)



CI, confidence interval; df, degrees of freedom; M, mean; N, number of patients; SD, standard deviation.

Rudolph A. Obesity Reviews. 2013;14:292-302

Intensity of Lifestyle Therapy



Miller K. Obesity Surgery. 2016 epub ahead of print
Lopez-Nava G. SOARD. 2015;11:861-865
Sullivan S. *Obesity*. 2017;25(2):294-301.

Diets with Data

Diet	Carb	Fat	Protein
LEARN	Moderate	Low	Normal
Atkins	Very Low	High	High
South Beach	Moderate	Moderate	Moderate
Paleo	Moderate	Low	High
Zone	Moderate	Moderate	Moderate
Pritikin/ Ornish	High	Very Low	Normal
Mediterranean	Moderate	Moderate	Normal
Keto	Very Low	High	Normal

Common Themes

- Reduction in either the type or amount of food
- Reduce or eliminate sweets
- Reduce or eliminate sugar sweetened beverages
- Use whole grains when grain products are consumed

Network Meta-Analysis: Comparisons of Named Diet programs

		12-mo Weight Loss, kg			
	No diet (6 mo: 0; 12 mo: 0)[a]	5.16 (2.68 to 7.63)	5.70 (4.14 to 7.35)	7.25 (5.33 to 9.25)	7.27 (5.26 to 9.34)
6-mo Weight Loss, kg	6.07 (4.23 to 7.84)	LEARN (6 mo: 0; 12 mo: 0.02)[a]	0.55 (−1.71 to 2.87)	2.10 (−0.20 to 4.47)	2.12 (−0.33 to 4.59)
	6.78 (5.50 to 8.05)	0.71 (−0.97 to 2.44)	Moderate macronutrients (6 mo: 0; 12 mo: 0)[a]	1.55 (0.13 to 2.95)	1.56 (−0.17 to 3.30)
	8.73 (7.27 to 10.20)	2.66 (0.93 to 4.44)	1.95 (1.13 to 2.79)	Low carbohydrate (6 mo: 0.83; 12 mo: 0.48)[a]	0.02 (−1.78 to 1.79)
	7.99 (6.01 to 9.92)	1.92 (−0.19 to 4.06)	1.20 (−0.42 to 2.79)	−0.74 (−2.31 to 0.78)	Low fat (6 mo: 0.17; 12 mo: 0.50)[a]

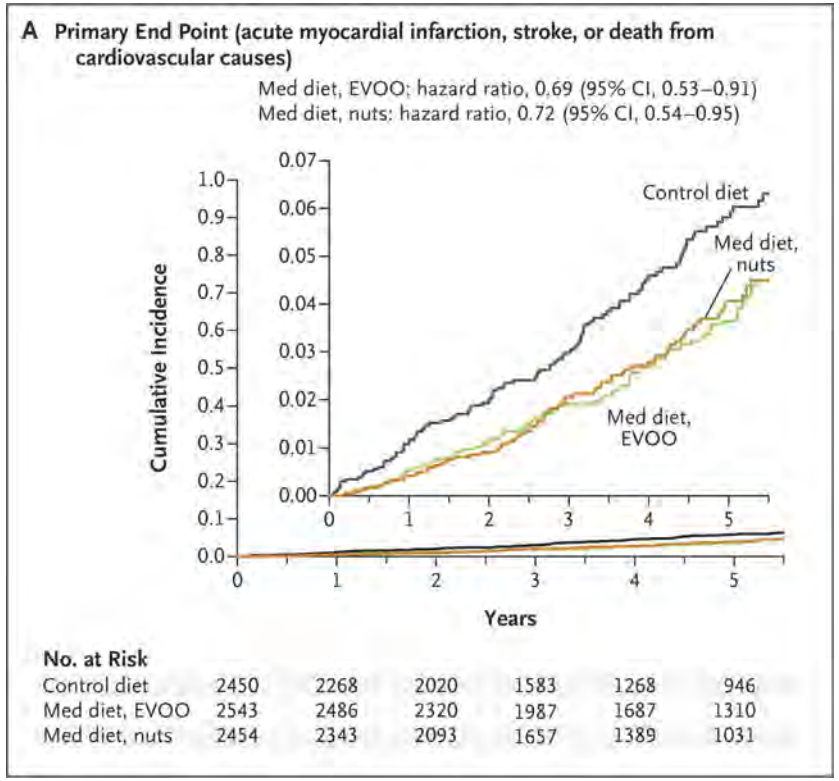
- 59 Article with 7286 patients
- Significant weight loss for both low-carb and low-fat diets
- Difference between named diets was small

Johnston BS. JAMA.2014;312(9):923-933

Mediterranean Diet: PREDIMED Study

Table 1. Summary of Dietary Recommendations to Participants in the Mediterranean-Diet Groups and the Control-Diet Group.

Food	Goal
Mediterranean diet	
Recommended	
Olive oil*	≥4 tbsp/day
Tree nuts and peanuts†	≥3 servings/wk
Fresh fruits	≥3 servings/day
Vegetables	≥2 servings/day
Fish (especially fatty fish), seafood	≥3 servings/wk
Legumes	≥3 servings/wk
Sofrito‡	≥2 servings/wk
White meat	Instead of red meat
Wine with meals (optionally, only for habitual drinkers)	≥7 glasses/wk
Discouraged	
Soda drinks	<1 drink/day
Commercial bakery goods, sweets, and pastries§	<2 servings/wk
Spread fats	<1 serving/day
Red and processed meats	<1 serving/day
Low-fat diet (control)¶	
Recommended	
Low-fat dairy products	≥3 servings/day
Bread, potatoes, pasta, rice	≥3 servings/day
Fresh fruits	≥3 servings/day
Vegetables	≥2 servings/day
Lean fish and seafood	≥3 servings/wk
Discouraged	
Vegetable oils (including olive oil)	≤2 tbsp/day
Commercial bakery goods, sweets, and pastries§	≤1 serving/wk
Nuts and fried snacks	≤1 serving/wk
Red and processed fatty meats	≤1 serving/wk
Visible fat in meats and soups‖	Always remove
Fatty fish, seafood canned in oil	≤1 serving/wk
Spread fats	≤1 serving/wk
Sofrito‡	≤2 servings/wk



Weight loss at 5 years:

- Control: -0.604 kg
- Med, EVOO: -0.88 kg
- Med, Nuts: 0.188 kg

HR primary Endpoint

- Med, EVOO: 0.69
- Med, Nuts: 0.72

Estruch R. NEJM. 2018;378:e34

Estruch R. Lancet Diabetes and Endocrinology.2019;7(5):e6-17

Meal Replacements and Odds of Achieving >5% and >10% TBWL at 1 year

	≥5% Weight Loss	≥10% Weight Loss
	OR [95% CI]	**OR [95% CI]**
MR diet vs diet only	2.83* [1.37, 5.86] I^2 = 40	1.73 [0.92, 3.26] I^2 = 0
MR diet + support vs diet + support	1.49* [1.08, 2.06] I^2 = 44	1.80* [1.12, 2.87] I^2 = 56
MR diet + support vs diet only	2.83* [1.37, 5.86] I^2 = 25	5.95* [2.12, 16.67] I^2 = 1
MR diet + enhanced support vs diet + support	4.32* [3.01, 6.20] I^2 = 0	6.63* [4.01, 10.94] I^2 = 0
MR diet + support vs minimal control	4.03* [1.87, 8.69] I^2 = 82	8.32* [2.02, 34.16] I^2 = 93

Astbury NM. Obesity Reviews. 2019;20(4):569-587

Long-term Calorie Goals

- Based on start weight, gender, level of physical activity
- Goal for 1-2 pound weight loss per week
  - 500 kcal/day deficit = 1 pound per week
  - 750-1000 kcal/day deficit = 2 pounds per week
- Estimates for BMI 30-40 kg/m^2:
  - 1200-1500 kcal/day women
  - 1500-1800 kcal/day men
- Comparison - Gastric Bypass
  - 500-970 kcal/ day in the first 3 months
  - 870-1420 kcal/day at the end of the first year

Jensen, MD. Obesity. 2014;22(2):S5-S39
Klein, S. Gastroenterology. 2002;123(3):882-932

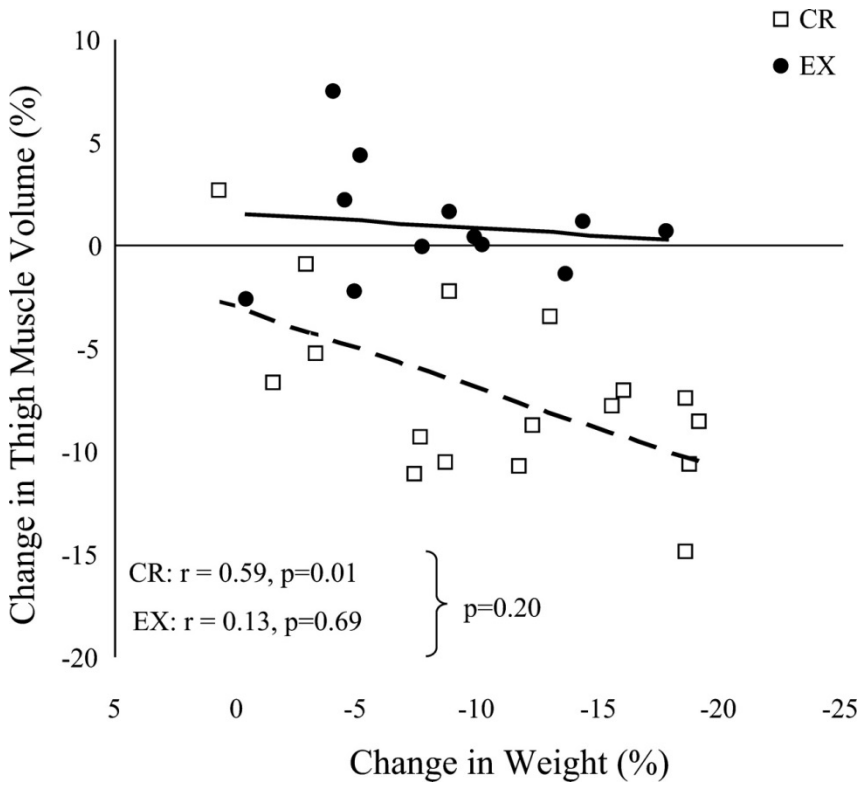
Bobbioni-Harsch E. Eur J Clin Nutr. 2002;56:551-6.
Ribeiro AG. Nutr Hosp. 2009;24:32-9.
Coughlin K, Bell RM, Bivins BA, et al. Arch Surg 1983;118:813-6.
Anderson WA. Obesity. 2007;15:1455-1463.

Dartmouth Health

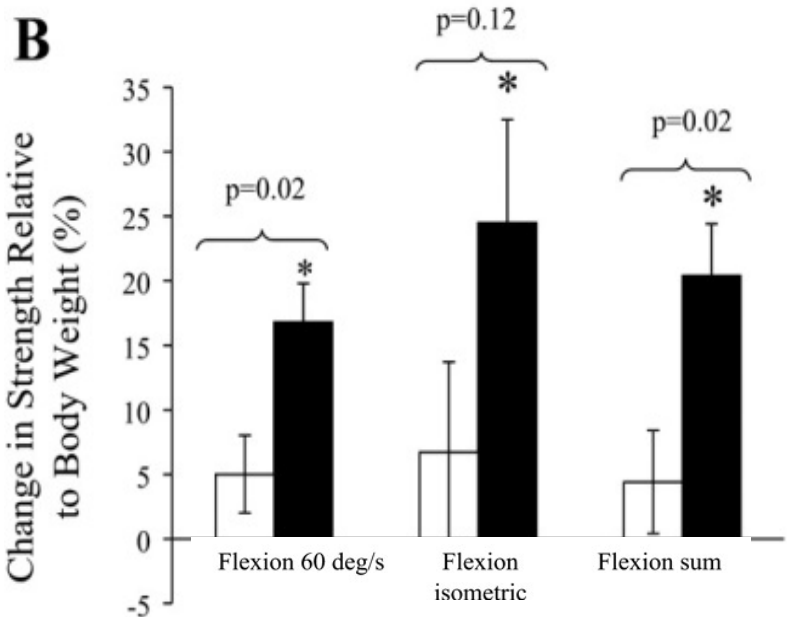
Project ECHO

Exercise Preserves Lean Muscle Tissue

Muscle Thigh Volume

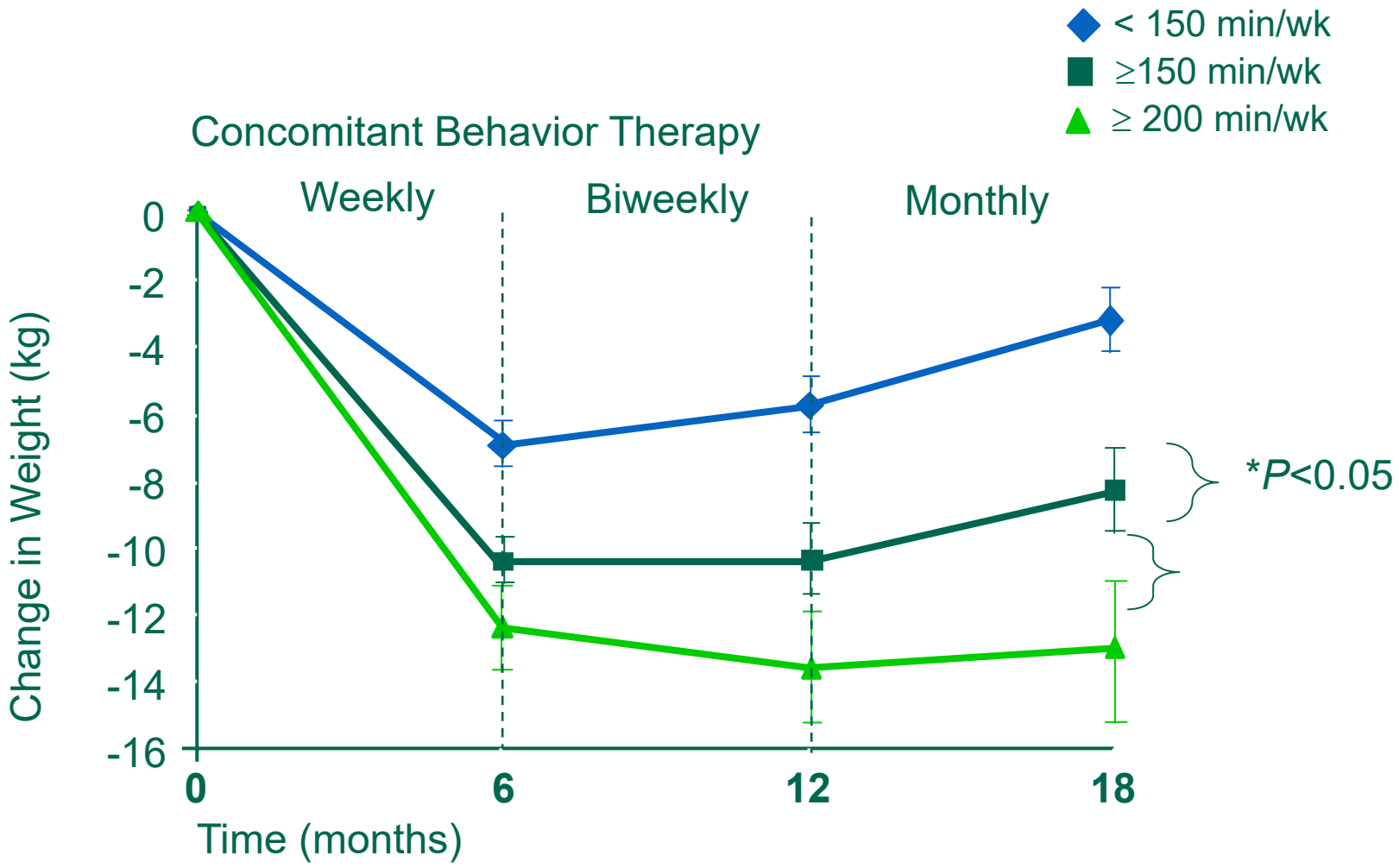


Strength Relative to Body Weight



Weiss, EP. Journal of Applied Physiology.2007;102(2):634-640

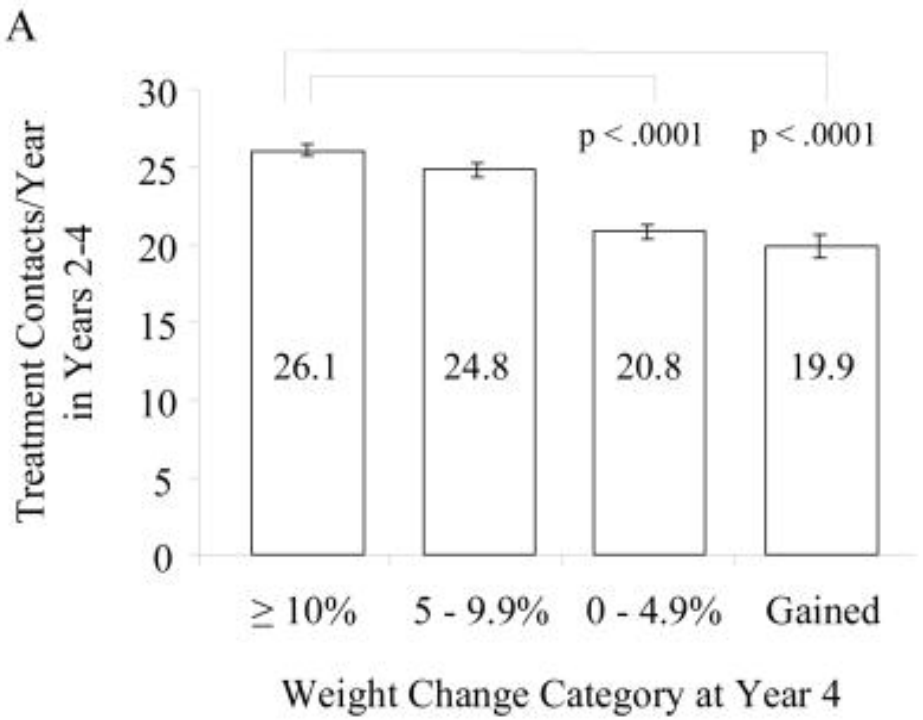
Physical Activity Is Necessary for Weight Loss Maintenance



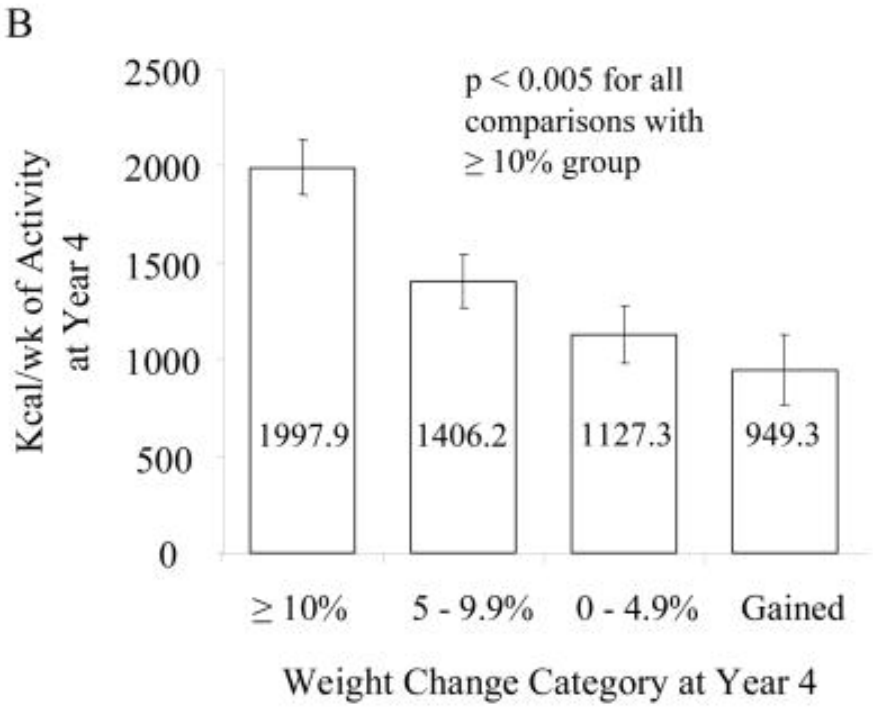
Jakicic et al. *JAMA* 1999;282:1554.

Predictors of Success in Lifestyle Therapy

Treatment Contacts



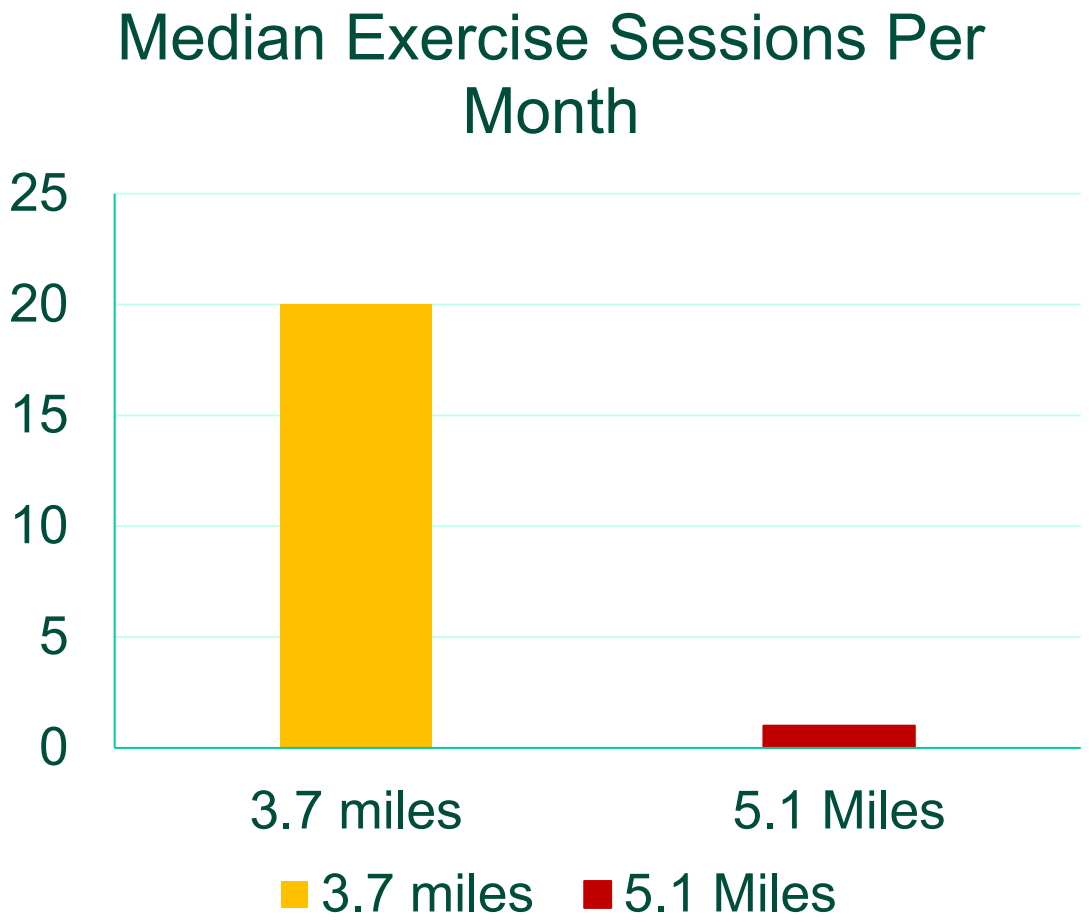
Exercise



Wadden TA. Obesity. 2011;19:1987-1998

Gym Use and Distance From Home

- Data collected from 7.5 million mobile devices by the data firm Dstillery
- Difference of only 1.4 miles between going to the 5 times a week vs one time per month
- Summary – even small barriers will reduce exercise



https://dstillery.com/press/probably-youre-skipping-gym/. Accessed 12.15.22

Exercise for Weight Loss and Weight Maintenance

American Heart Association/American College of Cardiology/The Obesity Society Guidelines and American Diabetes Association Guidelines

- **Weight loss and Adults with type I and type II diabetes**
  - ≥150 minutes per week moderate intensity (brisk walk)
  - Equal to ≥ 30 minutes/day most days of the week
- **Weight maintenance**
  - 200-300 minutes per week moderate intensity
  - 40-60 minutes/day most days of the week
- **Strength and flexibility**
  - Recommended as a consideration by the obesity guidelines
  - ADA Guidelines Recommend 2-3 sessions per week

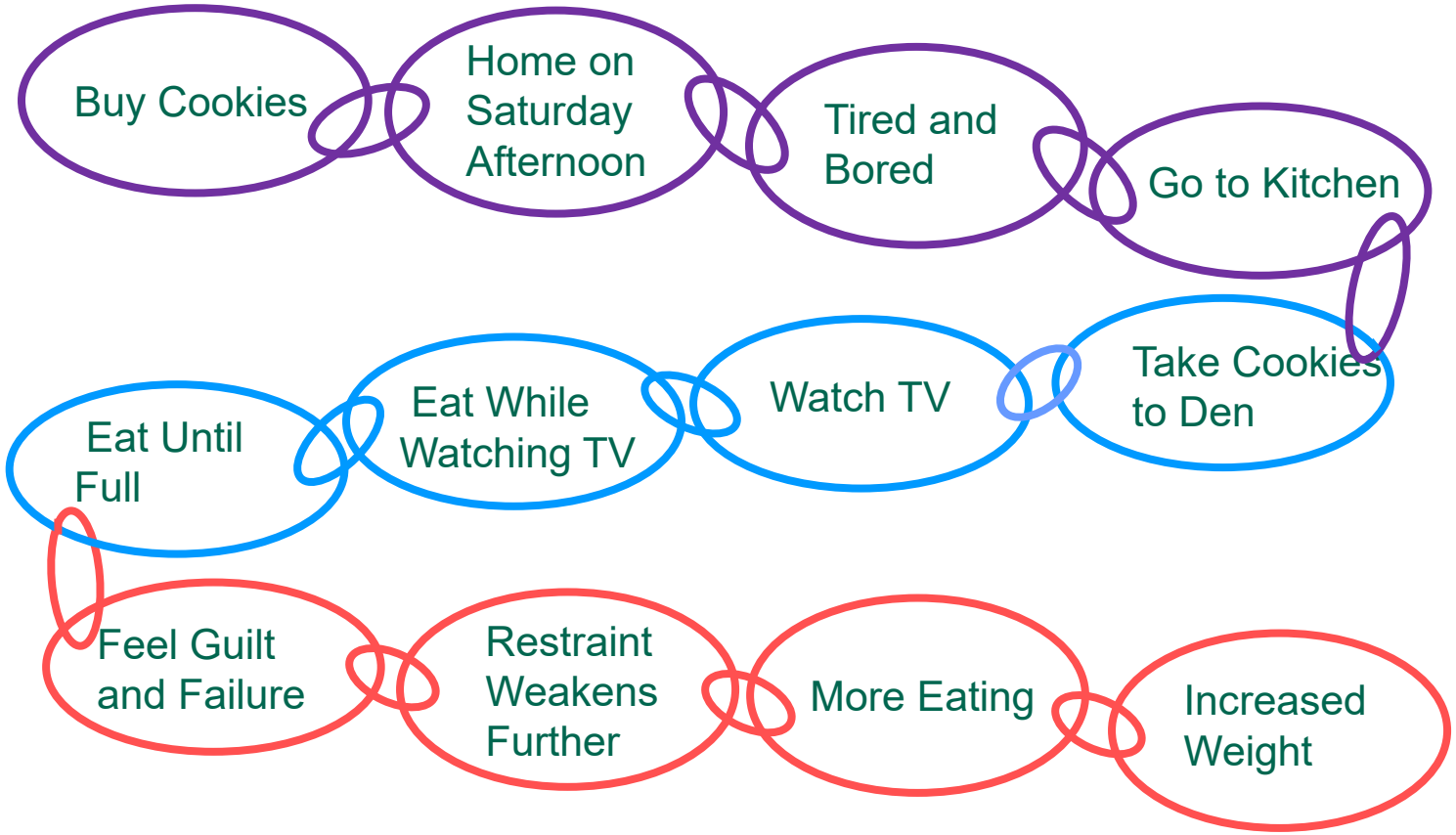
Jensen, MD. Obesity. 2014;22(2):S5-S39
Diabetes Care. 2022;45(Supplement_1):S60-S82

Department of Health and Human Services 2018 Physical Activity Guidelines

Age	Aerobic Activity	Muscle Strengthening
6-17	60 minutes of moderate or vigorous physical activity (PA)/day including at least 3 days ofvigorous PA/wk	3 days/week and included as part of the 60 minutes of daily PA. Also include bone-loading activity
18-64	150-300 minutes of moderate PA/wk, 75 minutes of vigorous PA/wk or equivalent combination spread throughout the week	Muscle strengthening activities at moderate or greater intensity (all major muscle groups) on 2 or more days/wk
65+	Same as adults, or be as active as abilities and health conditions allow	Same as adults, but include balance training and combination activities (strength and aerobic training together)
All Ages	Sit Less. Move More	

Piercy K. JAMA. 2018;320(19):2020-2028

Breaking the Obesity Behavior Chain



Adapted from Brownell. *The LEARN Program for Weight Control*. American Health Publishing Co.1997.

Pillars of Behavior Modification

Self Monitoring
- Recording intake and activities

Problem Solving
- Identifying barriers and finding solutions

Stimulus Control
- Avoiding triggers to eating, slowing the rate of eating

Social Support
- Recruiting friends and family

Cognitive Restructuring
- Thinking positively

Relapse Prevention
- Managing episodes of overeating/weight gain

Klein, S. Gastroenterology. 2002;123(3):882-932

Wadden, TA. Circulation. 2012;125(9):1157-70

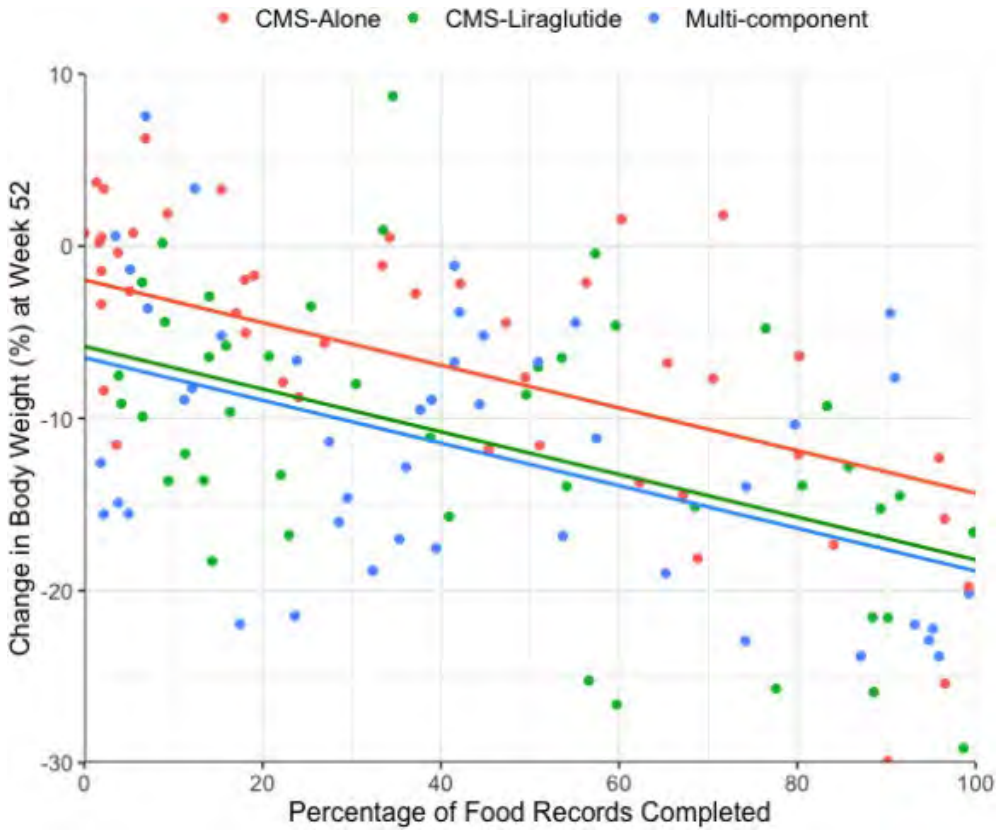
Self-Monitoring: Independently Associated with Weight loss

Systematic review of 22 studies

- More frequent and complete self-monitoring of food intake, exercise and body weight was consistently associated with more weight loss

Post hoc analysis of a randomized controlled trial of 3 arms: intensive behavioral therapy (IBT) alone vs IBT + liraglutide 3.0 mg/d vs IBT vs liraglutide 3 mg/d + meal replacements

- In a linear regression model controlled for treatment group, only adherence to self-monitoring predicted weight loss at 52 weeks
- Patients who completed 100% of their food records lost 12.4 percentage points more than those who completed 0%



Burke LE. J Am Diet Assoc. 2011;111:92-102
Tronieri JS. Behaviour Research and Therapy. 2020;131:103639

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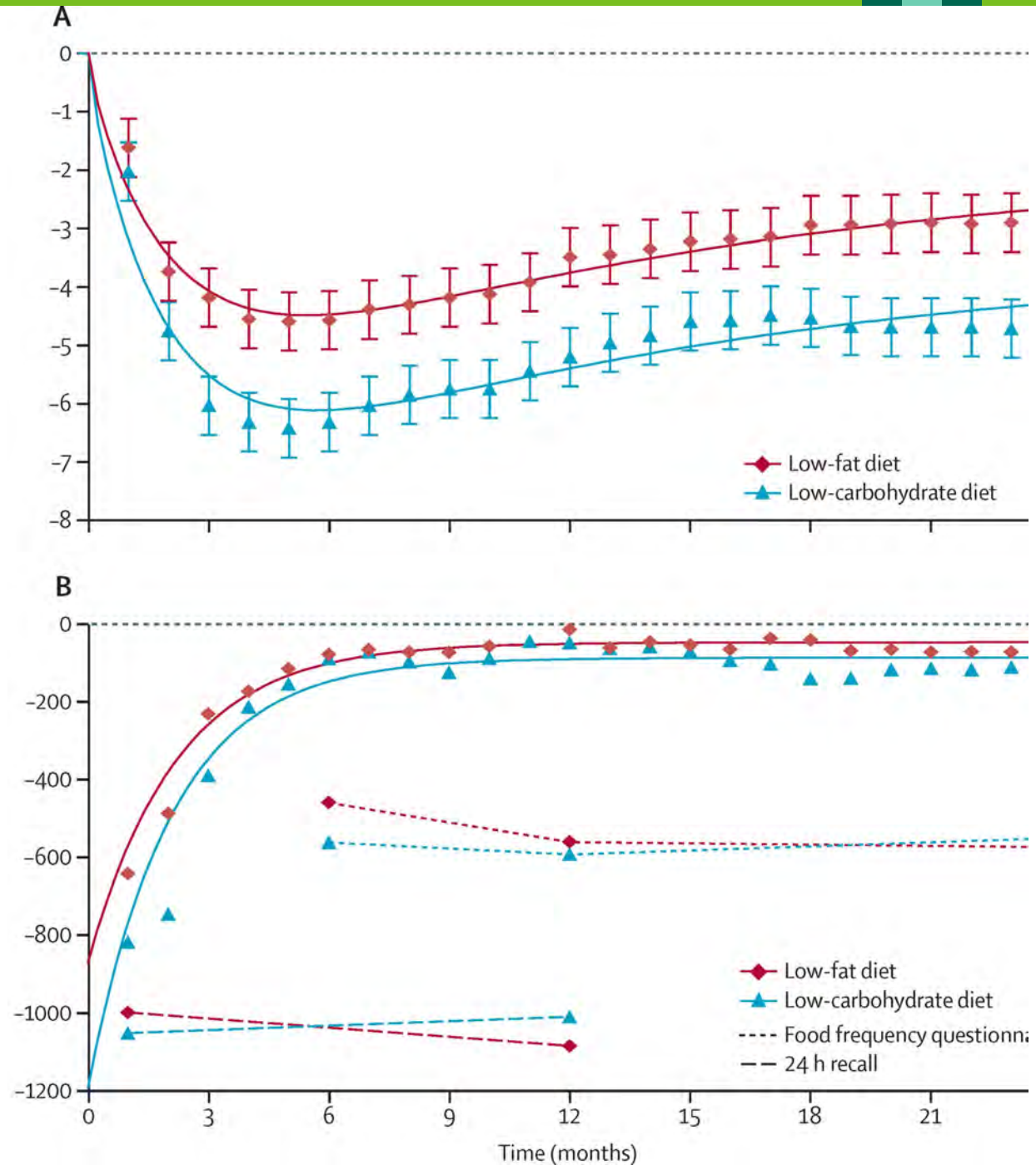
Use of Food and Activity Logs

- Cue the patient on what they have already eaten in the day
- Help the patient be more mindful with food choice
- Help identify patterns
- Food logs and in person 24-hour recalls are not accurate for total energy intake
  - Very hard to estimate energy intake
  - Should only be used as a tool to guide choices

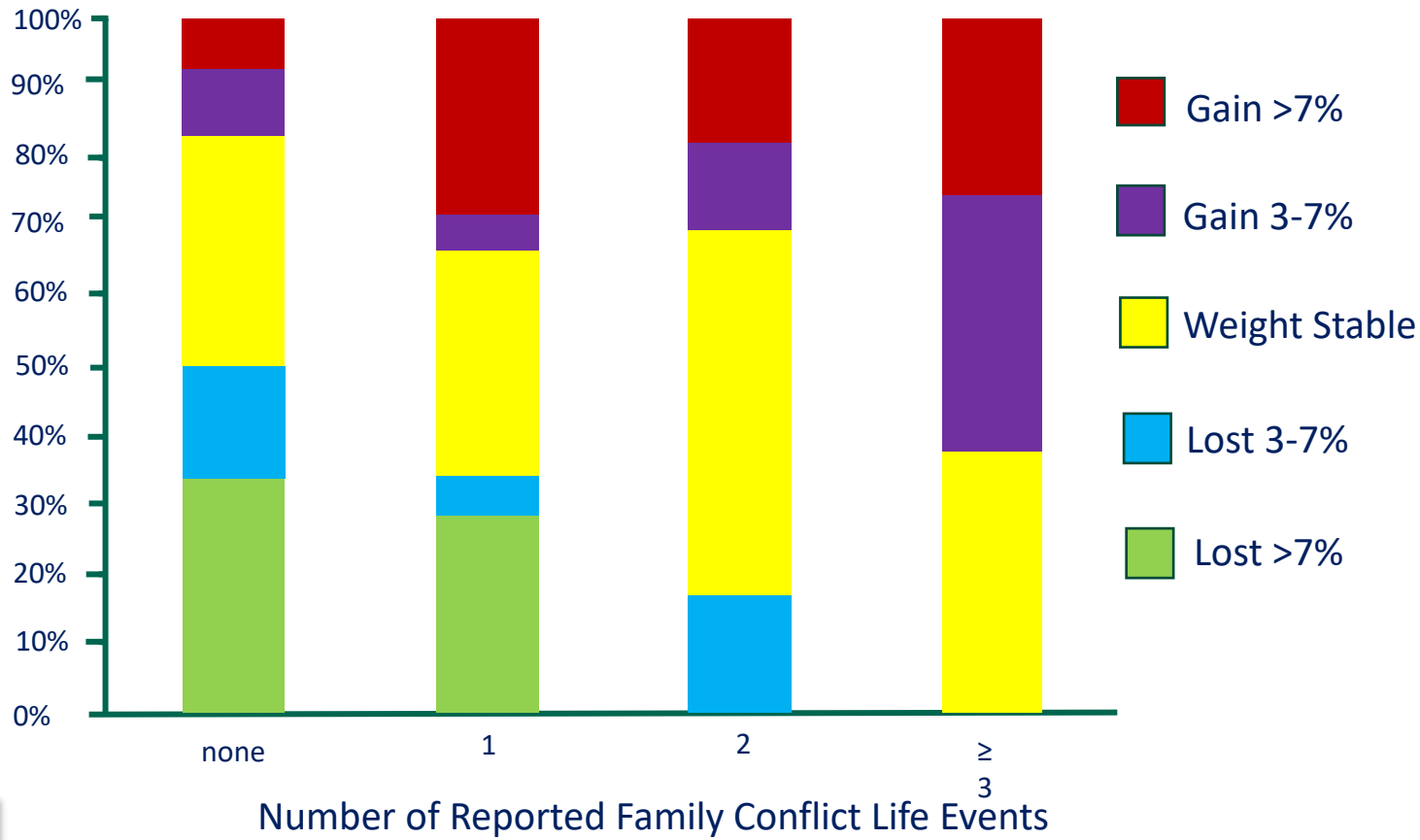


Freedhoff Y. The Lancet. 2016;338(10047):849-851

Factors That Can Derail Lifestyle Therapy

- **Stress**
  - Home related
  - Work related
- **Lack of Sleep**
  - Not getting to bed on time
  - OSA
  - Insomnia
- **Physical Injuries**
- **Food insecurity**

May need referrals for management



Philips EG. Obesity.2017;25:833-841

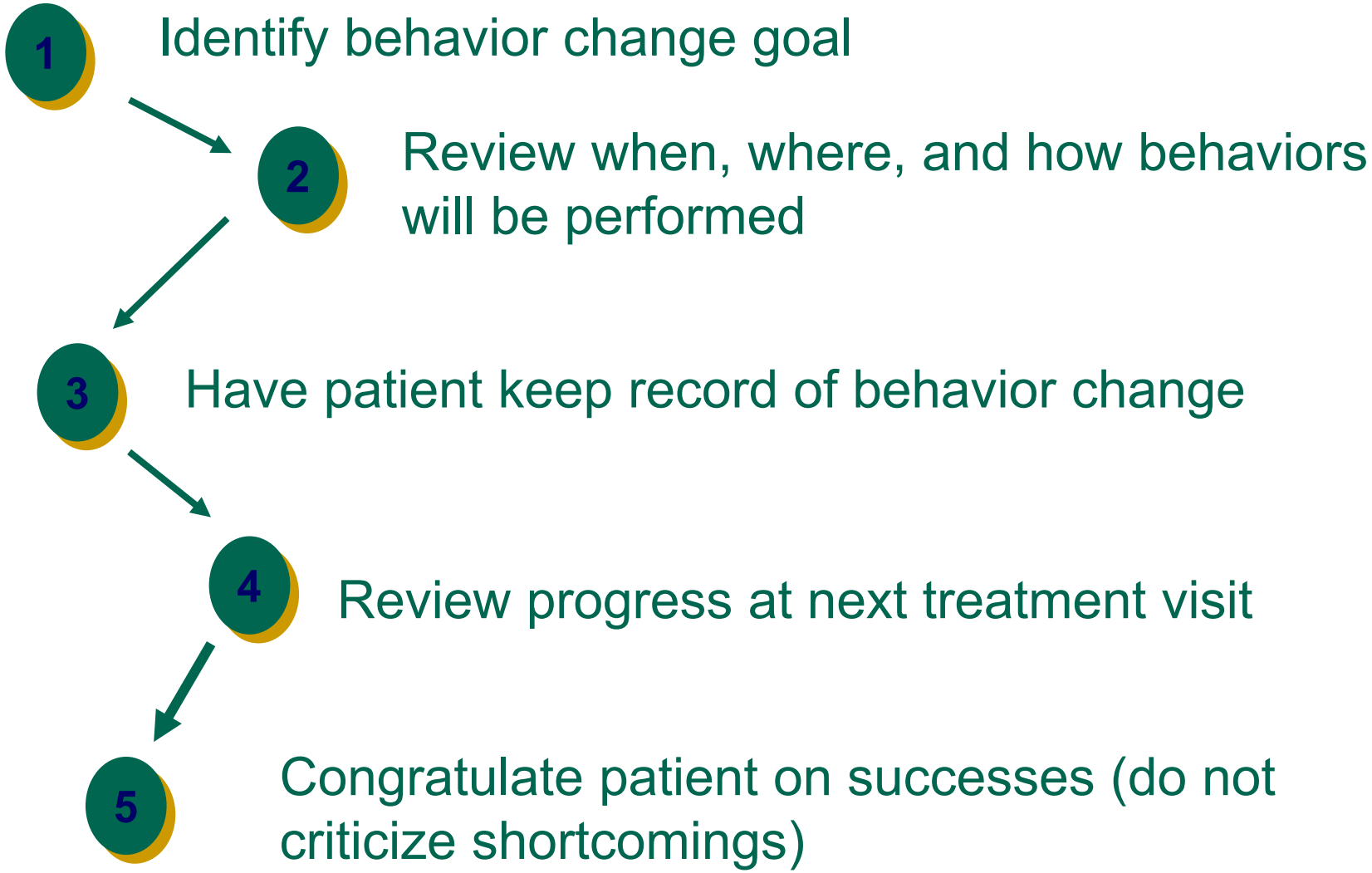
Delivering Lifestyle Therapy

- Trained Interventionist
  - Dietitian, nurse, psychologist, behavior coach, exercise professional, physician (Billing may be limited to physician, dietitian, psychologist)
- In person and over the telephone may yield similar results, less via internet only
- Intensity of lifestyle intervention does matter
  - High Intensity = 14 or more “visits” in 6 months*
  - Moderate Intensity = 6 to 13 “visits” in 6 months*
  - Difference between high and moderate intensity is about 5% TBWL
- Does not appear to be a difference in weight loss between individual sessions and group sessions

*Definition of exact number of visits varies

Jensen, MD. Obesity. 2014;22(2):S5-S39
Webb, VL. Gastroenterology. 2017;152(7):1752-1764

Five Steps to Facilitate Behavior Change



Wadden and Foster. *Med Clin North Am* 2000;84:441.

Goal Setting

Specific	• Names a specific action or behavior
Measurable	• The goal is made so that it can be measured
Attainable	• The goal can be reasonable attained
Relevant	• The goal is relevant to the desired behavior change
Time-Based	• The goal has a deadline for accomplishment

What Do I Do for My Patients Without a Dietitian or Health Coach?

Diet Recall

- Everything consumed (liquid and solid)
- You can skip this for time, but ask about snacking and meals out

Set calorie goal with typical ranges (BMI <40 kg/m2), calculate for higher BMI

- 1200-1500 kcal/day women,
- 1500-1800 kcal/day men,

Set Exercise Goal:

- 150 min/week moderate intensity exercise for weight loss
- 200-300 min per week for weight maintenance
- 2-3 sessions of strength/resistance exercise per week

Discuss barriers and goals at every visit

At least monthly follow-up for the first 6 months

Reduce

- Added sugars
- Processed grains
- Animal fat (except fatty fish)

Protein in moderation – 16-24% of calories (80-120 gm/day for most patients)

For MASLD or CVD patients: discuss Mediterranean diet

Increase

- Non-starchy Vegetables/Fruit
- Unsaturated vegetable oil (olive oil)
- Nuts (but limit total number of servings)

Use meal replacements to help achieve dietary goals

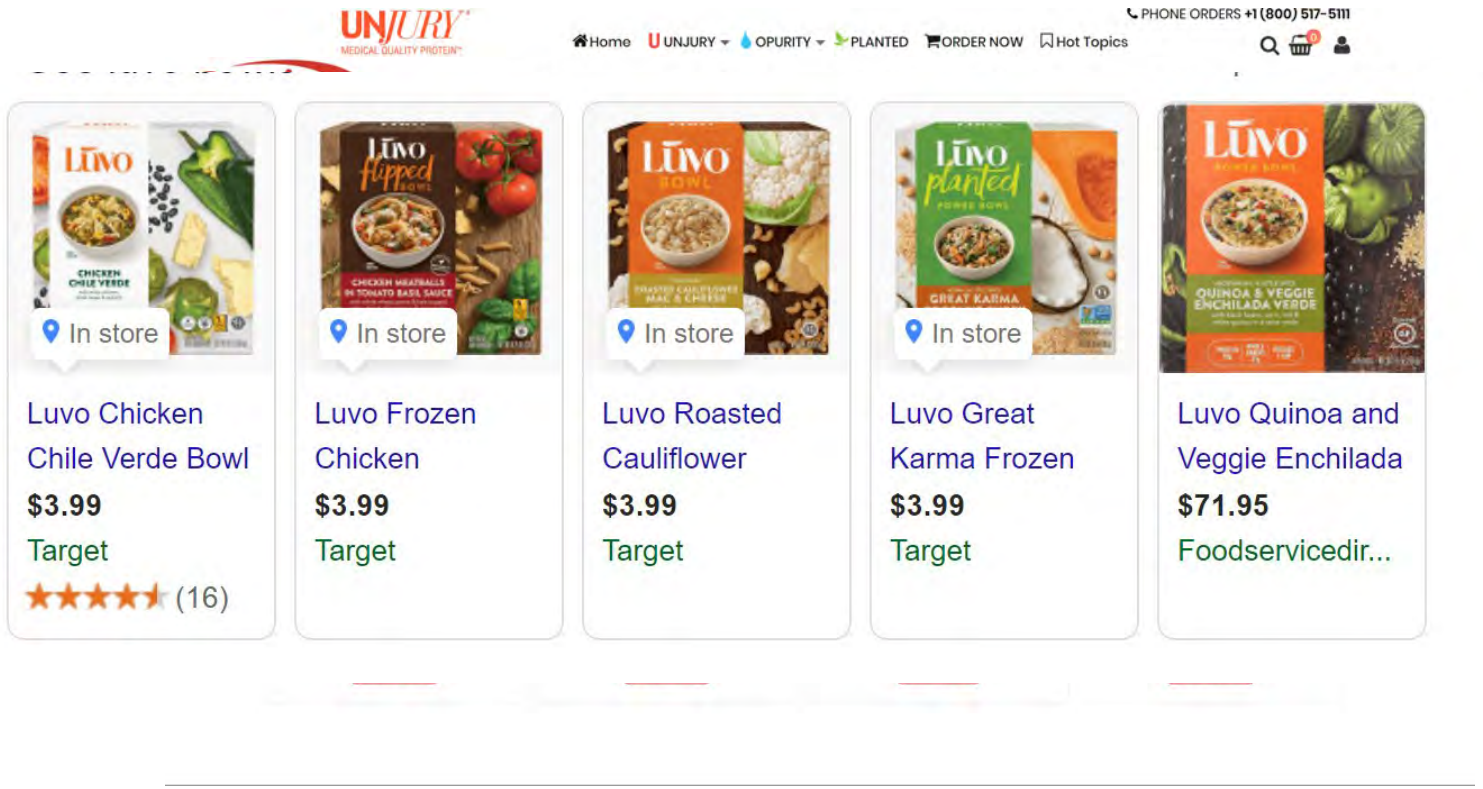
Jensen, MD. Obesity. 2014;22(2):S5-S39
Webb, VL. Gastroenterology. 2017;152(7):1752-1764
Mozaffarian D. Obesity. 2025. epub ahead of print

Resources for Exercise

- https://www.mayoclinic.org/healthy-lifestyle/fitness/in-depth/strength-training/art-20046031
- https://www.acefitness.org/resources/everyone/exercise-library/?srsltid=AfmBOopUPYpKGr7er-aaZG6q4TdBJkKKPdVwCueAXo3MezSgDf4zWxcw
- Apple Fitness App
- Multiple other exercise apps

Meal Replacements

- Types
  - Shakes
  - Bars
  - Frozen Entrée
  - Patient self purchase
  - Carry in the office
- Calorie Controlled
- Stimulus controlled



Conclusions

- Lifestyle therapy alone achieves only modest weight loss
- Lifestyle therapy maximizes weight loss with all adjunctive therapies
  - Anti-obesity medications
  - Endoscopic Bariatric Therapies
  - Bariatric Surgery
- Components
  - Diet
  - Exercise
  - Behavior Modification
- Can be done in a primary care practice – if time is limited, focus on one goal at a time

WELCOME to the *Obesity Care in All Ages ECHO*

Session 4, How to Use Anti-Obesity Medications Effectively (GLP-1 agonist) - August 12th, 2025

This ECHO is supported by the Walter and Carole Young Center for Digestive Health

Today's Program

- Brief housekeeping
- Didactic: How to Use Anti-Obesity Medications Effectively (GLP-1 agonist) – Elaine Banerjee, MD, MPH; Sarah Finn, MD
- Case Discussion
- Summary
- Up Next

Speaker Slides: Obesity Treatment with Glucagon-like Peptide (GLP-1) Receptor Agonists

Elaine S Banerjee, MD, MPH

Disclosures

I have no relevant conflicts of interest to disclose

Acknowledgements

- I appreciate the work of the ECHO team and the DH Weight Center team on this panel, especially Dr Sarah Finn and Dr Minda Gowarty for some the slides and content of this presentation

Objectives

- By the end of this presentation, participants should be able to:
  - Identify the indications, contra-indications, and side effects of GLP-1 RA
  - Apply evidence-based pharmacological management to develop personalized care plans for patients with obesity
  - Prescribe and manage GLP-1 RA treatment for obesity
- Of note, GLP-1 RA are not the only medications for the treatment of obesity and non-GLP-1 medications will be discussed in our next session

“I shouldn’t need a medication…”

GLP-1 Medications

Obesity

- Semaglutide (Wegovy)
- Tirzepatide (Zepbound)
- Liraglutide (Saxenda)

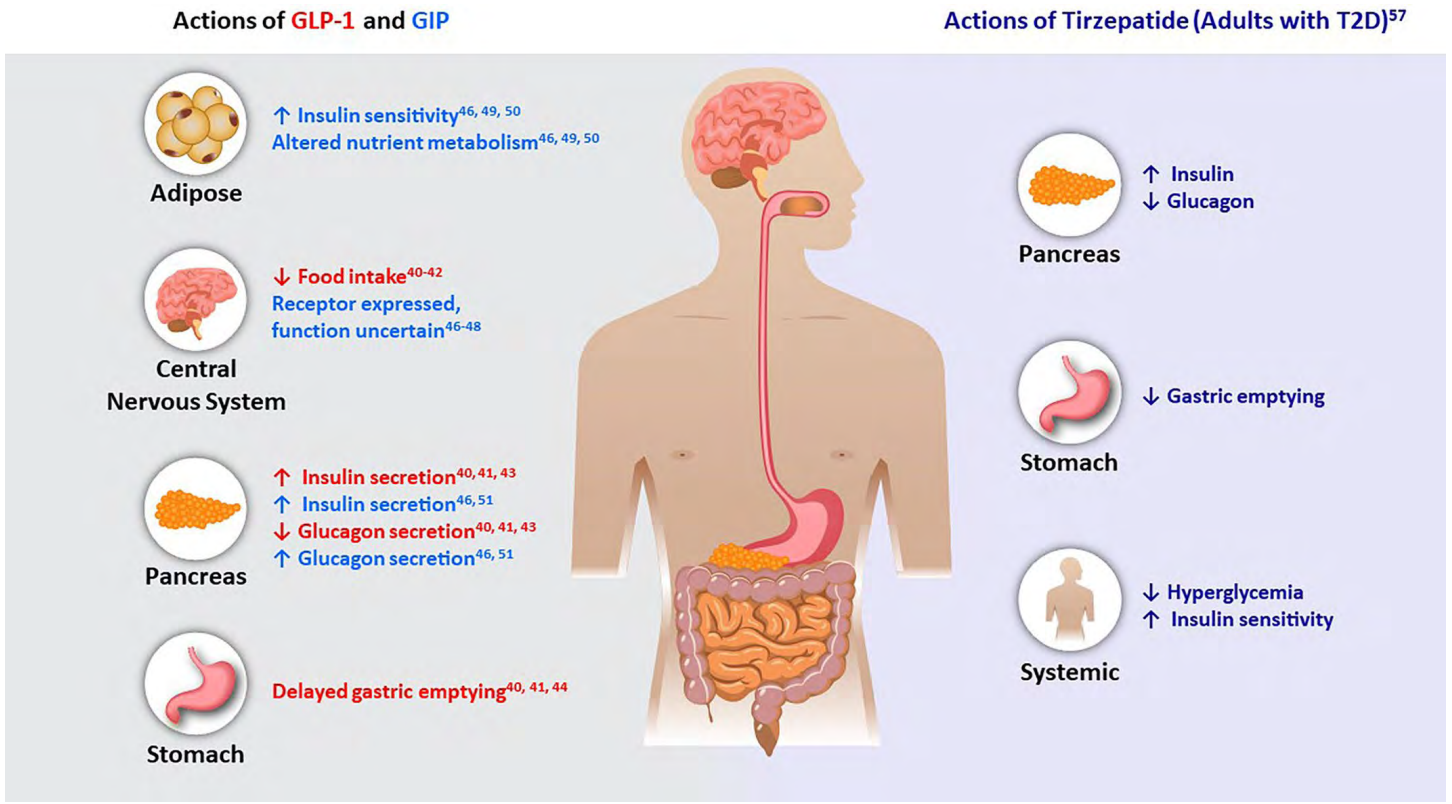
Diabetes

- Semaglutide (Ozempic, Rybelsus)
- Tirzepatide (Mounjaro)
- Liraglutide (Victoza)
- Dulaglutide (Trulicity)

Indications

- Obesity
  - BMI ≥ 30 kg/m^2
  - BMI ≥ 27 kg/m^2, AND serious complication of obesity
- Diabetes
- Zepbound: moderate-to-severe OSA
- Wegovy: CAD, PAD, CVA
- Not FDA approved: MASLD, HFpEF

Mechanism



De Block, C et al. Tirzepatide for the treatment of adults with type 2 diabetes: an endocrine perspective. Diabetes Obesity and Metabolism 1.2023. 25: (1). 3-17.

Mechanism

Side-effects, Contraindications, and Precautions

Side-effects of weight loss

- Gallstones and their complications which may result in gallstone pancreatitis
- Hair loss
- Gout flares
- Loss of lean body mass
- Loose skin

Side Effects – Medication-related

- GI*
  - Nausea – 16-44%
  - Constipation – 3-24%
  - Diarrhea 9-30%
  - Abdominal pain – 6-20%
  - Vomiting – 5-24%
  - Belching, GERD, & Flatulence 1-7%
- Fatigue – 5-11%
- Headache 1-17%
- Hypoglycemia – semaglutide and tirzepatide 1-6%, liraglutide 2-28%
- Injection site reaction 3-14%

UpToDate Lexidrug/Semglutide. UpToDate Lexidrug/Tirzepatide. UpToDate Lexidrug/Liraglutide. Accessed Aug 3, 2025.

Are they too new for us to know all the side effects?

- Exenatide was approved for diabetes in 2005
- Liraglutide was approved for diabetes in 2010 and for obesity in 2014
- Semaglutide was approved for diabetes in 2017 and for obesity in 2021
- Tirzepatide was approved for diabetes in 2021, for obesity in 2023, and for obstructive sleep apnea in 2024

Contraindications

- Personal or family hx of medullary thyroid cancer or MEN-2
- Pregnancy

UpToDate Lexidrug/Semglutide. UpToDate Lexidrug/Tirzepatide. UpToDate Lexidrug/Liraglutide. Accessed Aug 3, 2025.
Cesta CE, Rotem R, Bateman BT, et al. Safety of GLP-1 receptor agonists and other second-line antidiabetics in early pregnancy. *JAMA Intern Med*. Doi: 10.10001/jamainternmed.2023.6663

Precautions

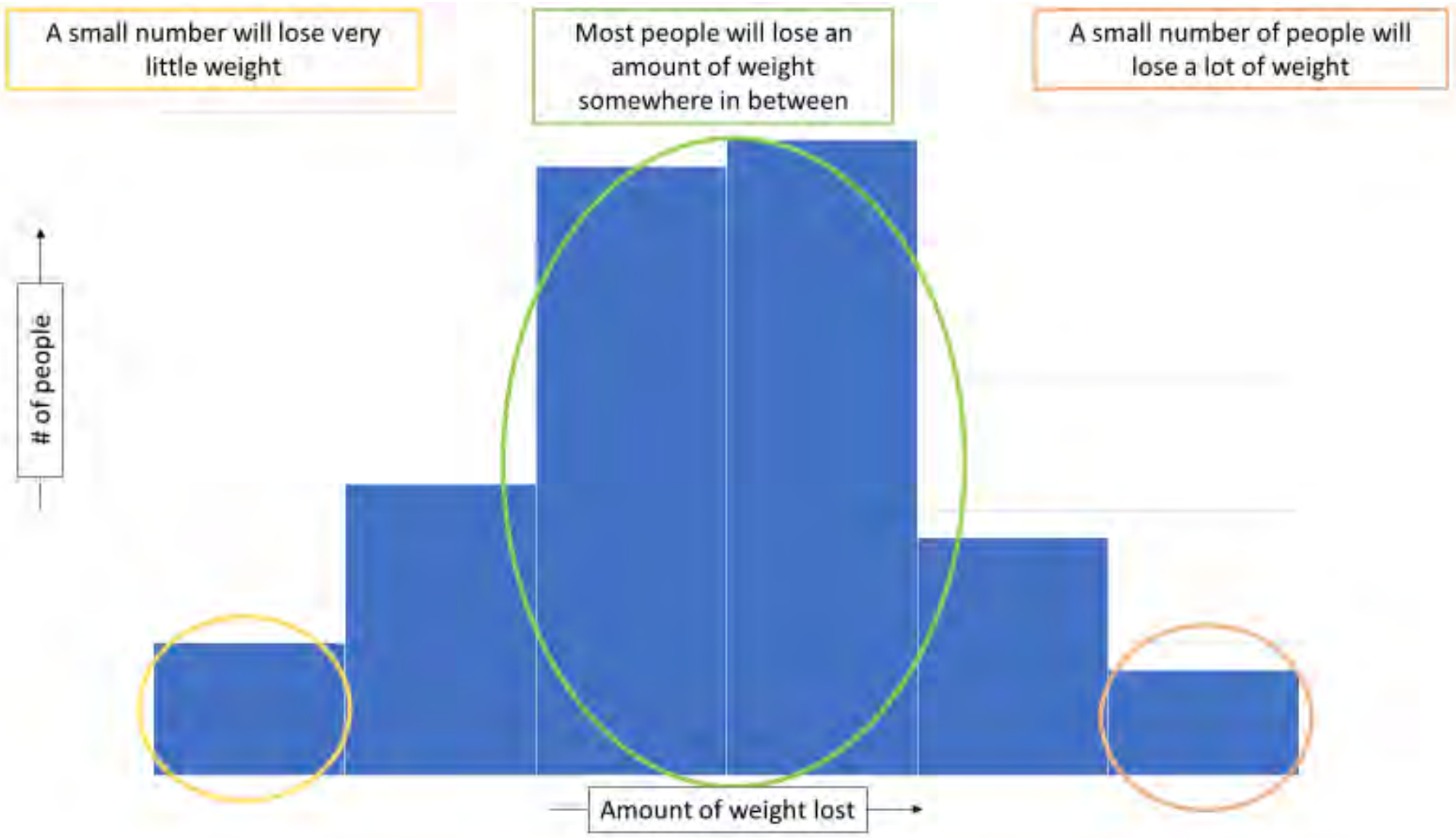
- Known gallstones
  - Consider ursodiol
- Pancreatitis
- Tirzepatide & oral contraceptives

Effectiveness

Effectiveness – Weight - Summary

	Average Total Body Weight Loss	Difference from Lifestyle
Lifestyle	3-5%	
Liraglutide	8-11%	5-6%
Semaglutide	15-17%	10-13%
Tirzepatide	21-25%	18-20%

Sjöstrom L, et al. *Lancet*. 1998;352(9123):167-172; Davidson MH, et al. *JAMA*. 1999;281(3):235-242; Allison DB, et al. *Obesity (Silver Spring)*. 2012;20(2):330-342; Gadde KM, et al. *Lancet*. 2011;377(9774):1341-1352; Greenway FL, et al. *Lancet*. 2010;376(9741):595-605; Apovian CM, et al. *Obesity (Silver Spring)*. 2013;21(5):935-943; Wadden TA, et al. *Obesity (Silver Spring)*. 2011;19(1):110-120; Pi-Sunyer X, et al. *N Engl J Med*.

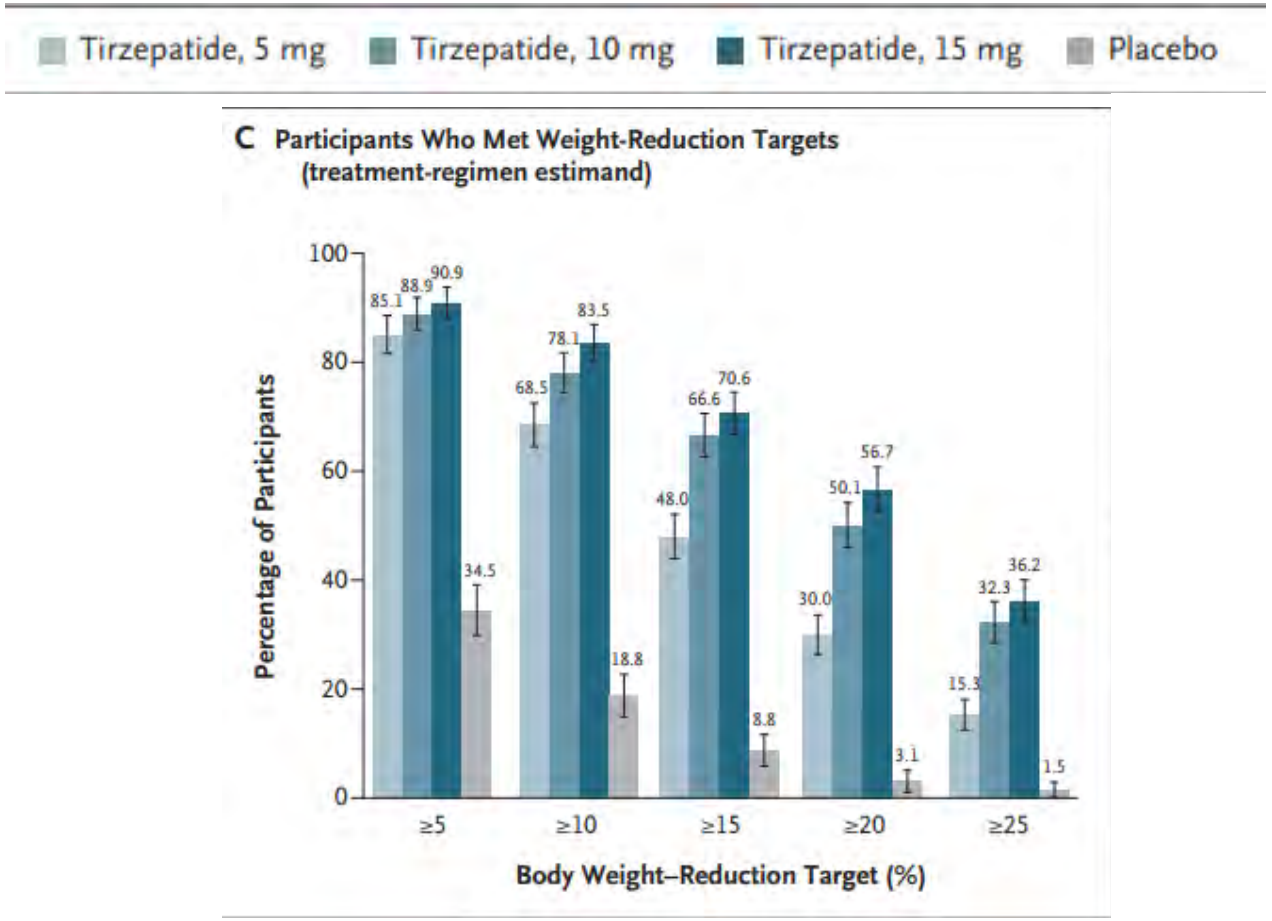

A small number will lose very little weight
Most people will lose an amount of weight somewhere in between
A small number of people will lose a lot of weight
# of people
Amount of weight lost

Effectiveness – Weight - Semaglutide

	Percentage achieving 5% weight loss	Percentage achieving 10% weight loss	Percentage achieving 15% weight loss	Percentage achieving 20% weight loss
Semaglutide (N=2,366)	86.4%	71.9%	54.6%	34.8%
Placebo (N=1,222)	37.5%	16.4%	7.4%	2.8%
Risk Ratio (95% CI)	2.2 (1.8,2.8)	4.1 (3.1,5.7)	7.1 (4.8,10.3)	11.9 (8.3,16.9)

Qin W, et al. Efficacy and safey of semaglutide 2.4mg for weight loss in overweight or obese adults without diabetes: An updated systematic review and meta-analysis including the 2-year STEP 5 trial. *Diabetes Obes Metab.* 2024;26:911-923.

Effectiveness – Weight - Tirzepatide



Jastreboff AM, et al. Tirzepatide once weekly for the treatment of obesity. N Engl J Med 2022;387:205-16.

Effectiveness – Quality of Life

Parameter	Tirzepatide 5 mg (*N* = 630)	Tirzepatide 10 mg (*N* = 636)	Tirzepatide 15 mg (*N* = 630)	Placebo (*N* = 643)
IWQOL-Lite-CT				
Total Score				
Baseline	64.2 (0.9)	61.9 (0.9)	63.0 (0.9)	63.2 (1.0)
Change from baseline to week 72	18.6 (0.6)	21.2 (0.6)	22.6 (0.6)	10.5 (0.7)
Change from baseline difference vs. placebo (95% CI), *p* value	8.1 (6.3 to 9.9)***	10.7 (8.9 to 12.5)***	12.1 (10.3 to 13.9)***	-
Physical Composite Score				
Baseline	64.0 (1.0)	61.5 (1.0)	62.7 (1.0)	63.3 (1.1)
Change from baseline to week 72	16.8 (0.7)	19.5 (0.7)	20.8 (0.7)	9.7 (0.7)
Change from baseline difference vs. placebo (95% CI), *p* value	7.2 (5.2 to 9.2)***	9.9 (7.9 to 11.9)***	11.1 (9.1 to 13.1)***	-
Physical Function Composite Score				
Baseline	64.4 (1.0)	61.9 (1.0)	63.3 (1.0)	64.0 (1.1)
Change from baseline to week 72	17.8 (0.7)	20.7 (0.7)	21.8 (0.7)	10.1 (0.8)
Change from baseline difference vs. placebo (95% CI), *p* value	7.7 (5.6 to 9.8)***	10.7 (8.6 to 12.8)***	11.7 (9.6 to 13.8)***	-
Psychosocial Composite Score				
Baseline	64.3 (1.0)	62.1 (1.0)	63.2 (1.0)	63.2 (1.0)
Change from baseline to week 72	19.6 (0.7)	22.1 (0.7)	23.6 (0.7)	11.0 (0.7)
Change from baseline difference vs. placebo (95% CI), *p* value	8.7 (6.7 to 10.6)***	11.2 (9.3 to 13.1)***	12.7 (10.7 to 14.6)***	-

Gudzeune KA, et al. Association between weight reduction achieved with tirzepatide and quality of life in adults with obesity: Results from the SURMOUNT-1 study. *Diabetes Obes Metab.* 2025;27:539-550.

Dosing & Titration

Dosing & Titration – General Principles

- Start at the lowest dose
- Titrate based on effect and tolerance
- Most people will need to get to the 3rd or 4th dose for effect
- Message after the 3rd shot at each dose
  - Weight
  - Side effects

Dosing & Titration - Semaglutide

Wegovy

- 0.25mg weekly for ≥ 4 weeks
- 0.5mg weekly for ≥ 4 weeks
- 1mg weekly for ≥ 4 weeks
- 1.7mg weekly for ≥ 4 weeks
- 2.4mg weekly

Ozempic

- 0.25mg weekly ≥ 4 weeks*
- 0.5mg weekly ≥ 4 weeks*
- 1mg weekly ≥ 4 weeks
- 2mg weekly†

*0.25/0.5mg adjustable dose pen with 2mg medication in the pen

† 1mg and 2mg pens are adjustable by counting clicks to get lower doses

Dosing & Titration - Tirzepatide

Zepbound & Mounjaro

- 2.5 mg weekly for ≥ 4 weeks
- 5 mg weekly for ≥ 4 weeks
- 7.5 mg weekly for ≥ 4 weeks
- 10 mg weekly for ≥ 4 weeks
- 12.5 mg weekly for ≥ 4 weeks
- 15 mg weekly

Dosing & Titration - Liraglutide

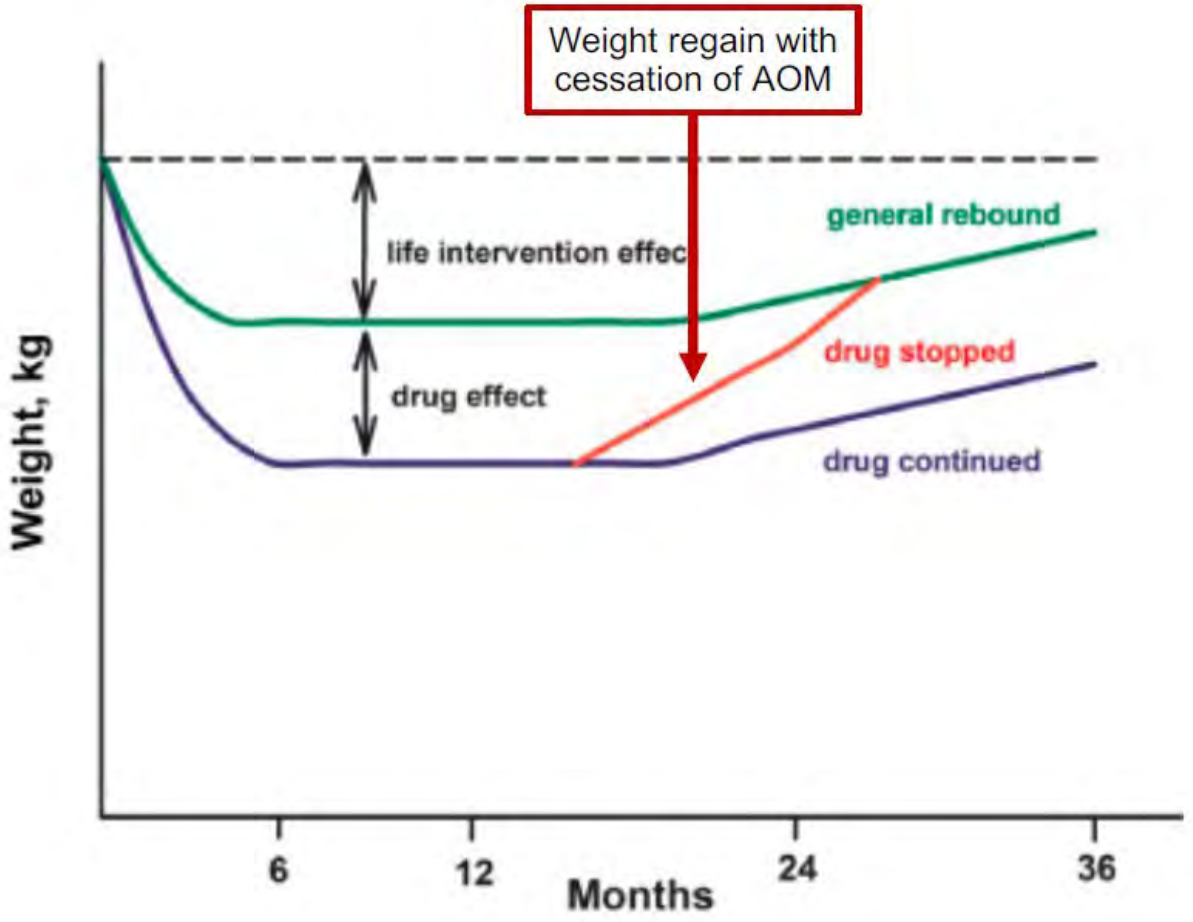
Saxenda

- 0.6mg daily for 1 week
- 1.2mg daily for 1 week
- 1.8mg daily for 1 week
- 2.4mg daily for 1 week
- 3mg daily

Victoza

- 0.6mg daily for 1 week
- 1.2mg daily for 1 week
- 1.8mg daily for 1 week

Duration


Weight regain with cessation of AOM
life intervention effec
drug effect
general rebound
drug stopped
drug continued
Weight, kg
6
12
24
36
Months

Insurance coverage

- Medicare – does not cover any medications for obesity
  - Wegovy for CAD with hx of MI
  - Zepbound for moderate-to-severe OSA
  - $2,000/year limit on out of pocket costs for medications
- Medicaid – state dependent
  - VT – no coverage for obesity, but may cover zepbound for OSA
  - NH – varies but some plans will cover GLP-1 RA for obesity
- Federal BCBS – tier 3 with high copay

Insurance coverage

- Marketplace – generally not covered
- Employer-based plans are employer dependent
- Most plans will cover a GLP-1 RA for Diabetes
  - Many plans have restrictions on which medication and other treatments
  - Generally not covered for pre-diabetes or insulin resistance

Troubleshooting

Troubleshooting: Managing GI side effects

- Constipation
  - Hydration & fiber (increasing gradually)
  - Osmotic laxatives (miralax)
  - Stimulant laxatives only if needed
- Diarrhea – generally self limited

- Nausea
  - Small meals, eating something first thing in the morning
  - Ginger
  - Ondansetron if needed
- Belching
  - Ginger, papaya enzyme

Dartmouth Health

Project ECHO

Common Side Effect Pattern with GLP1 Medications

Troubleshooting: Limiting loss of lean body mass

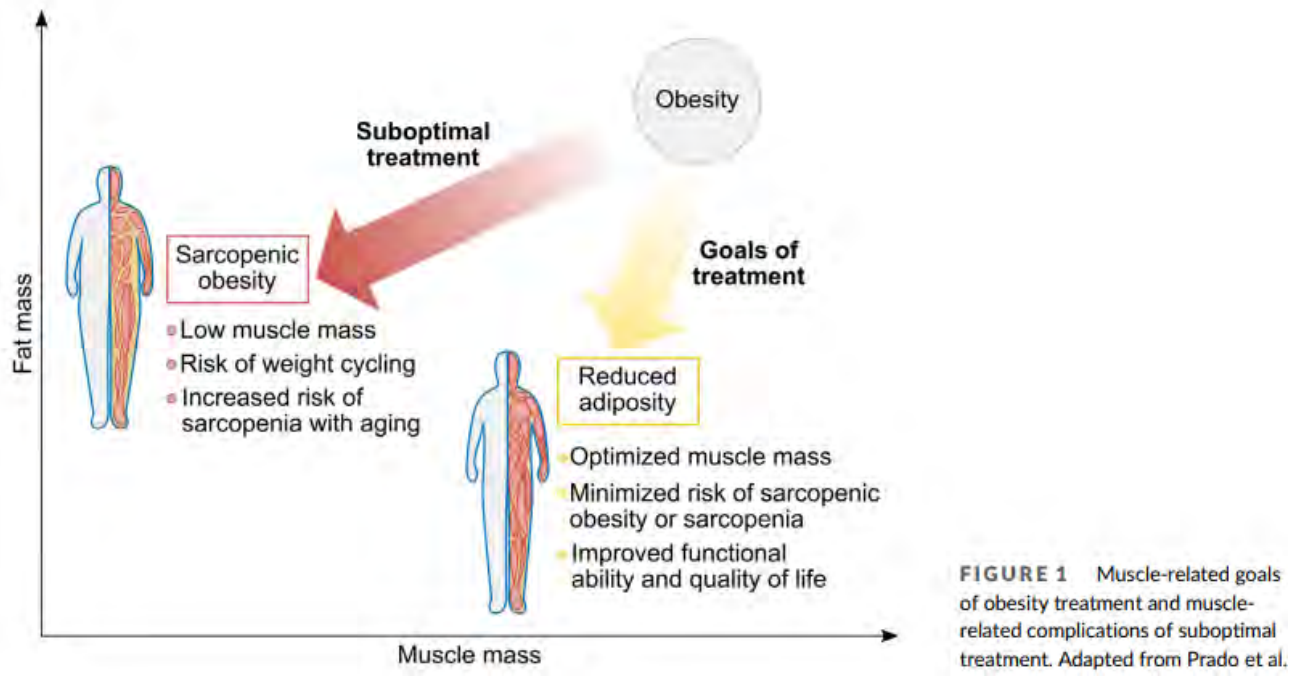
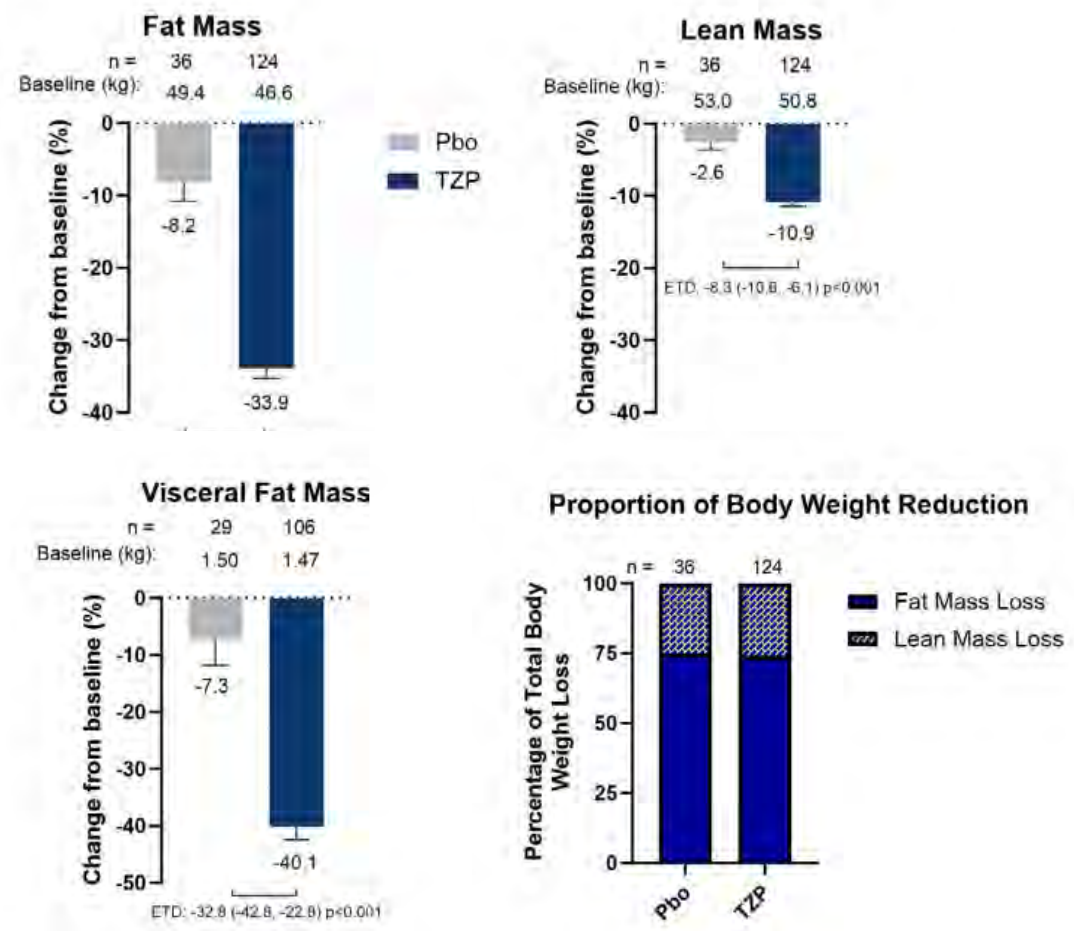


FIGURE 1 Muscle-related goals of obesity treatment and muscle-related complications of suboptimal treatment. Adapted from Prado et al.

Mechanick JI. Strategies for minimizing muscle loss during use of incretin-mimetic drugs for treatment of obesity. *Obesity Reviews*. 2025;26:e13841.

Troubleshooting: Limiting loss of lean body mass



Look M, et al. Body composition changes during weight reduction with tirzepatide in the SURMOUNT-1 study of adults with obesity or overweight. *Diabetes Obes Metab.* 2025;27:2720-2729.

Troubleshooting: Limiting loss of lean body mass

- Nutrition
  - Protein
    - 0.8g – 1.5g/kg body weight
    - Bariatric: 1.5g/kg ideal body weight
    - Joslin: 1-1.5g/kg adjusted body weight (IBW + 0.25xEBW)
  - Micronutrients
- Physical activity – especially resistance exercise
- Possible future role for bimagrumab, apiegromab, or cagrilintide

Mechanick JI. Strategies for minimizing muscle loss during use of incretin-mimetic drugs for treatment of obesity. *Obesity Reviews*. 2025;26:e13841.
Wilkinson TJ, et al. Preservation of healthy lean body mass and function during weight loss. *Clinical Obesity*. 2024:14:e12683.

WELCOME to the *Obesity Care in All Ages ECHO*

Session 5, How to Use Anti-Obesity Medications Effectively (1 AOM non glp 1 agonist)
- September 9th, 2025

This ECHO is supported by the Walter and Carole Young Center for Digestive Health

Today's Program

- Brief housekeeping
- Didactic: How to Use Anti-Obesity Medications Effectively (1 AOM non glp 1 agonist)
- – Sarah Finn, MD
- Case Discussion
- Summary
- Up Next

Obesity Treatment with Anti obesity Medicine (oral agents/non GLP1 agonist)

Sarah Finn, MD

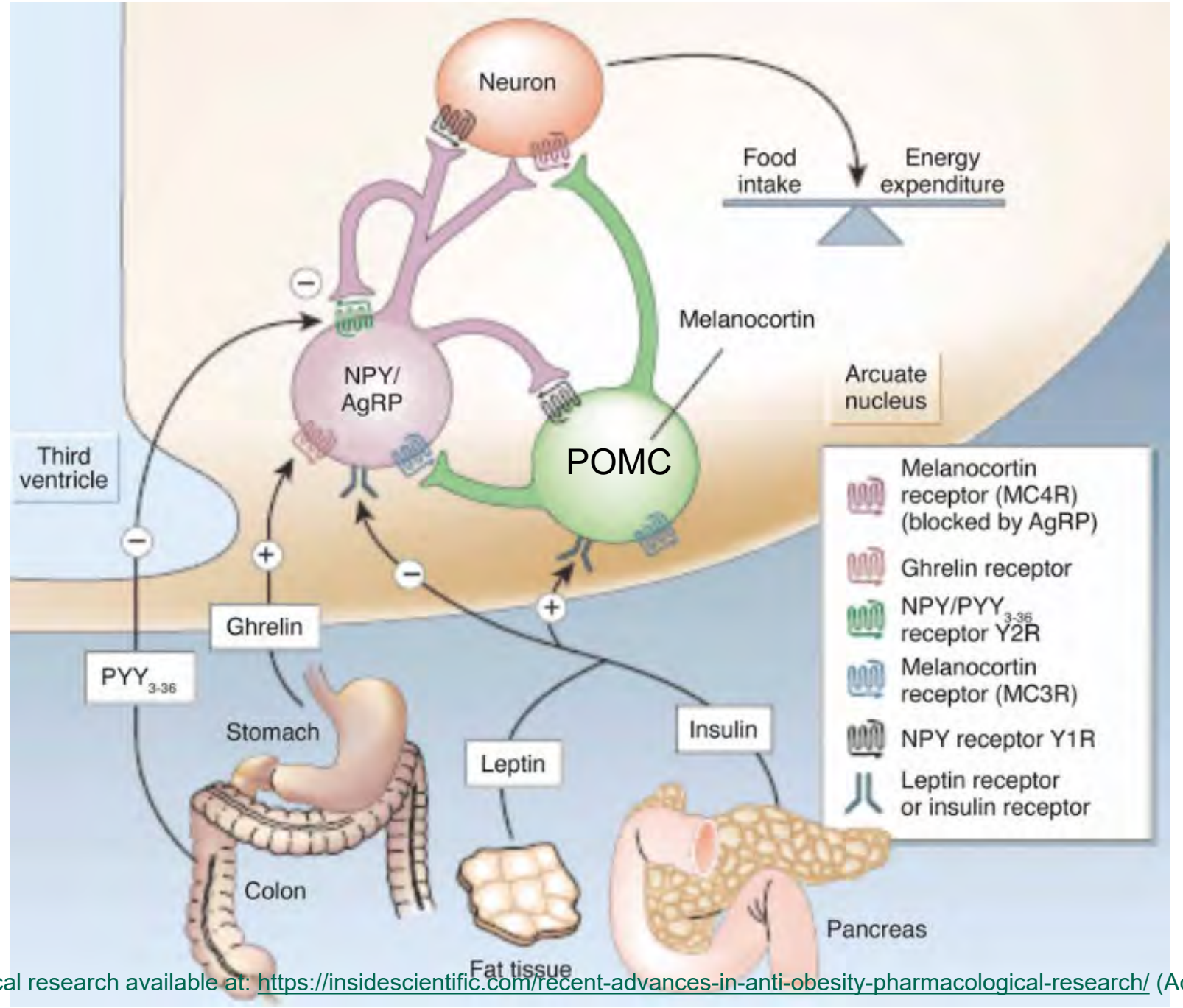
Disclosures

I have no relevant conflicts of interest to disclose

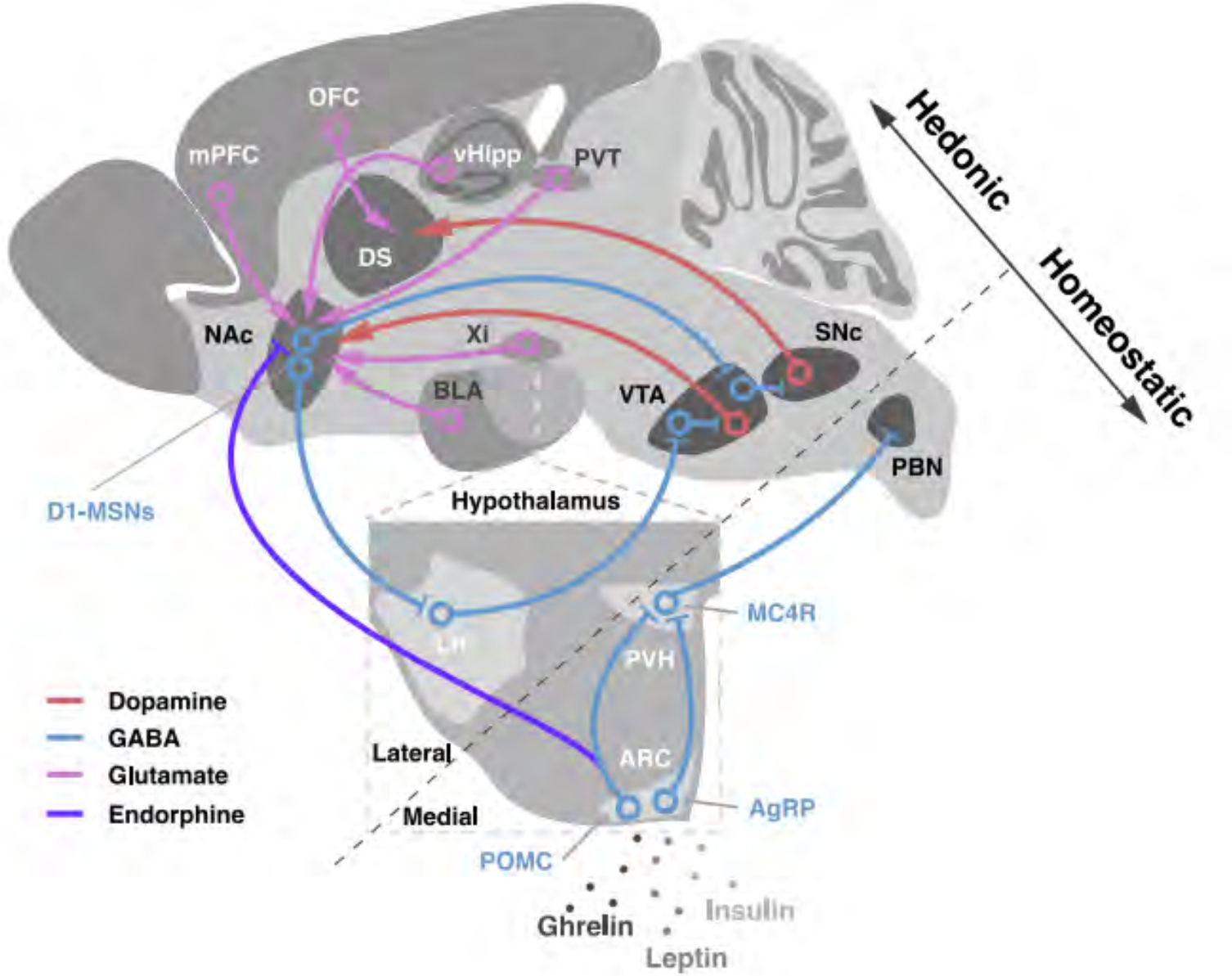
Objectives

By the end of this presentation, participants should be able to:

1. Understand mechanism of action of non GLP1 anti obesity medications
2. Understand short- and long-term benefits
3. Understand risks and management of complications
4. Variability of response and management of suboptimal initial response, recurrent weight gain and complications



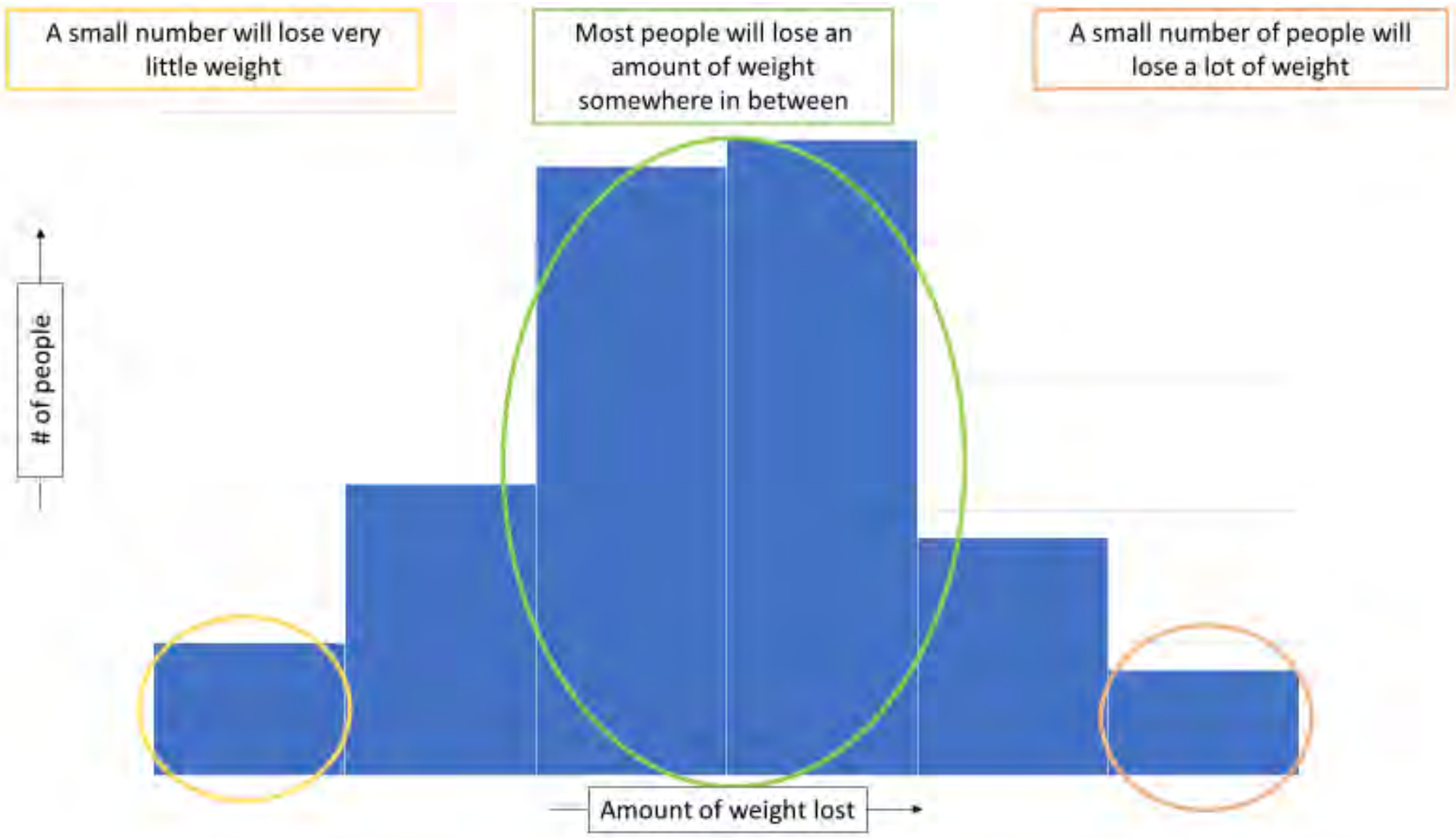
Recent Advances in Anti-Obesity Pharmacological research available at: https://insidescientific.com/recent-advances-in-anti-obesity-pharmacological-research/ (Accessed 9.16.2023

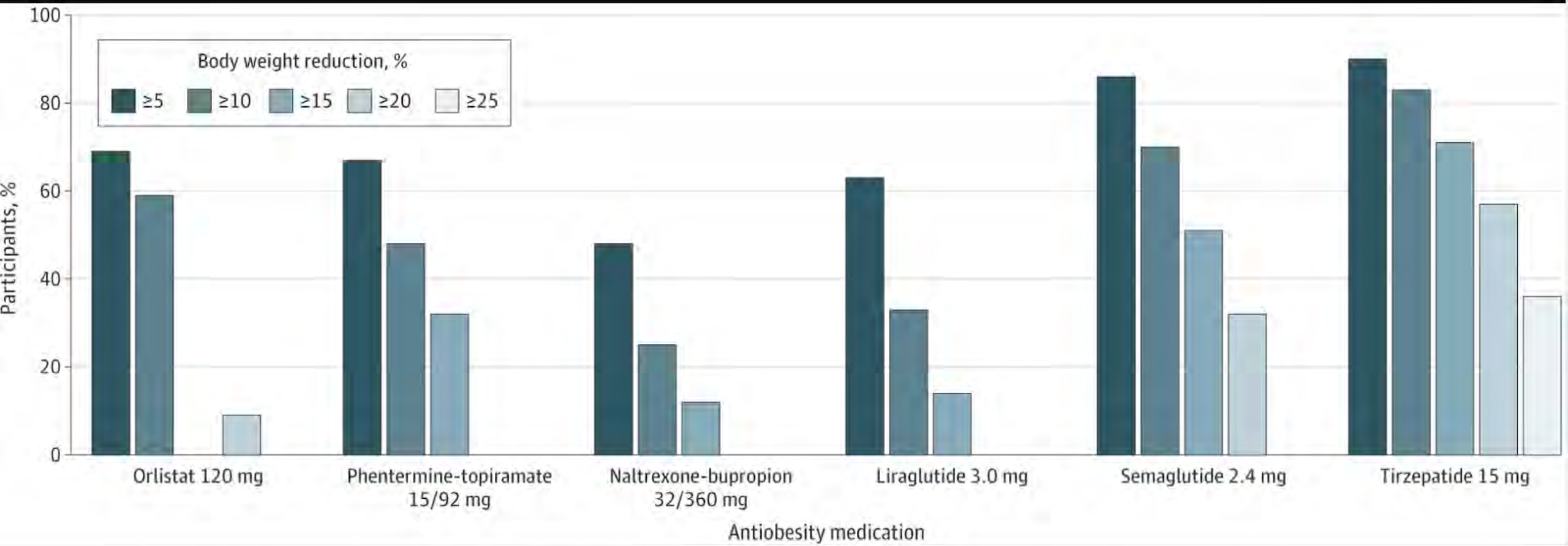


Stuber GD, Schwitzgebel VM, Luscher C. The neurobiology of overeating. *Neuron.* 2025;113(11):1680-1693.

Current AOM Pharmacotherapy

	FDA Approved	Off Label
First generation	Phendimetrazine Benzphetamine Diethylpropion **Phentermine**	Metformin Dapaglifloxin — Diabetes
Second generation	**Orlistat** **Phentermine/Topiramate** **Naltrexone/Bupropion** Liraglutide 3.0 mg	**Topiramate (seizures/migraines)** **Zonisamide (seizures/migraines)** **Bupropion (depression)** **Naltrexone (addiction)**
Third generation	Semaglutide 2.4 mg Tirzepatide	Liraglutide 1.8 mg Semaglutide Tirzepatide Exanatide Dulaglutide — Diabetes
Monogenic obesity	Setmelanotide	


A small number will lose very little weight
Most people will lose an amount of weight somewhere in between
A small number of people will lose a lot of weight
# of people
Amount of weight lost

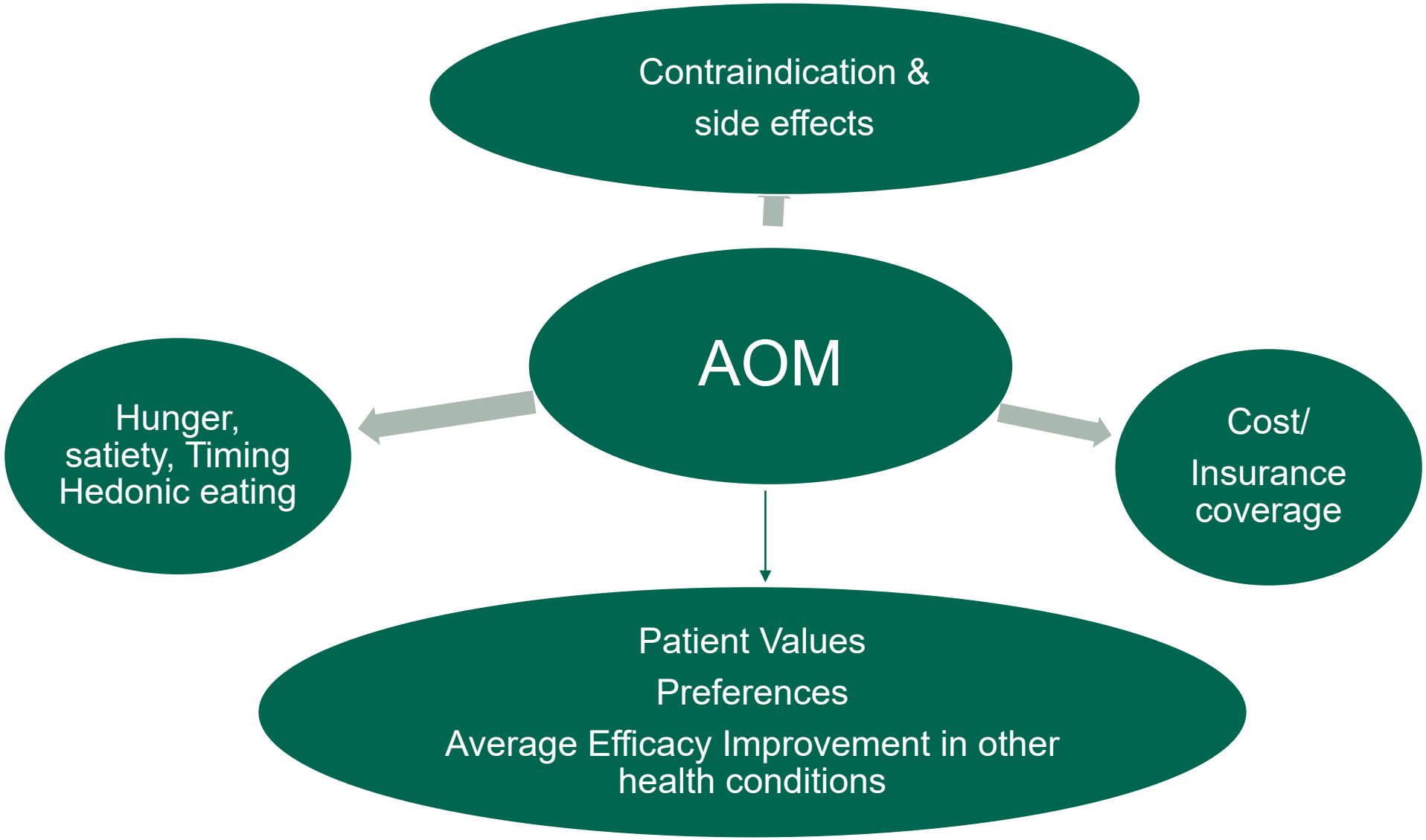


Gudzune KA, Kushner RF. Medications for Obesity: A Review. JAMA. 2024;332(7):571–584. doi:10.1001/jama.2024.10816

Treatment – Pharmacotherapy, Oral Agents

	Orlistat	Phentermine	Qsymia (phentermine/topiramate)	Contrave (bupropion/naltrexone)
Conditions to avoid in	Bariatric surgery Liver disease Pregnancy/breast feeding	Seizures Glaucoma, ESRD Pregnancy/breast feeding	Seizures Glaucoma Kidney stones ESRD on HD Pregnancy/breast feeding	Seizures Glaucoma Lower doses with CKD/Liver disease Pregnancy/breast feeding
% TBW loss	2.9-6.1 KG (6-8 lbs.)	5; 3.6kg (~8lbs)	7-9.8	5-7
Contraindications	Malabsorption syndromes	concurrent stimulant, Substance use disorder	lack of highly-effective pregnancy prevention	untreated bipolar disorder, active opioid use,
Adverse effects	Diarrhea Flatus with discharge Fecal urgency Fatty stool (Steatorrhea) Oily evacuation Fecal incontinence Rare liver injury	Jitteriness, tremor, increased BP or HR, dry mouth, insomnia, constipation	Same as phentermine plus dizziness, abnormal taste, paresthesia, kidney stones	Nausea, constipation, insomnia, dry mouth, sweating, headaches, increased BP

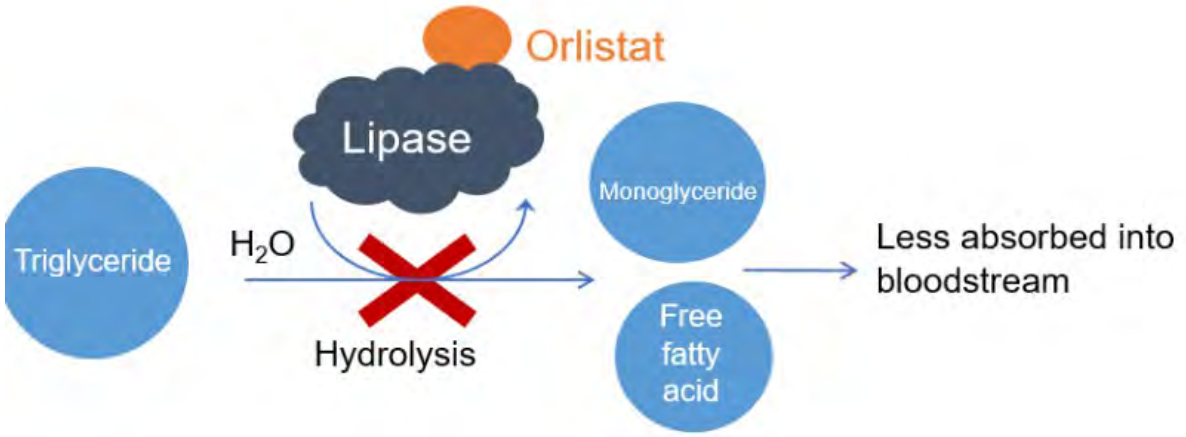
Choosing Anti-Obesity Medications



Orlistat

Mechanism of Action

- Reversible inhibitor of gastrointestinal lipases reducing lipid absorption
- (25-30% of fat calories are not absorbed)
- Reinforces avoidance of energy dense foods



The Scientific Exchange for U.S. Healthcare Professionals: FORWARD: Focus on Obesity Education Curriculum (2023) available at: Obesity FORWARD Resources for HCPs | Scientific Exchange (scientific-exchange.com) (Accessed:8.15.2025)

Clinical Trials Orlistat 120 mg TID

Authors Participants	Average KG weight loss
Hutton, Fergusson et al. 10, 631	6.1 kg vs 2.6 kg placebo
Davidson MH, Hauptman, J et al. 3, 305	5.8 kg vs 3 kg placebo
Suyog, J, et al. 80	4.65 kg vs 2.5 kg placebo
Rissanen A, Lean MEJ (XENDOS trial) 2,550	-2.4 KG weight changes treatment difference -0.4% treatment improvement in A1c vs placebo

Igel LI, Kumar RB, Saunders KH, Aronne LJ. Practical Use of Pharmacotherapy for Obesity. Gastroenterology. 2017 May;152(7):1765-1779. doi: 10.1053/j.gastro.2016.12.049. Epub 2017 Feb 10. PMID: 28192104.

Orlistat 120 mg TID

Malabsorption procedures (bariatric surgery)
Concurrent meds:
- Cyclosporine
- Coumadin
- Anti-epileptics
- Antiretroviral Agents
- Levothyroxine

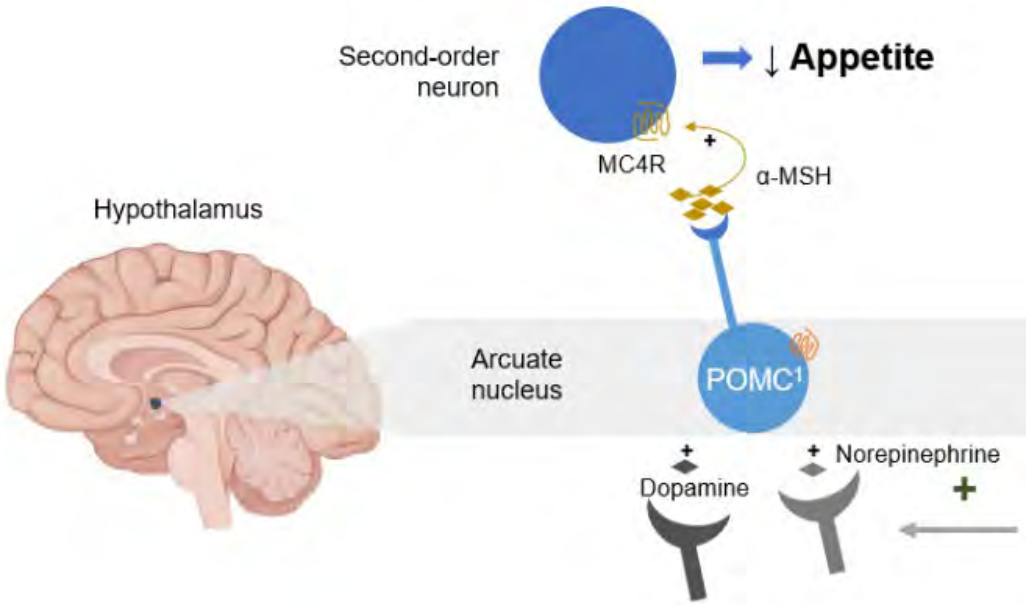
High cholesterol
Diabetes
Constipation

Diarrhea
Flatus with discharge
Fecal urgency
Fatty stool (Steatorrhea)
Fecal incontinence
Rare liver injury

Phentermine

Mechanism of Action

- Increases release of norepinephrine (and dopamine and serotonin to lesser degree) in hypothalamus
- Enhance appetite suppression via central adrenergic pathways, reduced food consumption



The Scientific Exchange for U.S. Healthcare Professionals: FORWARD: Focus on Obesity Education Curriculum (I2023) available at: Obesity FORWARD Resources for HCPs | Scientific Exchange (scientific-exchange.com) (Accessed:8.15.2025)

Phentermine

Prior heart attack, Aneurysm, stroke
Seizure
Uncontrolled HTN
Tachyarrhythmia
Hyperthyroidism (untreated)
Severe anxiety, Bipolar DO
Glaucoma
Pregnancy/breastfeeding

Lack of co-morbid conditions
High hunger/cravings

Insomnia
Headache
Constipation
Irritability
Eye pain (monitor)
Increased BP, HR
Dizziness
Jitteriness, Tremor

Phentermine

Dosing

- Phentermine (Lomaira) 4 mg 1-3 times daily (start ½ tablet) before meals
- Phentermine (Adipex) 15mg daily capsule (can start ¼ tablet 37.5mg tab)
- Approved for short term use (3 months); long term therapy is recommended by experts
- Schedule IV Controlled substance
- Check state requirements for controlled substance requirements; for NH: Yearly PDMP and in office visit

Patient Monitoring

- Avoid caffeine, energy drinks, decongestants
- Monitor BP and HR at home
- Suicidal ideation or worsening mood/anxiety

Phentermine/Topiramate

Mechanism of Action

- Phentermine
  - Increases release of norepinephrine (and dopamine and serotonin to lesser degree) in hypothalamus
  - Enhance appetite suppression via central adrenergic pathways, reduced food consumption
- Topiramate
  - GABA receptor modulator (post synaptic neurons) carbonic anhydrase inhibition, glutamate antagonism

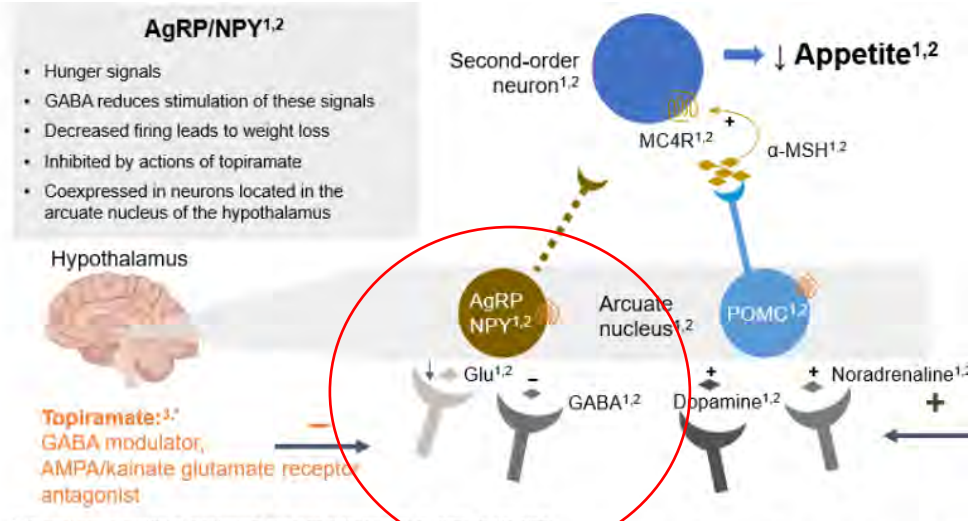


*Figure shows hypothetical mechanism of action of topiramate on appetite signaling.
AgRP, agouti-related protein; AMPA, α-amino-3-hydroxy-5-methyl-4-isoxazolepropionic acid; α-MSH, alpha-melanocyte stimulating hormone; GABA, Glu, glutamate; MC4R, melanocortin-4 receptor; NPY, neuropeptide Y; PHEN/TPM ER, phentermine–topiramate extended-release; POMC, proopion
1. Witkamp RF. Pharm Res 2011;28:1792–818; 2. Stahl S. Stahl's Essential Psychopharmacology: Neuroscientific Basis and Practical Applications. Cambridge University Press, 2013; 3. Khazaal Y and Zullino DF. Eur J Clin Pharmacol 2007;63:891–2.

The Scientific Exchange for U.S. Healthcare Professionals: FORWARD: Focus on Obesity Education Curriculum (2023) available at: Obesity FORWARD Resources for HCPs | Scientific Exchange (scientific-exchange.com) (Accessed:8.15.2025)

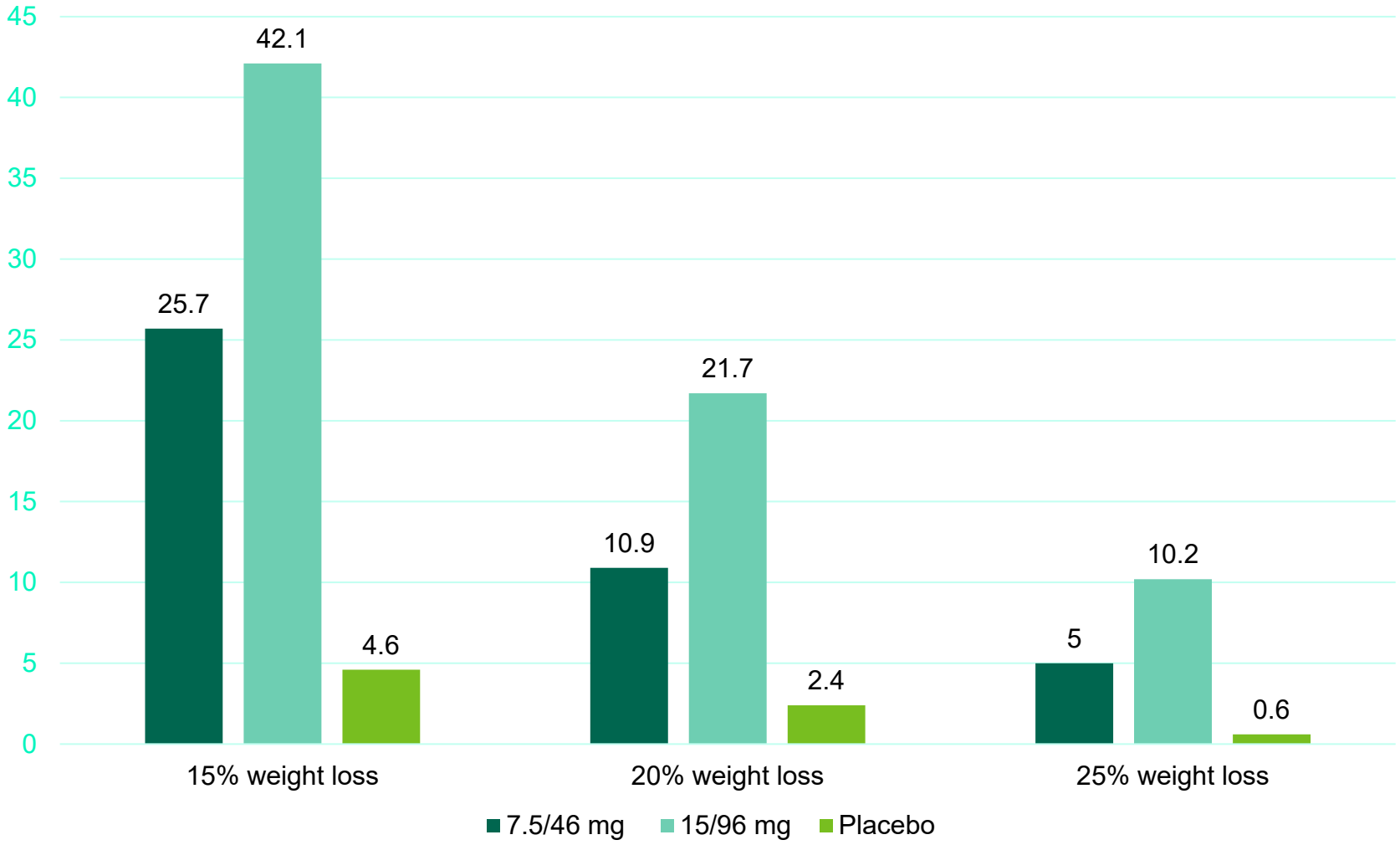
Clinical Trials Phentermine/Topiramate

Trial Name Participants	Average Percent Total body weight loss
EQUIP 1267	14%
EQUATE 756	9.2%
CONQUER 2487	12.4%
SEQUEL 676	10.5% 2 years

* No Cardiovascular outcomes trial completed

Igel LI, Kumar RB, Saunders KH, Aronne LJ. Practical Use of Pharmacotherapy for Obesity. Gastroenterology. 2017 May;152(7):1765-1779. doi: 10.1053/j.gastro.2016.12.049. Epub 2017 Feb 10. PMID: 28192104.

Clinical trials Phentermine/Topiramate



Smith SM, Meyer. Phentermine/topiramate for the treatment of obesity Ann Pharmcother.2003. Mar:340-9. PMID:23482732

Phentermine + Topiramate XR (Qsymia)

Prior heart attack, Aneurysm, stroke
Uncontrolled HTN
Tachyarrhythmia
Hyperthyroidism (untreated)
Severe anxiety
Glaucoma
Kidney stones (calcium phosphate)
Pregnancy or breast feeding
CKD stage IV/V

Lack of co-morbid conditions
High hunger/cravings
Women on birth control

Depression not well treated
Paresthesia
Memory issues/forgetfulness
Taste distortion
Dry mouth
Dizziness
Constipation
Insomnia
Serious but rare: hypokalemia** pay attention to non-potassium sparing diuretics

Phentermine/Topiramate (Qsymia)

Dosing

- Qsymia: 3.75/23mg x 14d then 7.5/46mg, 15/92mg
- Phentermine 8 mg daily and topiramate 25-50 mg daily (more affordable)
- Schedule IV Controlled substance
- Check state requirements for controlled substance requirements; for NH: Yearly PDMP and in office visit

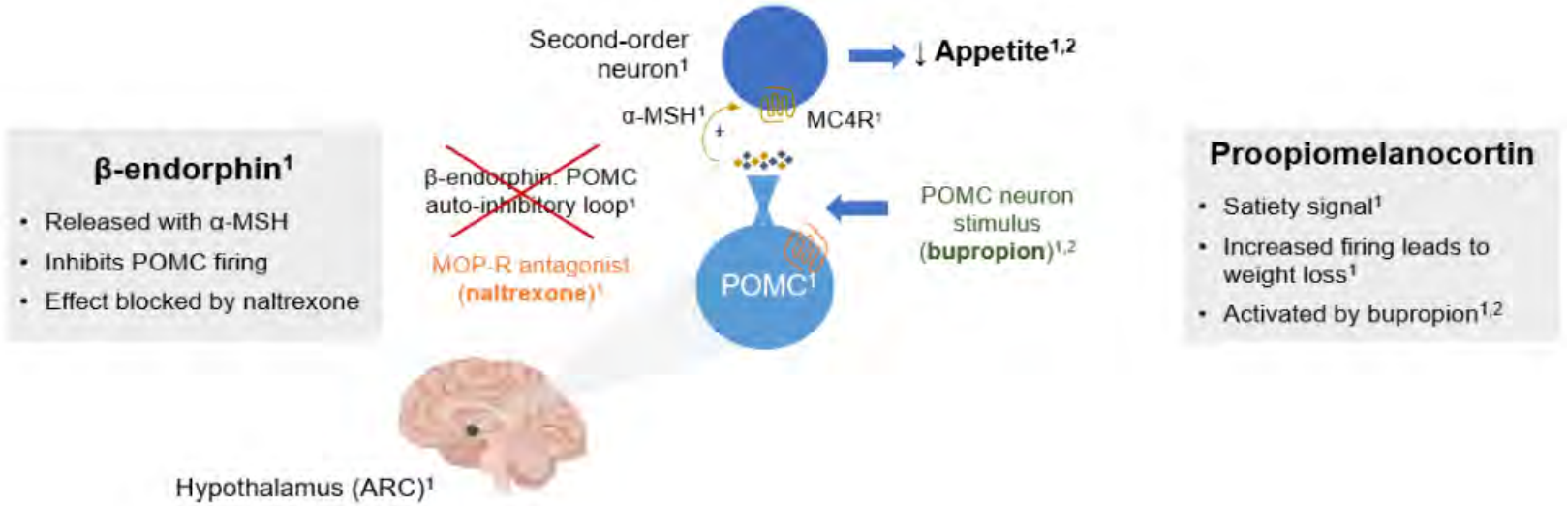
Patient Monitoring

- If on diuretics-monitoring potassium before and during treatment
- Monitor metabolic acidosis higher doses/long term exposure
- Suicidal ideation or anxiety/depression
- Evaluate pregnancy status prior to use in patients who can become pregnant.
- Patients who can become pregnant should have a negative pregnancy test prior to and monthly during therapy.
- Effective contraception should be used during treatment.
- Irregular bleeding may occur with use of combination oral contraceptives; efficacy of contraception may be dependent upon dose.

Naltrexone/Bupropion (Contrave)

Mechanism of Action

- Opioid receptor antagonist dopamine agonist/norepinephrine-dopamine reuptake inhibitor
- Increased satiety, appetite suppression



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Clinical Trials Naltrexone + Bupropion (Contrave)

52 weeks multicentered RCT	% Total weight loss
COR-I	6.1% vs. 1.3% placebo -4.8%
COR-II	7.1% vs 2% placebo 5%-48% 10%-27% 15%-10%
COR-BMOD	9% vs 5% placebo
COR-DM	> 5%- vs 1.8% placebo

* No Cardiovascular outcomes trial completed ; No dedicated RCT for prevention of weight regain or long –term mainten

Naltrexone/ Bupropion (Contrave)

Seizure disorder
Severe anxiety
Uncontrolled headaches
Heart disease
Uncontrolled high blood pressure
Chronic opioid or methadone use
Drug or alcohol withdrawal
Anorexia nervosa or bulimia nervosa
Glaucoma
Liver failure (reduce dose)
Kidney disease (reduce dose)

Type 2 Diabetes
Emotional eater
Cravings for food and addictive behaviors related to food
Quitting tobacco
Quitting alcohol
Depression

Nausea
Vomiting
Constipation
Stomach upset
Trouble sleeping
Headache
Dry mouth
Dizziness
Worsening mood, suicidality
Sweating

Naltrexone + Bupropion (Contrave)

Dosing

Week 1: 1 tablet in am
Week 2: 1 tablet in am and 1 tablet in pm
Week 3: 2 tablets in am and 1 tablet in pm
Week 4 and on : 2 tablets in am and 2 tablets in pm

Bupropion SR 100 mg tablets

Week 1: 1 tablet in the am
Week 2: 1 tablet in the am and 1 tablet in the pm
Week 3: 2 tablets in the am and 1 tablet in the pm
Week 4 and on: 2 tablets in am and 2 tablets in pm
*You can change from 2 100 mg tablets to 200 mg tablet

Naltrexone 50 mg tablet

Week 1: ¼ tablet in the am
Week 2: ½ tablet in the am
Week 3: ½ tablet in the am and ¼ tablet in the pm

Patient Monitoring

- Monitor BP and HR weekly for a month
- Worsening depression/anxiety
- Can reduce side effects by reducing dose

Treatment Recommendations

Do not delay treatment; be proactive in prevention of obesity complications

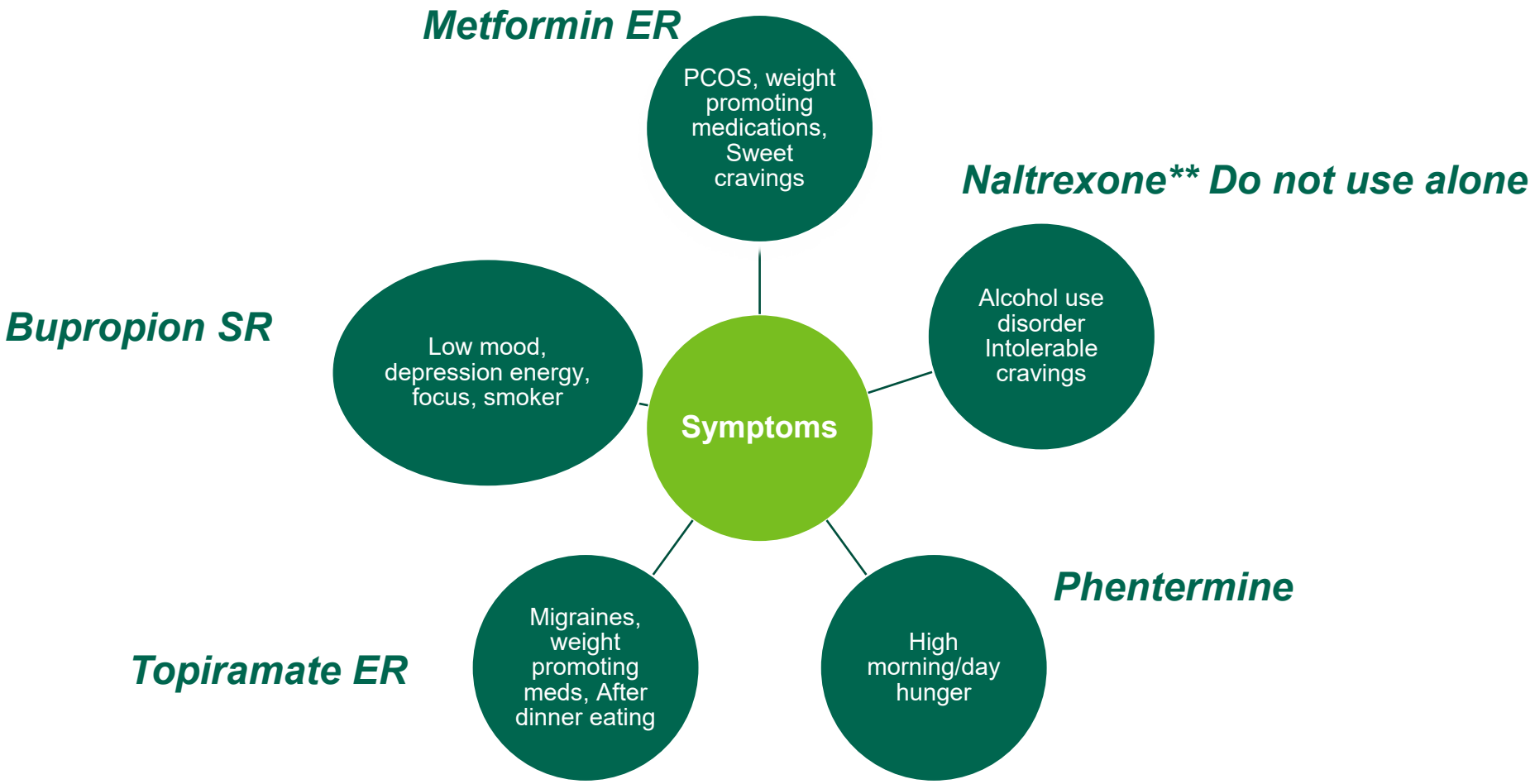
Starting treatment • BMI ≥ 27 with complications • BMI ≥ 30 12-16 weeks if less than 3-5% of body weight change course (discontinue, change dose, alternate medication, etc.) Use in combination with lifestyle and behavioral change!	**Maintenance** **Medication recommended life long** Monitor every 6, 12 months Reassess (exercise, diet, psychological, health issues, concomitant medications)

Shared Decision making on Treatment Goals

- In addition to weight loss, focusing on health metrics, reduction in cardiometabolic risk, improvement, remission or resolution of adiposity related complications, maintenance of weight loss, management of symptoms of obesity (appetite cravings), improvement of quality of life.
- Medications help prevent weight regain and maintain weight loss after health changes alone
- Personalized to meet individual values, preferences and treatment goals, safe, effective, culturally acceptable and affordable for long -term adherence
- If BMI still in obesity range, but patients complications have reduced, good QOL, and less amount of ASE on medication, that should be goal weight and tell the patient that!

Pharmacotherapy for obesity management in adults:
2025 clinical practice guidelines CMAJ 2025 August 11;197:E797-809. doi: 10.1503/cmaj.250502

“Off label” AOM that are affordable and tailored for combination treatment



Case 1

Ms. Suarez 45 year old woman, weight 230, BMI 35, waist circumference 40 inches. BP 125/76

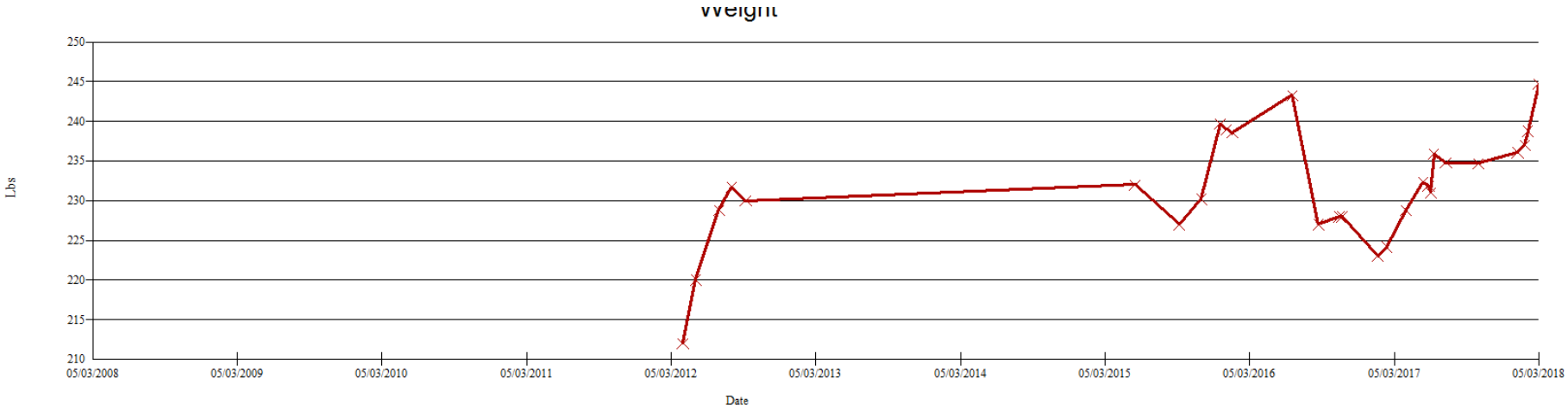
Insomnia: Amitriptyline 250 mg QHS

Anxiety: Clonazepam 1.5 mg PO BID

PCOS: Fasting insulin 36 uU/ml, A1c 6.0 on metformin

HTN: controlled on lisinopril

Kidney stones: Calcium oxalate



You she is already on metformin to help with psychotropic induced weight gain in addition to prediabetes. She would like to lose more weight and metformin “isn’t’ working any more” because her hunger has come back. Labs: A1c 5.6. Patient would like to lose more weight and she does not have coverage for GLP1 agonist.

What are your next steps?

A. Tell her she has already lost 6% of her body weight and she doesn’t need any further intervention. Stop metformin as it isn’t working

B. Continue metformin and add phentermine 4 mg titrate to 8 mg

C. Continue metformin and start naltrexone titration

D. Stop metformin and start on phentermine 8 mg

You she is already on metformin to help with psychotropic induced weight gain in addition to prediabetes. She would like to lose more weight and metformin “isn’t’ working any more” because her hunger has come back. Labs: A1c 5.6. Patient would like to lose more weight and she does not have coverage for GLP1 agonist.

What are your next steps?

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B. Continue metformin and add phentermine 4 mg titrate to 8 mg

C. Continue metformin and start naltrexone titration

D. Stop metformin and start on phentermine 8 mg

Combination AOM Pearls

- Goals, reasonable expectations on treatment discussion at every visit!
- You can safely add phentermine (and Wellbutrin) in a patient with well controlled HTN even if they need their medication adjusted
- Both phentermine/Wellbutrin have overlapping adrenergic activity and using combination may result in higher risk of anxiety, lower threshold for seizures
- When an agent is ineffective for monotherapy (without serious ASE), it may be reintroduced later in a combination resulting in good weight loss

- You add phentermine and titrate up. She has some constipation, but it improves with water. Over a period of 10 months, she loses another 25 pounds. Her total weight loss is 41 pounds (Total 21.25%) and final weight 190 pounds (BMI 29.3). She wants to lose more weight, but also doesn't want to be on 'medications forever'.
  How do you counsel her?

Case 2

Mr. Williams 32 year old weight, Vitals: 260 lbs, BMI 38 BP 116/76 HR 83

PMH:

- Mild OSA, uses CPAP
- OA: ibuprofen
- Depression: Zoloft
- Migraines: propranolol

He has high hunger during the day, no emotional eating. He would like GLP1 agonist, but no coverage. He is concerned of taking a medication twice a day. **What would you do for this patient?**

A) Start Phentermine/Topiramate

B) Start Naltrexone/Bupropion

C) Start Metformin

D) Start Wellbutrin

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Case 2

Mr. Williams follows up with you after being on phentermine/topiramate and has lost 15 lbs. (5% body weight) in 3 months. His headaches are much improved. He notes he is having tingling in his hands and feet, but it's not bothering him to much. He would like to increase his medication. You increase him to 11.25/69 x 2 weeks then 15 mg phentermine/ 96 mg of topiramate. He follows up with you in 3 months and has lot additional 20 pounds (total 35 lbs. lost, 13.46% of his body weight), but notes that he feels "foggy" and has been more forgetful.

What would be your next steps?

A. Slowly titrate off Phentermine/Topiramate

B. Reduce phentermine/topiramate back to 11.25/69 mg dose

C. Stop Phentermine/Topiramate, start Naltrexone/Bupropion

D. Continue phentermine, stop Topiramate

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D. Continue phentermine, stop Topiramate

Phentermine/Topiramate PEARLS

- When patients with moderate/high dose of topiramate develop cognitive side effects, reducing the dose to a lower, but still effective dose can allow the continued use of the medication
- Taper down phentermine/Topiramate slowly to minimize side effects
  - Combo step down or alternative every other day x 7 days to off
  - Two separate drugs, decrease dose of topiramate
- Recommend trial of ER versions
- Calcium phosphate stones are associated with topiramate

Case 3

Ms. Reed is a 38 year old, BMI 40 waist circumference 43, BP 145/89 HR 92

PMH:

DM with gastroparesis: A1c 7.8, metformin, glipizide

HTN: Lisinopril

PCOS: OCP

Depression: untreated

Back pain: untreated

She feels she is an emotional eater with food noise ‘all day’. **What medication would you try first?**

A) Tirzepatide 2.5 mg and titrate up

B) Qsymia 3.75/23 and titrate up

C) Naltrexone/bupropion

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B) Qsymia 3.75/23 and titrate up

C**) Naltrexone/bupropion**

Naltrexone/bupropion Pearls

- Monitor BP and HR weekly for a month
- Monitor depression/anxiety
- Can reduce side effects by reducing dose back to week 2 or 3 of titration
- Use reduced doses (week 2) for CKD/Liver disease

Case 4

- You see Mrs. Emmel for obesity follow up and you would like to start GLP1 agonist. She has had gastric bypass in 2018 with 15% total body weight regain and no concerns for starting GLP1 agonist. Insurance came back with denial saying patient has tried and failed ‘making’ a patient try orlistat before prescribing GLP1 agonist. Patient is worried about side effects as used Alli (over the counter) pre-surgery and had explosive diarrhea.

What can you say to the patient and insurance company:

- A) Orlistat is contraindicated in malabsorption syndromes
- B) We need to try orlistat first
- C) Orlistat may help your constipation
- D) sorry, I can’t prescribe any meds for you

Case 4

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WELCOME to the *Obesity Care in All Ages ECHO*

Session 6, Approach to the Pediatric Patient with Obesity - AAP Clinical practice guidelines
- September 23rd, 2025

This ECHO is supported by the Walter and Carole Young Center for Digestive Health

Today's Program

- Brief housekeeping
- Didactic: Approach to the Pediatric Patient with Obesity - AAP Clinical practice guidelines
- – Auden McClure, MD, MPH
- Case Discussion – Christine Arsnow
- Summary
- Up Next

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Approach to the Pediatric Patient with Obesity

The American Academy of Pediatrics Clinical Practice Guidelines

Auden McClure, MD MPH

Co-director, Pediatric Weight and Lipid Program

The Weight Center, Center for Digestive Health

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Dr McClure has no financial conflicts of interest to disclose

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Objectives for today

Define obesity as a disease

Provide an overview of pediatric obesity medicine using the American Academy of Pediatrics Clinical Practice Guidelines

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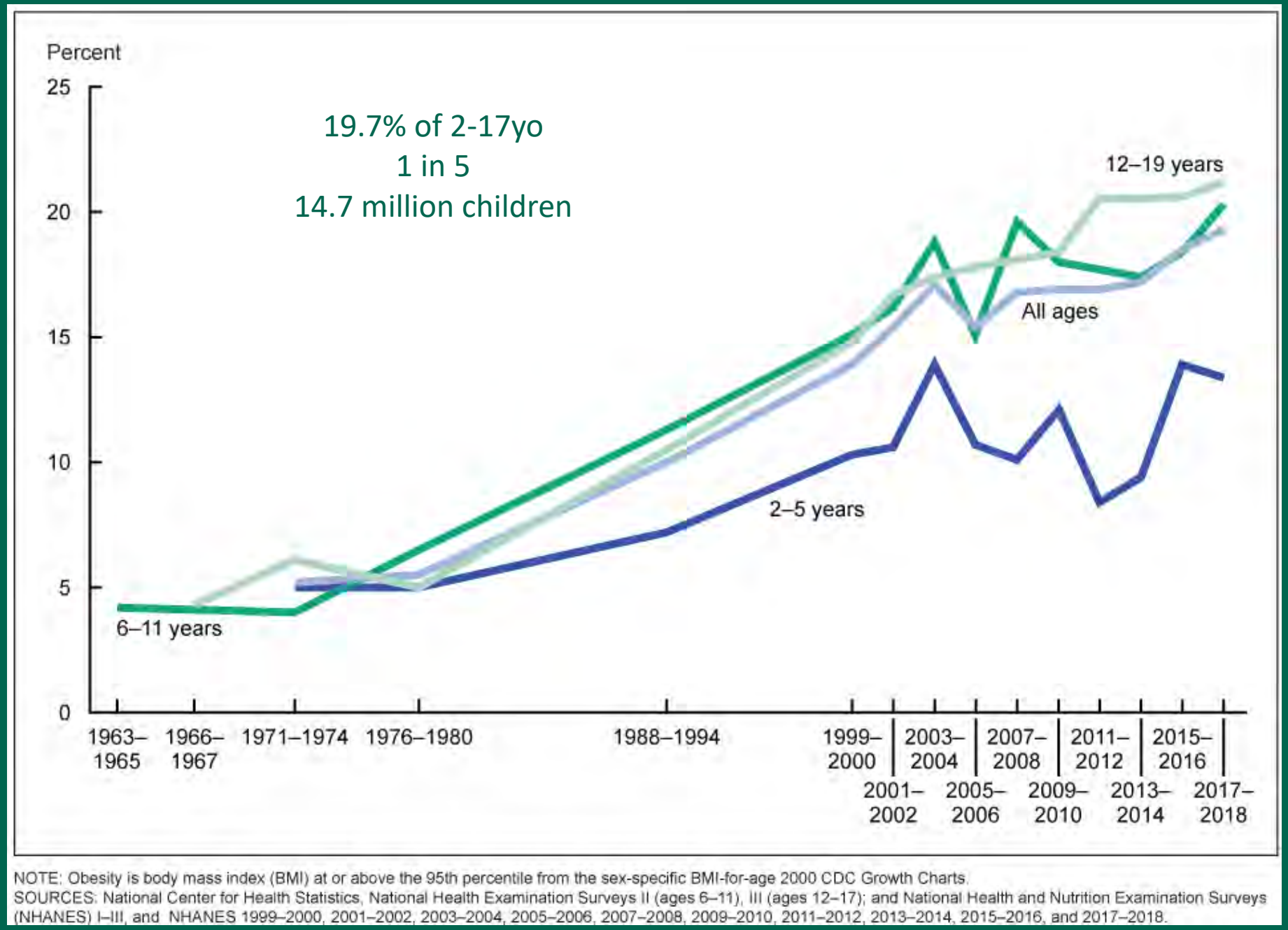
Rising Prevalence of Pediatric Obesity



NOTE: Obesity is body mass index (BMI) at or above the 95th percentile from the sex-specific BMI-for-age 2000 CDC Growth Charts.
SOURCES: National Center for Health Statistics, National Health Examination Surveys II (ages 6–11), III (ages 12–17); and National Health and Nutrition Examination Surveys (NHANES) I–III, and NHANES 1999–2000, 2001–2002, 2003–2004, 2005–2006, 2007–2008, 2009–2010, 2011–2012, 2013–2014, 2015–2016, and 2017–2018.

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Complications of Obesity

Prediabetes

Prevalence of ~26% (1 in 4) of adolescents with obesity[1,2]

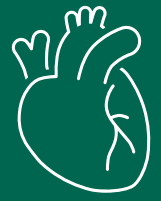
MASLD Metabolic dysfunction associated steatohepatitis)

Prevalence of 30 -50% in children & adolescents with obesity[1,3]

OSA Obstructive Sleep Apnea

Prevalence of ~45% in children & adolescents with obesity[1,4]

Hypertension



Prevalence of 5 -30% in children & adolescents with obesity[1,5]

PCOS Polycystic Ovarian Syndrome

Prevalence of 3-11% in adolescents with obesity[1]

Psychosocial

Depression
Internalized Stigma
Decreased QOL[1]

Slide adapted from Ania M. Jastreboff MD PhD, ATPO 2025; 1. Hampl, *Pediatrics* 2023; 2. Andes, *jamapediatrics*2019; 3. Panganiban, *Obes Pillars* 2025; 4. Andersen, *Eur Arch Otorhinolaryngol* 2019; 5. Skinner, *Pediatrics* 2023

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OMA Definition of Obesity

Chronic, relapsing, multi-factorial, neurobehavioral disease, wherein an increase in body fat promotes adipose tissue dysfunction and abnormal fat mass physical forces, resulting in adverse metabolic, biomechanical, and psychosocial health consequences

https://obesitymedicine.org/blog/definition-of-obesity; 2025 Obesity Algorithm®
https://obesitymedicine.org/resources/obesity-algorithm/pediatric-obesity-algorithm

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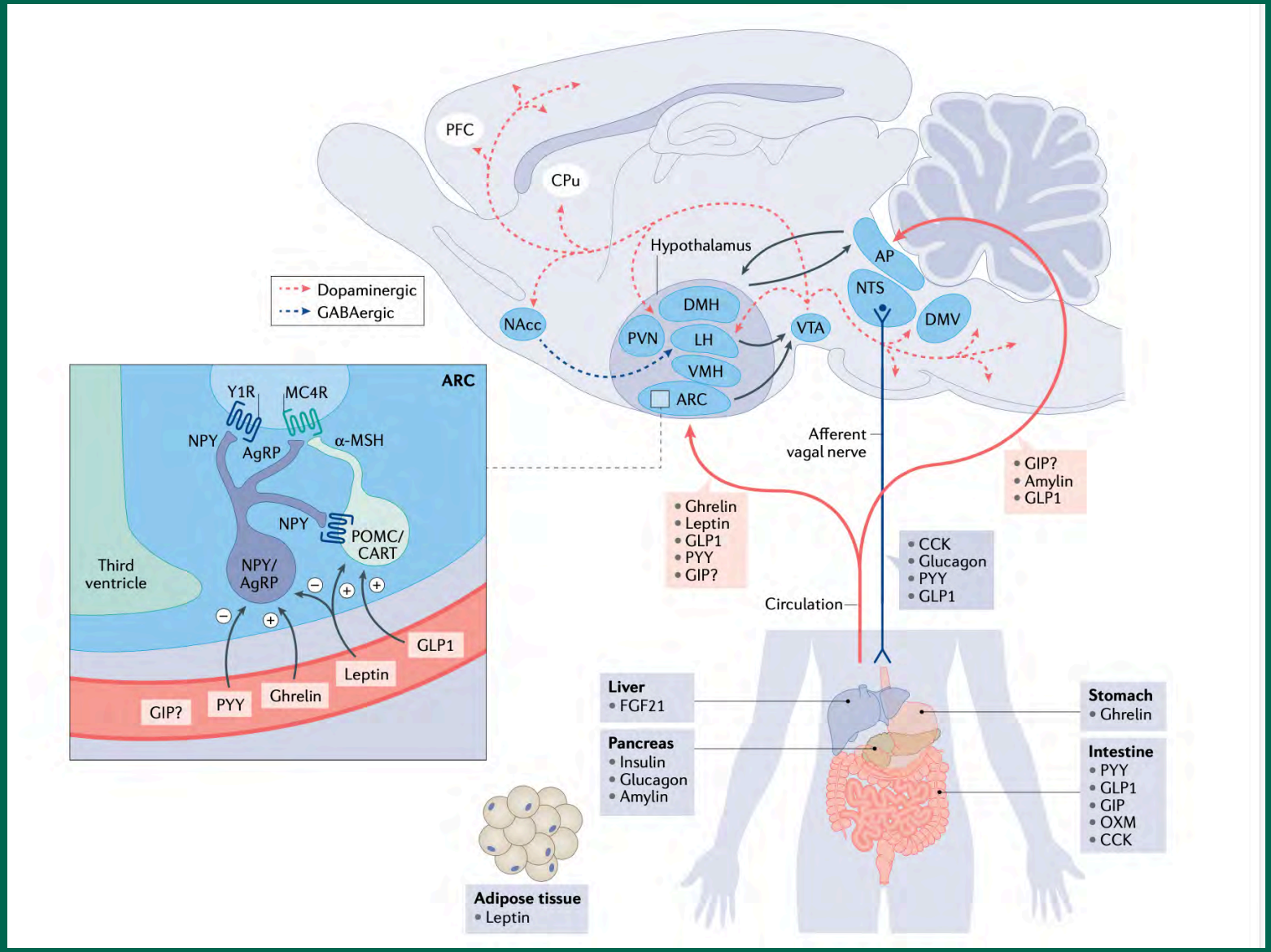
Neurohormonal Regulation of Weight

Complex interplay of hormones which regulate energy balance and determine set point (defended fat mass)



Muller et al. *Nature Reviews* 2022; 21:201-223

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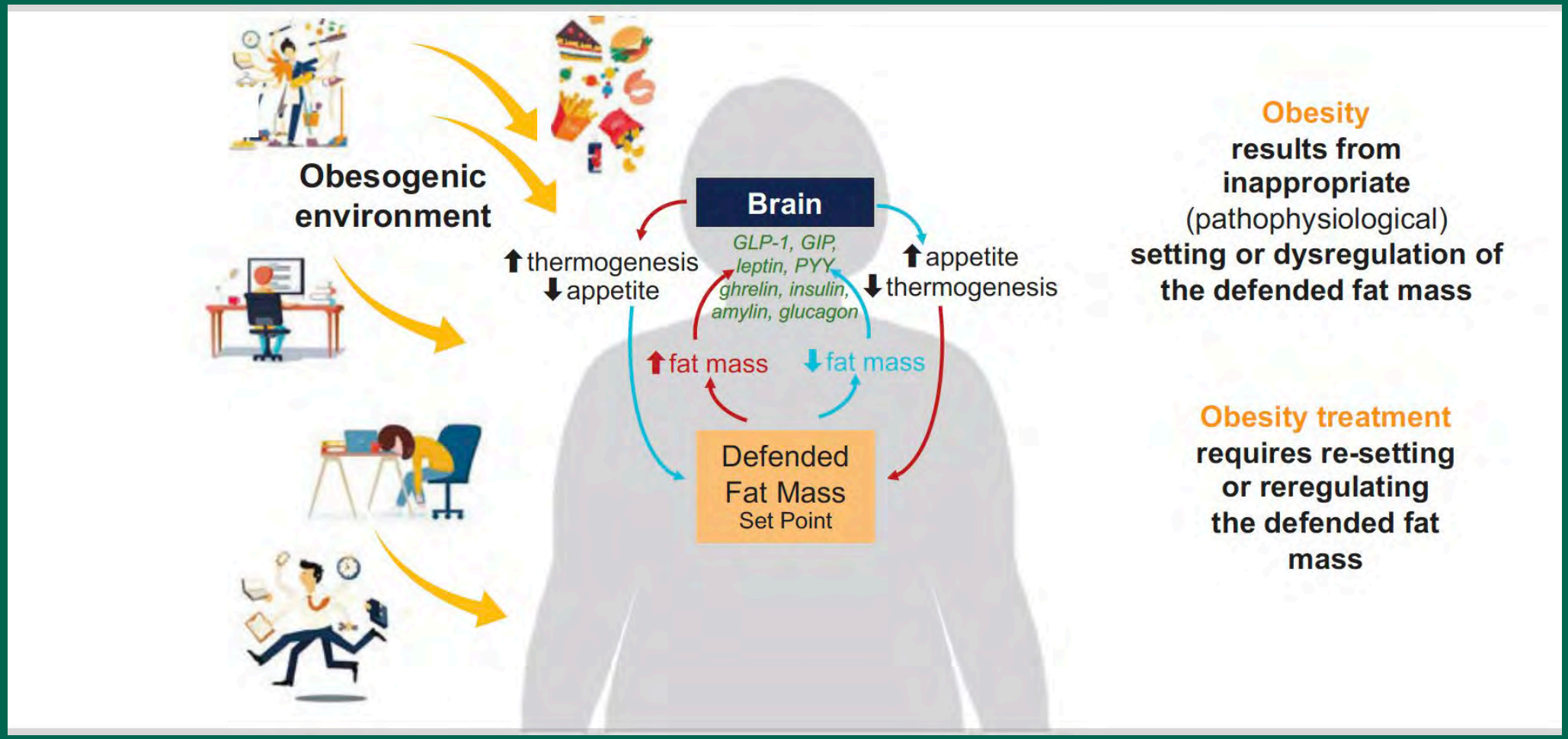
In obesity that set point is too high

Concept of Defended Fast Mass (Set Point)



Slide from Ania M. Jastreboff MD Phd; Concept from Lee Kaplan MD PhD

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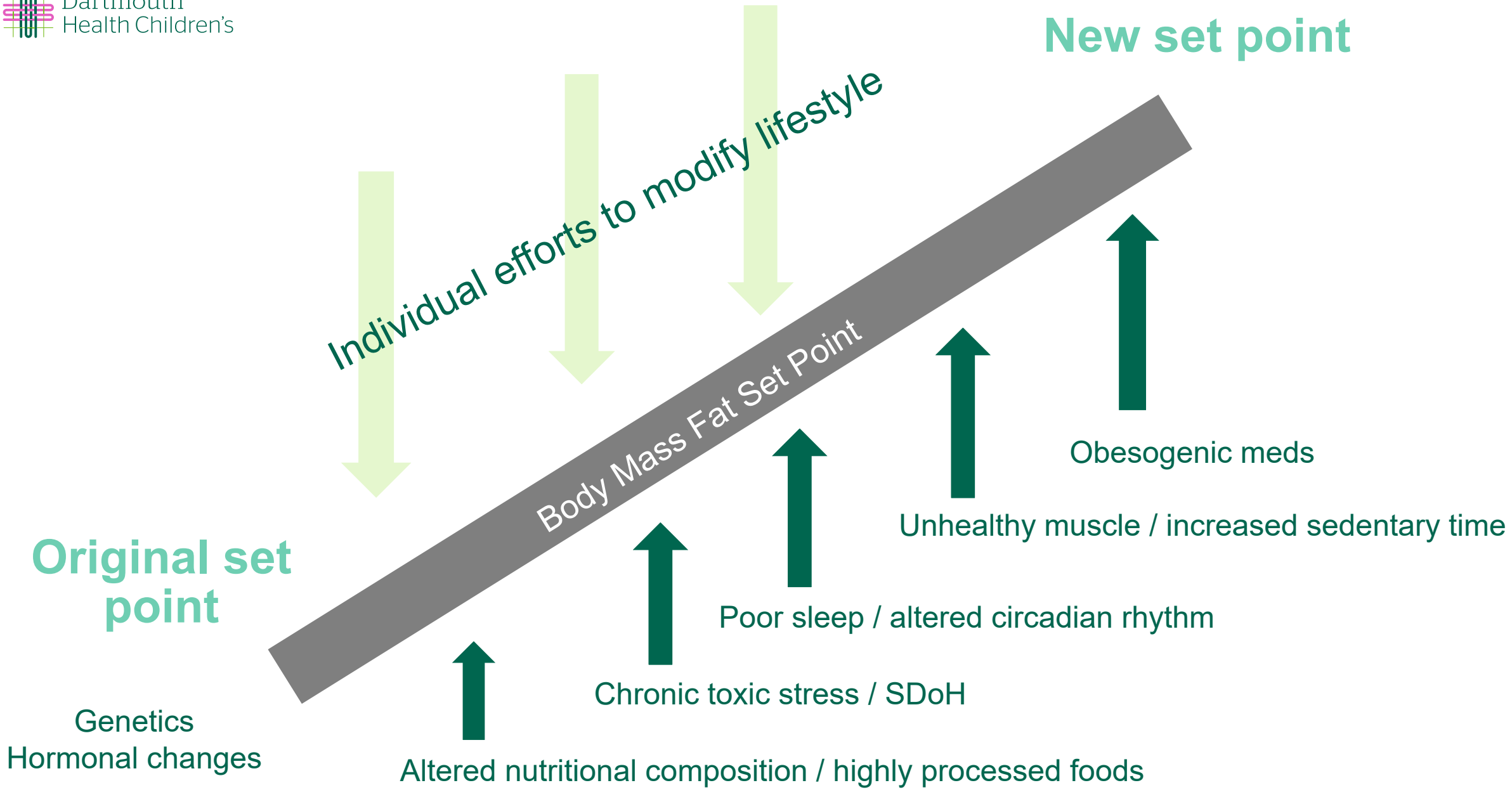

Slide: adapted from Lee Kaplan MD

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What Obesity Is

Caused by countless factors (many/most of which are not within the control of the individual) that collectively facilitate weight gain over time

Doggedly persistent, particular when surfacing early in life:

- If obesity surfaces in childhood, it is probably a particularly aggressive form of the disease
- >85% of youth with obesity will grow up to be adults with obesity

Slide: adapted from Aaron Kelly PhD, ATPO 2025: Freedman et al. J Pediatrics 2007

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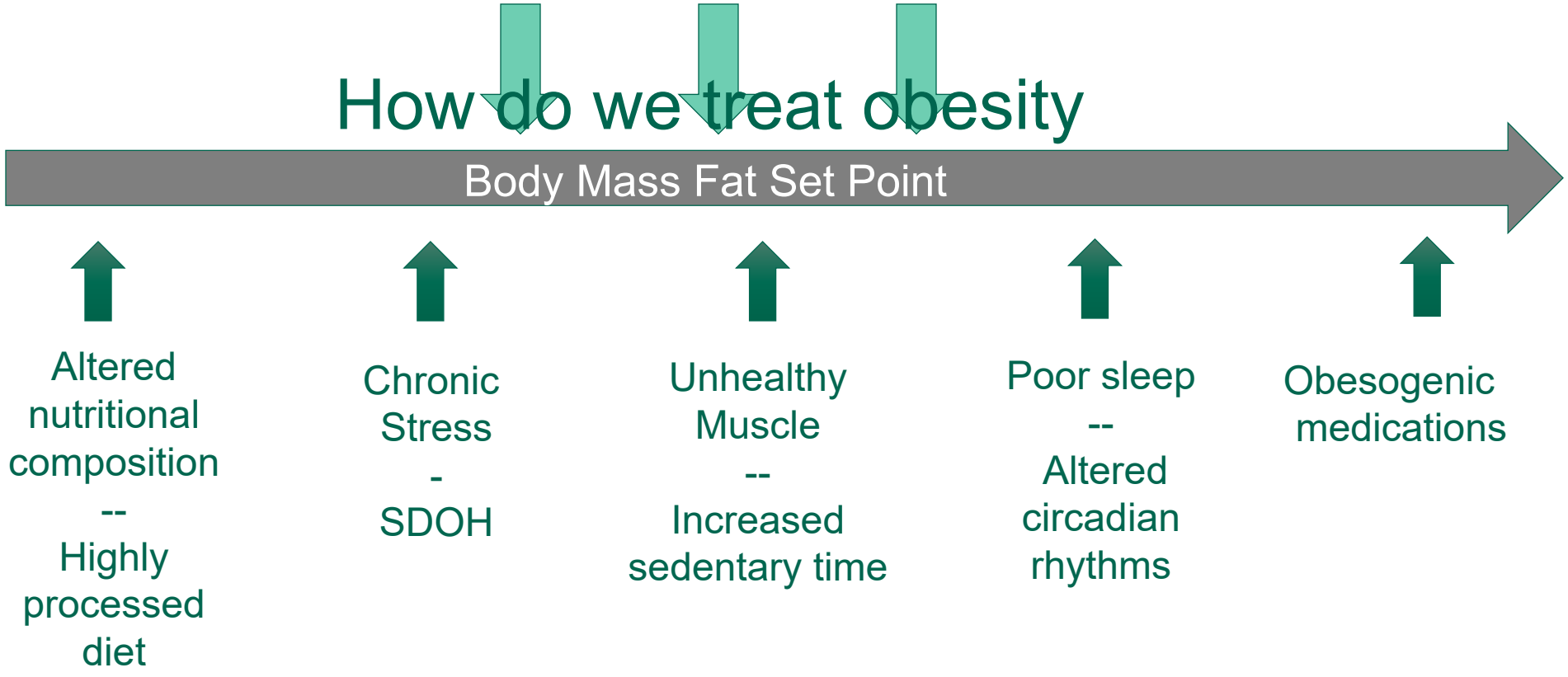
Durable Anti-Obesity Therapy (lifestyle, medication, surgery)



Obesogenic Environment / drivers of obesity

Slide / concept: adapted from Lee Kaplan MD

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Some Important Points to Consider

- Obesity is a complex and chronic disease!
  - Disease of abnormal physiology resulting from multi-factorial causes, including genetics, environment, and social determinants of health
  - Long term management will be necessary, and treatment response may vary

- **It is not**
  - a "choice," lack of willpower, or poor parenting
  - a simple balance between calories in and calories out – is much more complex

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What is our job?

- Identification (Diagnosis)
  - Not just obesity as defined by BMI, but the disease of obesity
  - Identify complications such as insulin resistance, pre-diabetes, lipid abnormalities, fatty liver disease, hypertension, PCOS, etc.
- Understand the prognosis of each issue
  - Families can't make treatment decisions if they do not understand the prognosis and treatment options
- Discuss an initial (individualized) management plan
- Treat when able, refer when appropriate

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Treatment Goals

- Goal is to durably reduce excess adiposity
- While concurrently treating obesity-related complications
- Watching and waiting is no longer an appropriate option

- For adults, even 5-10% weight loss is associated with improved cardiometabolic outcomes
- For children, goal is BMI reduction > 10%, even below 85-95th percentile, if complications persist

CLINICAL PRACTICE GUIDELINE Guidance for the Clinician in Rendering Pediatric Care

American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN™

Clinical Practice Guideline for the Evaluation and Treatment of Children and Adolescents With Obesity

Hampl SE, *Pediatrics* 2023

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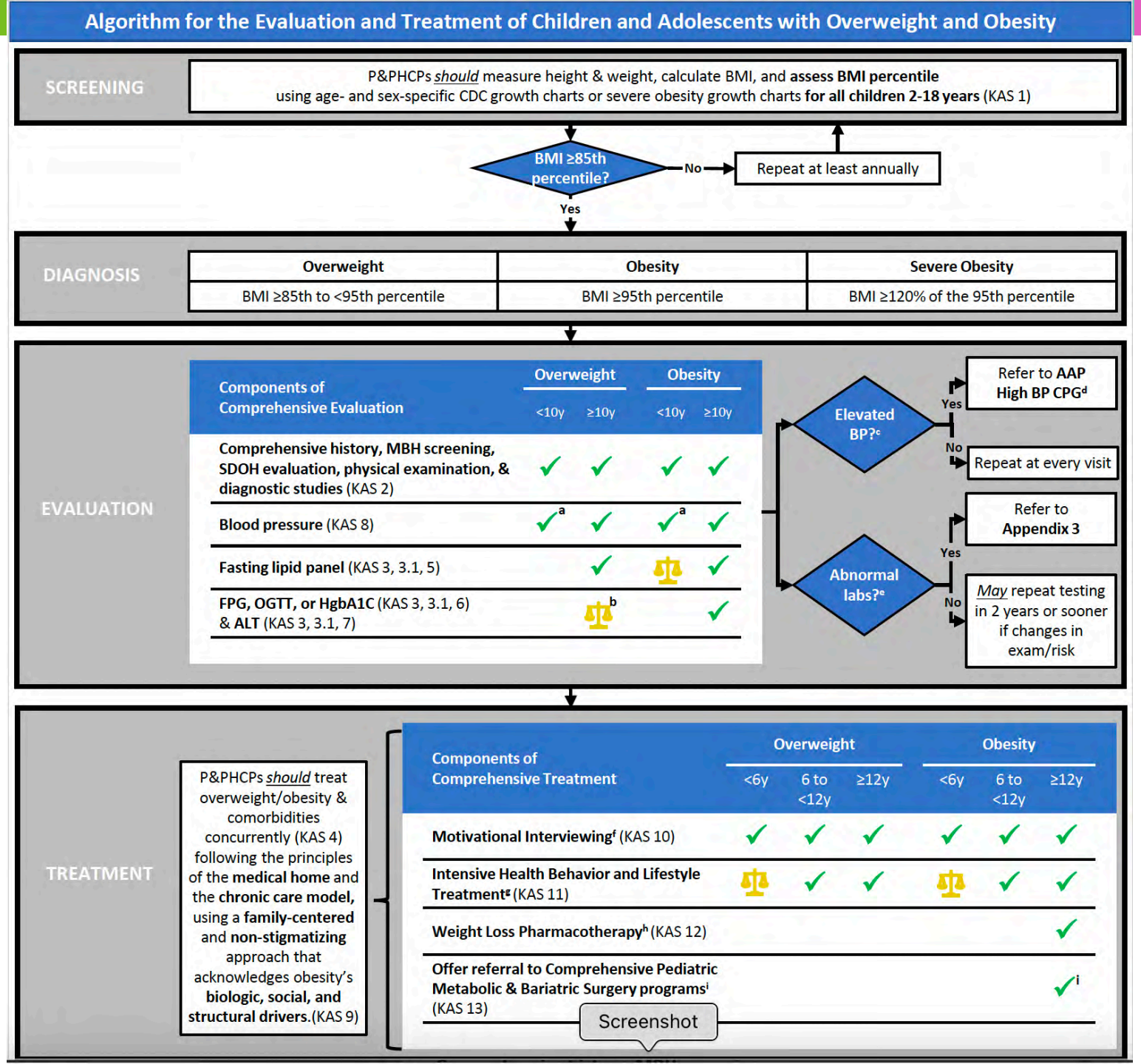
Clinical Practice Guidelines

- **Full Report**
- **Executive Summary**
- **AAP Decision Support Tools**
  - Algorithm
  - Key Action Statements
  - Consensus Recommendations
- **Found at AAP Institute for Childhood Healthy Weight**



Algorithm for Screening, Diagnosis, Evaluation, and Treatment of Pediatric Overweight and Obesity
https://www.aap.org/en/patient-care/institute-for-healthy-childhood-weight/clinical-practice-guideline-for-the-evaluation-and-treatment-of-pediatric-obesity/

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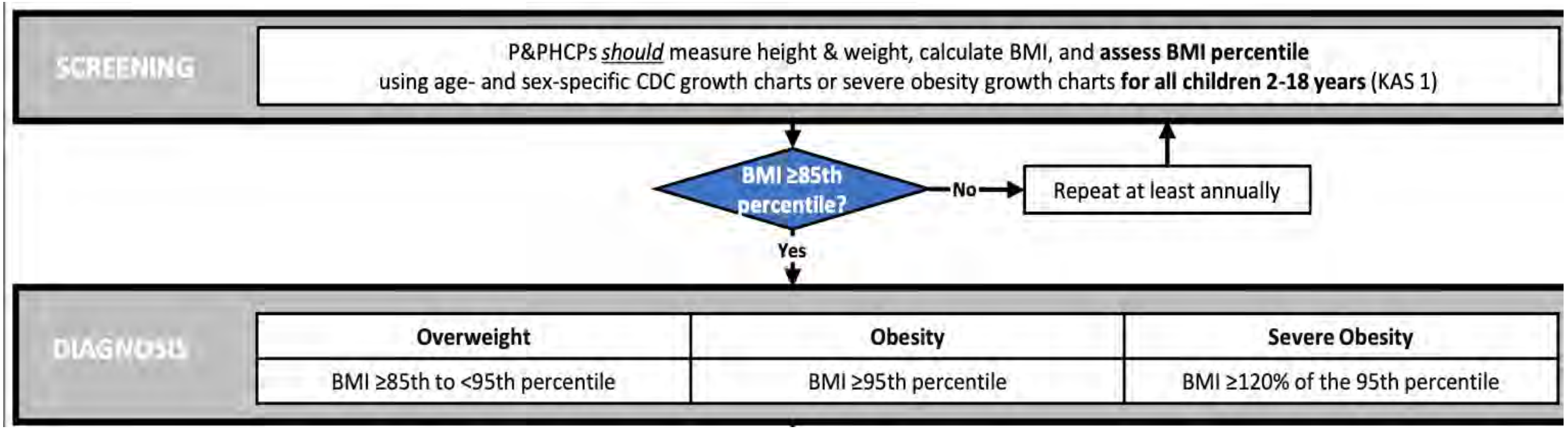

US Preventive Services Task Force Grade B evidence for screening for obesity using BMI

Algorithm for Screening, Diagnosis, Evaluation, and Treatment of Pediatric Overweight and Obesity
https://www.aap.org/en/patient-care/institute-for-healthy-childhood-weight/clinical-practice-guideline-for-the-evaluation-and-treatment-of-pediatric-obesity/

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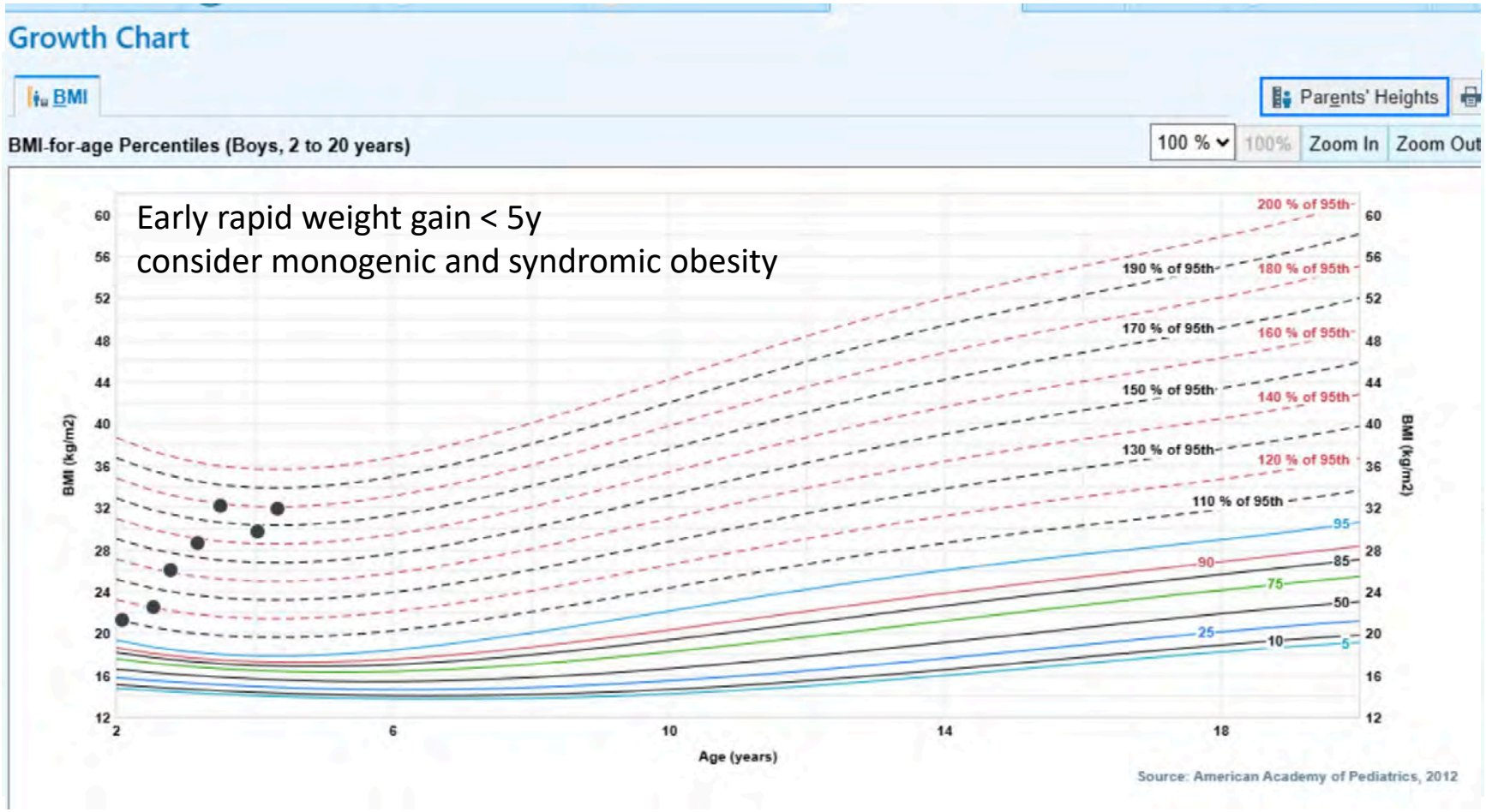
Extended Growth Charts



Class I obesity

BMI ≥ 95th percentile to < 120% of 95th percentile

Class 2 obesity

BMI ≥ 120% to < 140% of 95th percentile or BMI ≥ 35 to <40 kg/m ^{2}

Class 3 obesity

BMI ≥ 140% of 95th percentile or BMI ≥ 40 kg/m ^{2}

Gulati AK, Kaplan DW, Daniels SR. Clinical tracking of severely obese children: A new growth chart. Pediatrics. 2012;130: 1136-40

https://www.cdc.gov/obesity/basics/childhood-defining.html

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✓ = should ⚖ = consider

Screening for obesity-related complications

EVALUATION

Components of Comprehensive Evaluation	Overweight		Obesity	
	<10y	≥10y	<10y	≥10y
Comprehensive history, MBH screening, SDOH evaluation, physical examination, & diagnostic studies (KAS 2)	✓	✓	✓	✓
Blood pressure (KAS 8)	✓[a]	✓	✓[a]	✓
Fasting lipid panel (KAS 3, 3.1, 5)		✓	⚖	✓
FPG, OGTT, or HgbA1C (KAS 3, 3.1, 6) & **ALT** (KAS 3, 3.1, 7)		⚖[b]		✓

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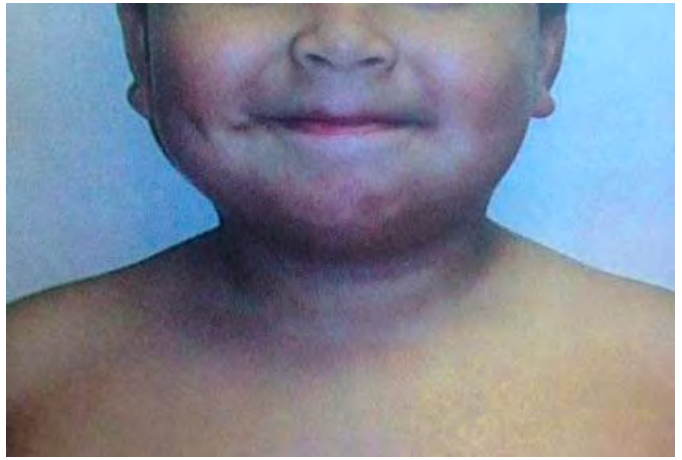
Focused History

In children with overweight/ obesity evaluate for obesity-related co-morbidities:

- Assess individual, structural, and contextual risk and protective factors related to healthy behavior and healthy weight, including:
  - Medical history: chief complaint/history of present illness, review of systems, medication history, family history
  - Social determinants of health
  - Individual/family lifestyle behavior history
  - Mental and behavioral health, psychosocial consequences of living with obesity
- Physical exam
- Diagnostic studies



Acanthosis nigricans

Hampl SE, *Pediatrics* 2023

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Communicating with families

- Partner with families - use respect, trust, open and objective communication
  - Avoid labeling by using patient first language (child with obesity)
  - Use words that are perceived as neutral by parents, teens, children
- Parents know their children best – listen, with compassion
- Acknowledge that they have been working hard to address obesity
- Explain the multifactorial nature of obesity
  - What we can influence = obesity pillars (diet, activity, sleep, stress, meds)
  - What we can't, like our genetics or family history
- Share the story of obesity pathophysiology and target treatment to that

adapted from: **Clinical Flow: Assessment and Evaluation**
https://www.aap.org/en/patient-care/institute-for-healthy-childhood-weight/clinical-practice-guideline-for-the-evaluation-and-treatment-of-pediatric-obesity/

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Treat obesity and co-morbidities concurrently

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Volume 140, Issue 3
September 2017

PEDIATRICS

FROM THE AMERICAN ACADEMY OF PEDIATRICS | CLINICAL PRACTICE GUIDELINE | SEPTEMBER 01 2017

Clinical Practice Guideline for Screening and Management of High Blood Pressure in Children and Adolescents

Algorithm for Screening, Diagnosis, Evaluation, and Treatment of Pediatric Overweight and Obesity
https://www.aap.org/en/patient-care/institute-for-healthy-childhood-weight/clinical-practice-guideline-for-the-evaluation-and-treatment-of-pediatric-obesity/

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FPG, OGTT, or HgbA1C (KAS 3, 3.1, 6) & **ALT** (KAS 3, 3.1, 7)		⚖[b]		✓

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Infancy (0-24 months)	Toddler (Age 2-4 years)	Early Childhood (Age 5-9 years)	Puberty (Age 10-14 years)	Adolescent (Age 15-18 years)
Weight>Length	BMI ≥ 95th percentile Or ≥ 85th percentile with 2 or more risk factors (24-48 months)	BMI ≥ 95th percentile Or ≥ 85th percentile with 2 or more risk factors	BMI ≥ 95th percentile Or ≥ 85th percentile with 2 or more risk factors	BMI ≥ 95th percentile Or ≥ 85th percentile with 2 or more risk factors
	- Fasting Blood Glucose and/or HbA1c - Fasting Lipid Panel/Non fasting if fasting not feasible - ALT - Consider 25 OH Vitamin D, Consider iron studies - BP annually if ≥ 3 years			
		- Consider Sleep Study - Consider Uric Acid - Consider fasting serum insulin		
Abnormal labs results for which additional testing is recommended: LDL ≥130; TG ≥100 (<10 years) or 130 (≥10 years); Prediabetes: HgbA1C ≥5.7 –6.4; FBS 100-125, OGTT 140-199; T2DM: FPG ≥126mg/dL, OGTT ≥200, HgbA1C ≥6.5; ALT≥2x upper limit of normal (≥52 males / ≥44 females)			- Consider Urine Microalbumin/Creatinine ratio - Consider C-peptide, hs-CRP	

Reference/s: [135] [136]

Obesity Medicine Association

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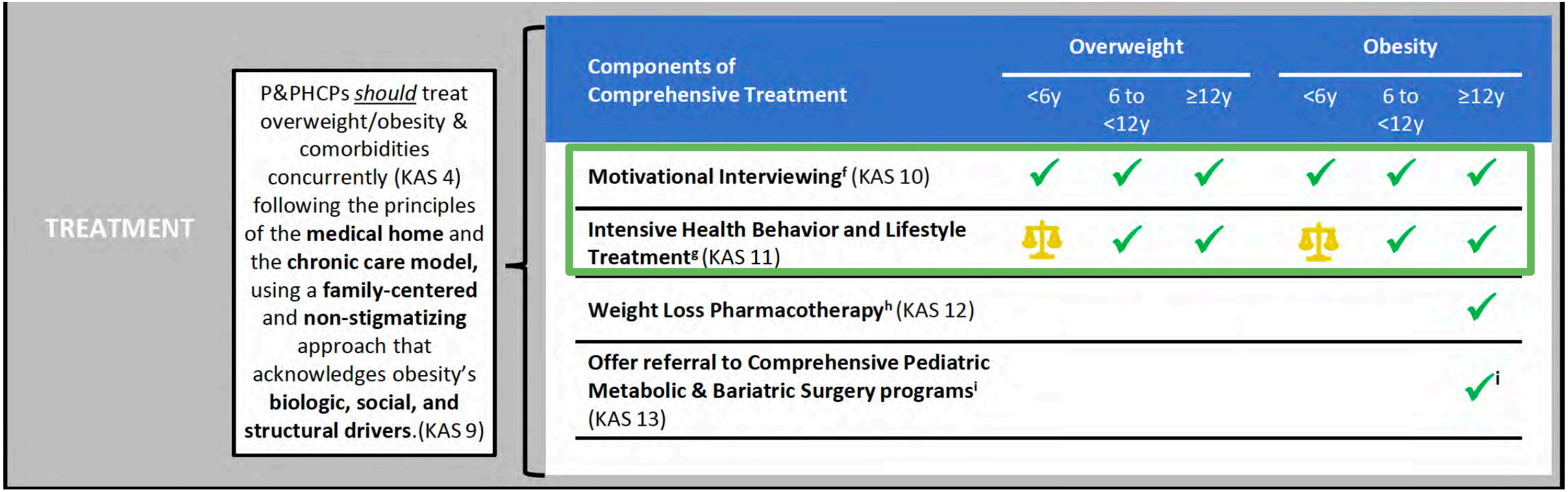

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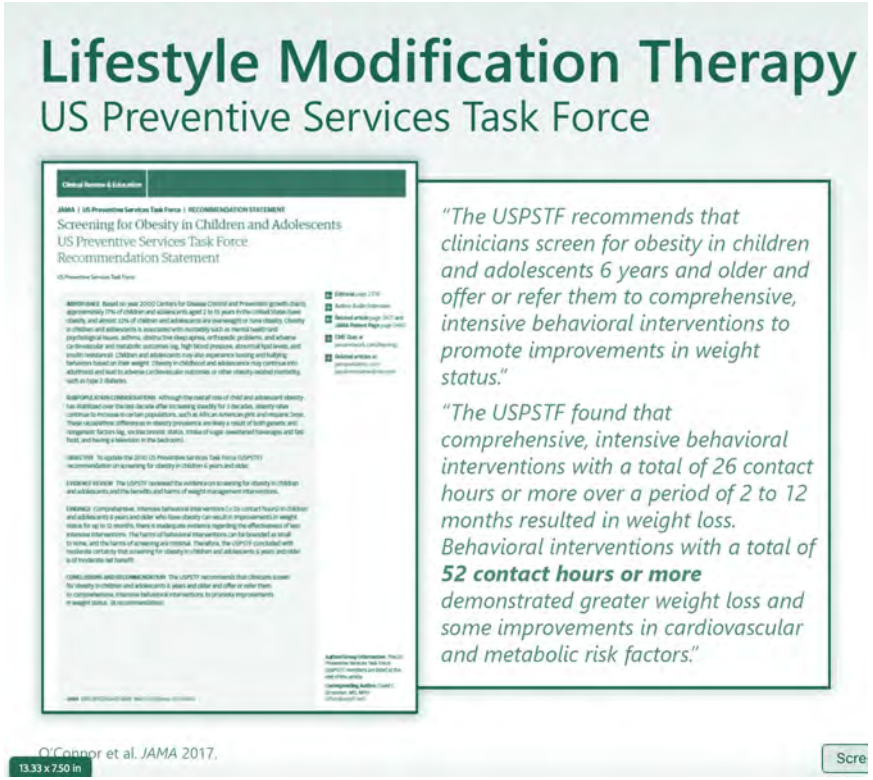
Intensive Health Behavior and Lifestyle Treatment

- Patient and family working with multidisciplinary team
  - Provider with training in obesity medicine
  - Other professionals with behavior and lifestyle and mental health expertise
- Focus on nutrition, activity, sleep, reduction of sedentary time, mental health, parenting skills…
- Longitudinal - more effective with more contact hours
- Healthcare or community setting – community partnerships are key, offer what is feasible



Hampl SE, *Pediatrics* 2023

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We have the tools

- For children and adolescents there may be a potential window of opportunity to prevent/treat inflammation and changes in hypothalamus that drive insulin resistance and increased set point
  - Health behavior and lifestyle change is a foundation
  - Switching out obesity promoting medications when possible
  - When appropriate, offering concurrent adjunctive treatment and / or referral to tertiary care for:
    - IHBLT
    - Weight loss medications
    - Metabolic & bariatric surgery

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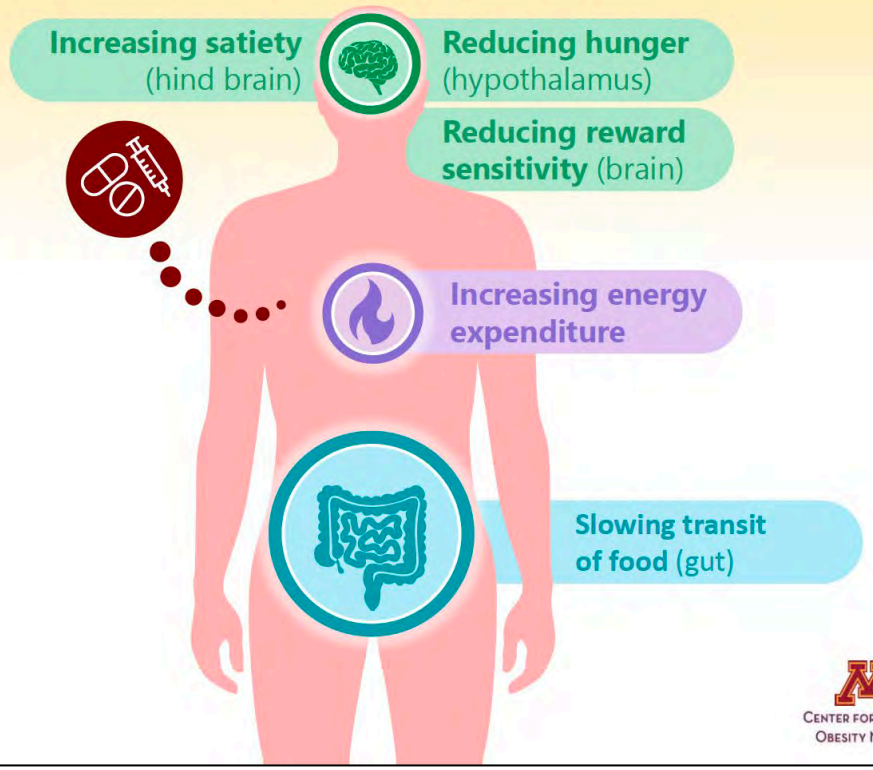
TREATMENT

P&PHCPs *should* treat overweight/obesity & comorbidities concurrently (KAS 4) following the principles of the **medical home** and the **chronic care model,** using a **family-centered** and **non-stigmatizing** approach that acknowledges obesity's **biologic, social, and structural drivers**.(KAS 9)

The Rationale For Obesity Pharmacotherapy

- Filling the treatment gap
- Ability to target underlying biological pathways regulating energy balance
- Potential for enhancement of weight loss maintenance
- Potential to scale up



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Series Sessions

Date	Session Title
5/13/2025	Why Obesity is a Disease
6/10/2025	Approach to the Patient with Obesity
7/8/2025	Optimizing the Use of Lifestyle-based Obesity Care
8/12/2025	How to Use Anti-Obesity Medications Effectively (GLP-1 agonist)
9/9/2025	How to Use Anti-Obesity Medications Effectively (1 AOM non glp 1 agonist)
9/23/2025	Approach to the Pediatric Patient with Obesity – AAP Clinical Practice Guidelines
10/7/2025	How to Use Endoscopic Therapy Effectively
10/21/2025	Pediatric Anti-Obesity Medications and Bariatric Surgery
11/4/2025	Metabolic-Bariatric Surgery: Who, When, Why, and Which One
11/18/2025	Improving Equitable Access to Obesity Care

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CASE DISCUSSION

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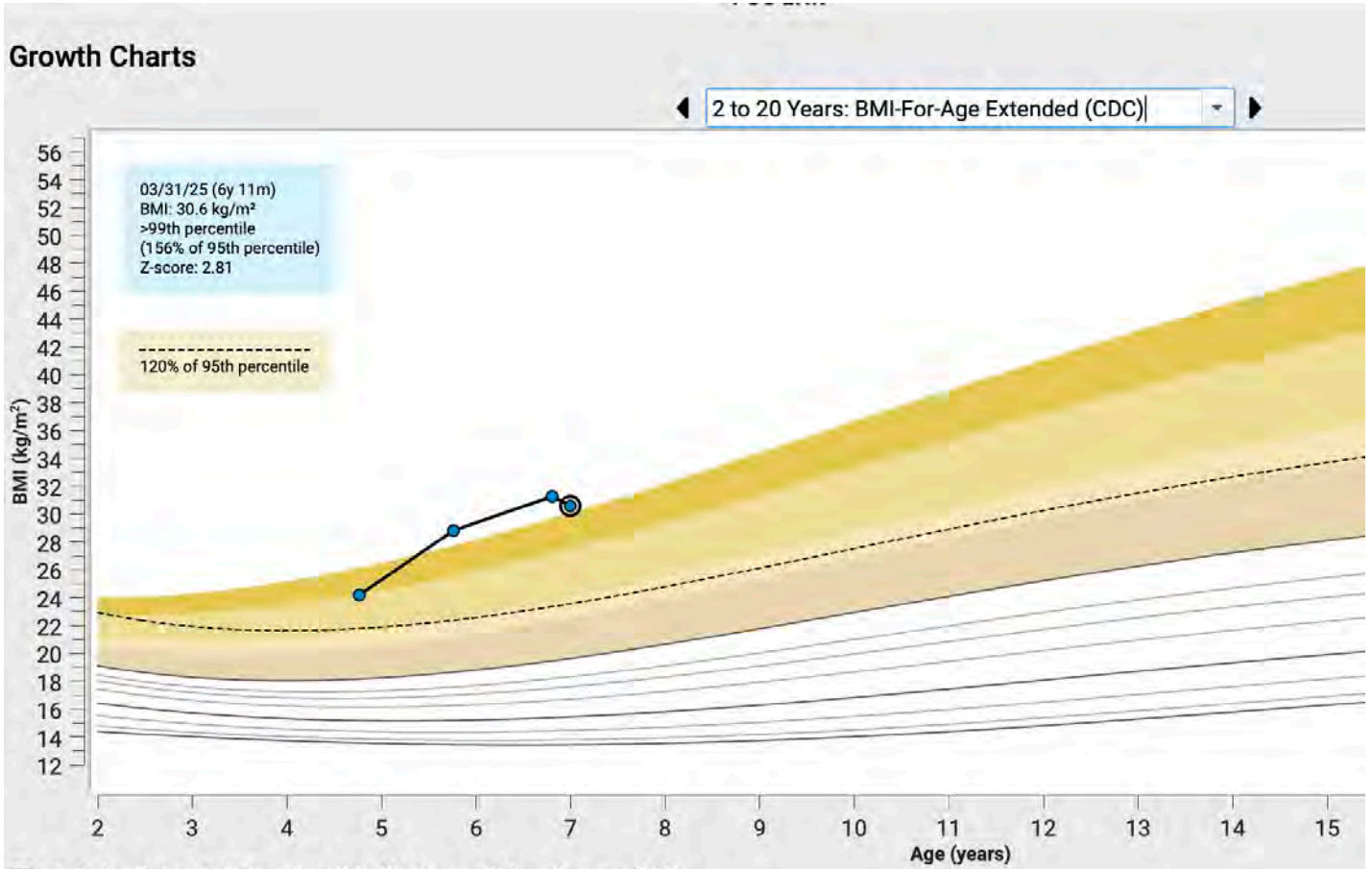
Patient Overview

- **Patient**: 6-year-old female with obesity since toddlerhood
- **Parental Concern**: Mother prefers weight not discussed in front of child



Tabular Data BMI-For-Age 2 to 20 Years: Girls Source: CDC

Show	Date	Age	BMI	Percentile	% of 95th Percentile	Z-score
●	03/31/25	6 yrs, 11 mos	30.6 kg/m²	>99th	156%	2.81
●	01/20/25	6 yrs, 9 mos	31.3 kg/m²	>99th	161%	2.86
●	01/05/24	5 yrs, 9 mos	28.8 kg/m²	>99th	155%	2.94
●	01/06/23	4 yrs, 9 mos	24.2 kg/m²	>99th	133%	3.08

Dartmouth Health Children's

Diet History

- **What do you like to eat?:** Hot dogs, chicken fingers, plain noodles, ramen, bagels
- **Patient refuses all fruits and vegetables, including cucumbers, apples, strawberries, carrots**
- **Beverages**:
  - At mom's: Water, milk, chocolate milk
  - At dad's: Soda, water, chocolate milk

Dartmouth Health Children's

Social History

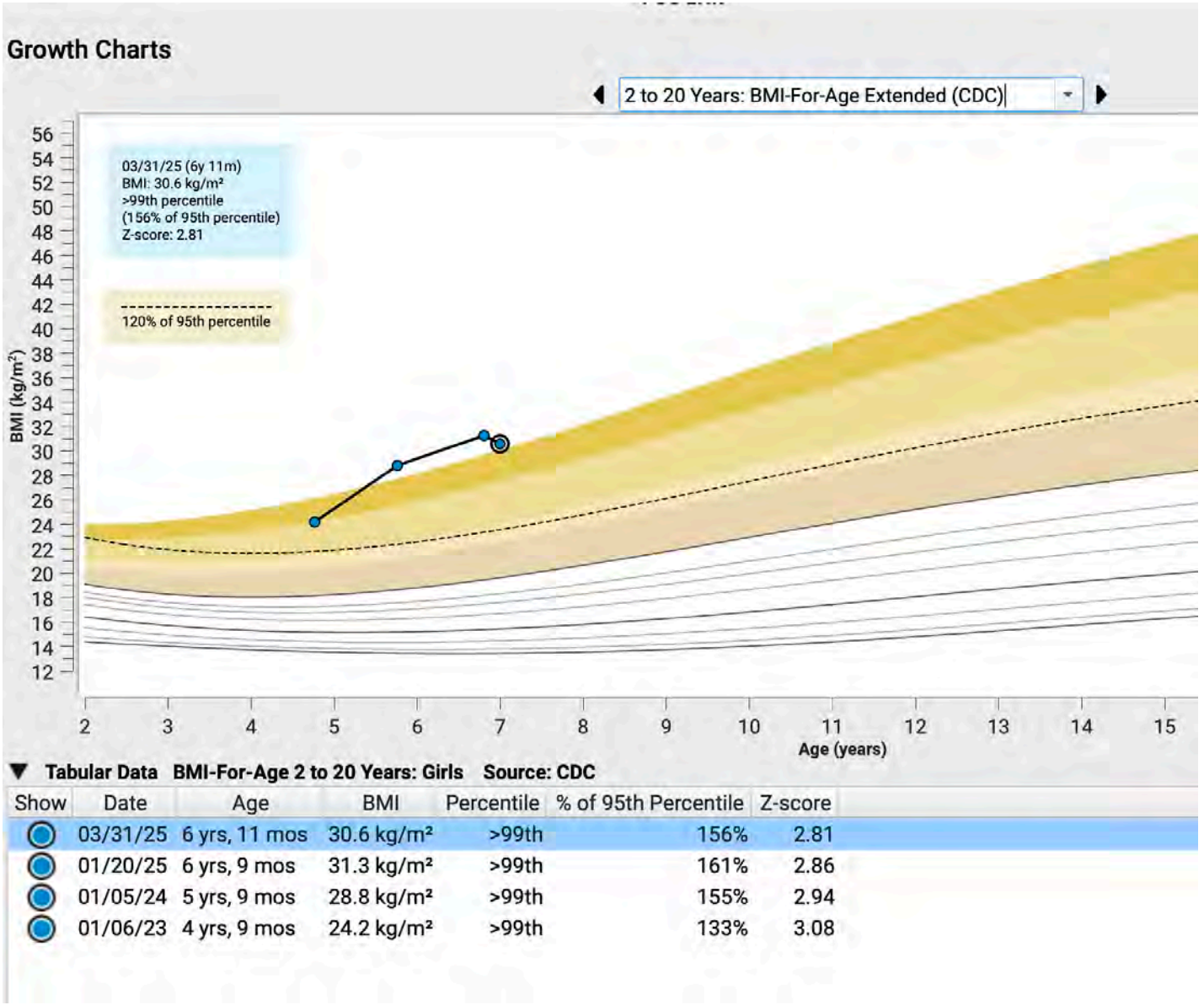
- **Family**: Divorced parents, limited communication

- **What do you like to do?**:
  - Riding bikes
  - Playing at the park
  - “Doing moves” (demonstrates a cool dance move)

Dartmouth Health Children's

Clinical Data

Measurement	Value
Weight	117 lbs
Height	52 inches
BMI	30.6 kg/m2 (>99th percentile)
Blood Pressure	100/80
AST / ALT	17 / 24
Hemoglobin A1c	5.3%
Total Cholesterol	150
Triglycerides	85
HDL / LDL	51 / 82



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Dartmouth Health Children's

Discussion Question

How can we provide nutrition guidance to children with obesity in a way that:

- **Avoids shame**
- **Protects self-esteem**
- **Encourages ongoing trust in medical care?**

Dartmouth Health Children's

CASE #2

Presentation

13 yo with BMI 130th% of 95th percentile seen with concern for weight.

- Social History – lives with parents and sister, parents work, supportive household
- Family history
  - Obesity on mom's side, MGM with Type 2 DM and MASH
  - Mom says she works hard to stay healthy weight –no prediabetes, but had GDM
  - No Fhx of bariatric surgery or AOM use. Dad and sister are thin, "can eat anything"
- Past medical history / ROS – generally healthy, no asthma, constipation, headaches, snoring, mental health concerns. No medications

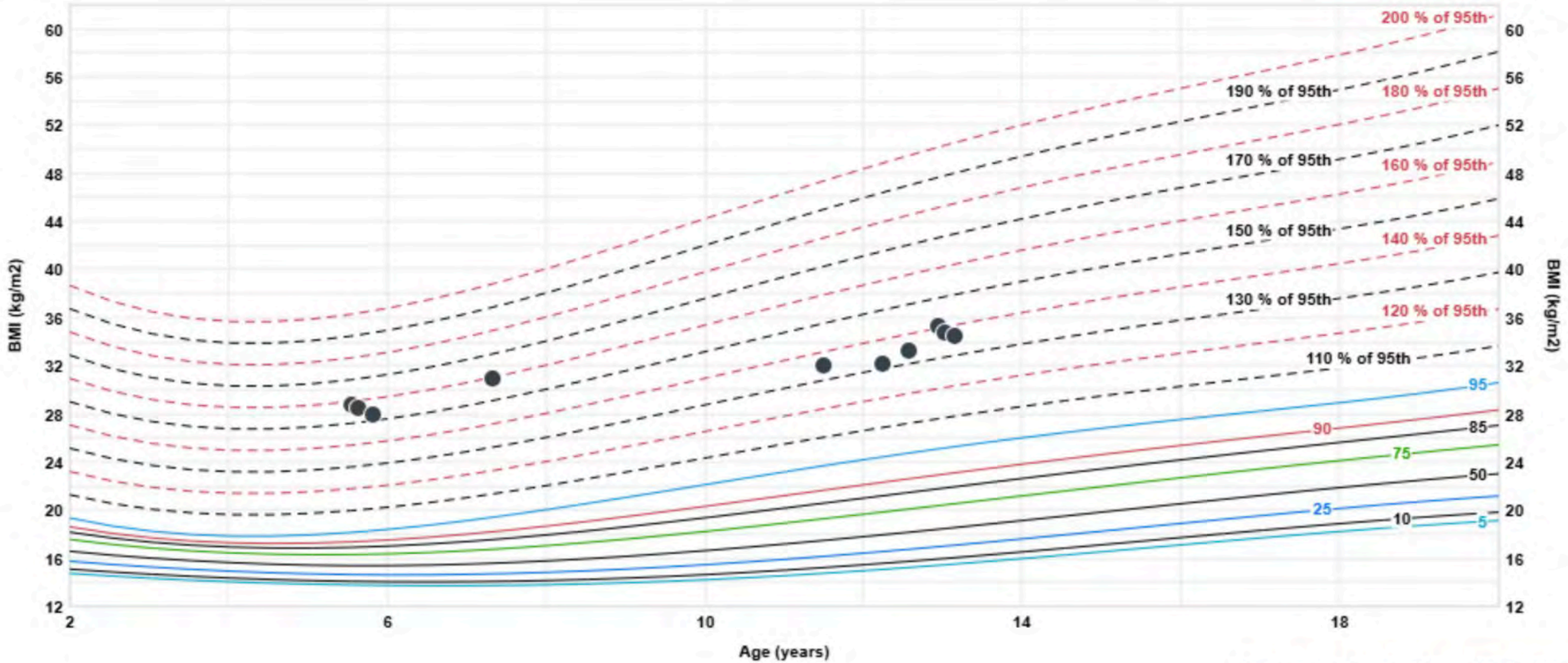
Growth Chart

BMI

Parents' Heights

BMI-for-age Percentiles (Boys, 2 to 20 years)

100 % | 100% | Zoom In | Zoom Out



Source: American Academy of Pediatrics, 2012

Dartmouth Health Children's

Please Share Anything Else you feel is relevant to understanding the case

- Weight history
  - Parents say patient has always struggled with weight, even with intensive high school football, his weight drops some but then rebounds. Teen expresses frustration with being so active and not losing weight, being “stuck”. Would like to try a medication
- Review of health behaviors
  - Mom says they have a very healthy diet at home but Caleb is much pickier than her other children, tends to be hungry all the time. Likes 1-2 vegetables, likes fruit but doesn’t often choose it. Tends toward pasta, pizza, burgers, also snack foods which they have at home since younger sister needs to gain weight. They don’t have soda at home but he drinks sweet tea, and energy drinks, which he buys with his own money
  - Very active with football in fall, baseball in spring. No winter sport

Dartmouth Health Children's

Question(s) raised:

- What would be the next step in addressing weight concern in this teen?
- What evaluation would you do?
- What would your initial step in treatment be?

Dartmouth Health Children's

Evaluation

Labs

- A1C 5.7
- ALT 50 / AST 36
- Lipids with HDL 33 / Trig 215 / LDL 79

Abdominal Ultrasound

- Diffuse increased echogenicity suggestive of steatosis. Normal gallbladder

Dartmouth Health Children's

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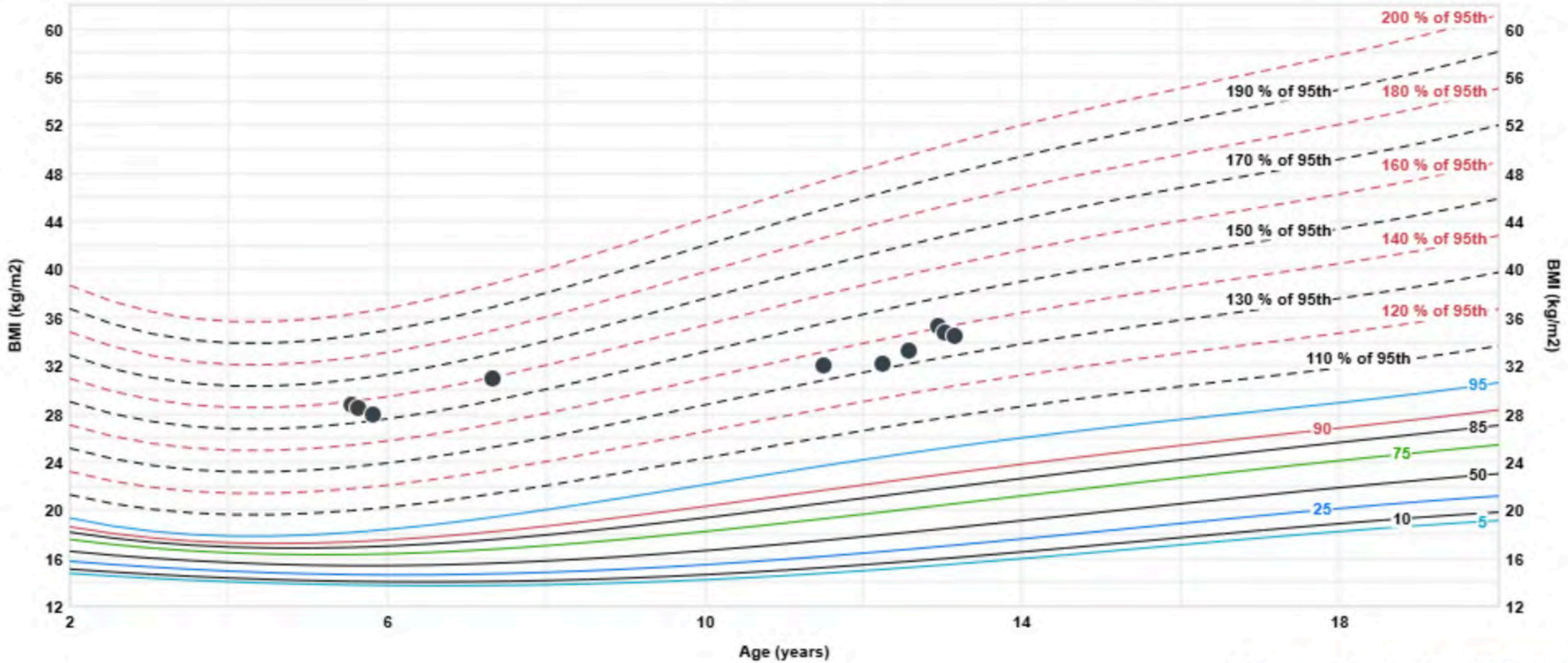

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Dartmouth Health Children's

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Dartmouth Health Children's

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Dartmouth Health Children's

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WELCOME to the *Obesity Care in All Ages ECHO*

Session 7, How to use Endoscopic Therapy Effectively

- October 7th , 2025

This ECHO is supported by the Walter and Carole Young Center for Digestive Health

How to Use Endoscopic Therapy Effectively

Shelby Sullivan MD, FACG, FACG, DABOM

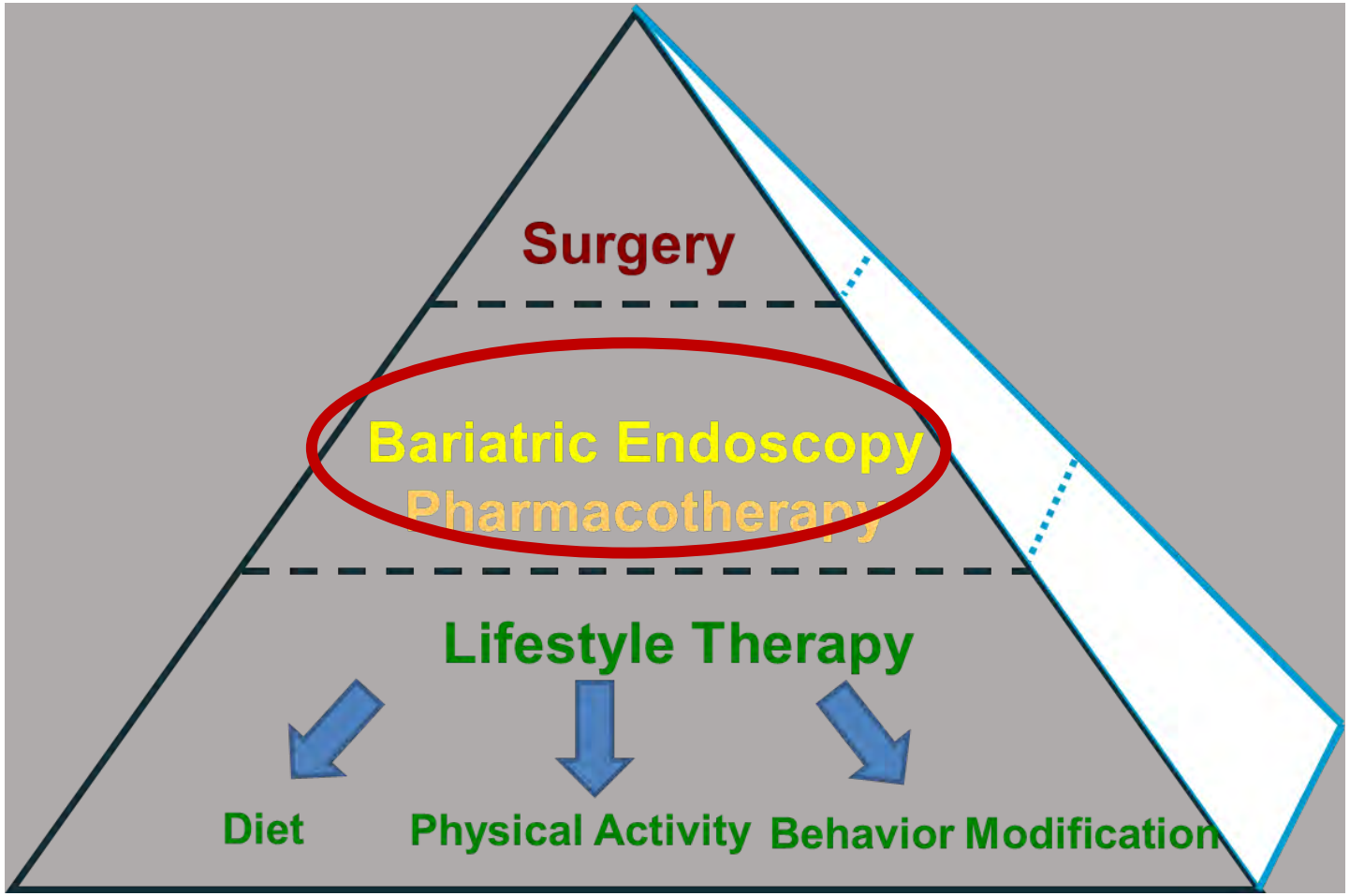
Director, Endoscopic Bariatric and Metabolic Program

Dartmouth-Hitchcock Medical Center and Geisel School of Medicine

Disclosures

- Shelby Sullivan, M.D. has financial interests to disclose.
- Research Support / Grants Last 24 Months
  - Allurion Technologies, Fractyl Laboratories
- Consulting / Employment Last 24 Months
  - Allurion Technologies, Fractyl Laboratories, Biolinq, Pentax , Olympus

Comprehensive Obesity Treatment: Bariatric Endoscopy



What are is Endoscopic Therapy for Obesity?

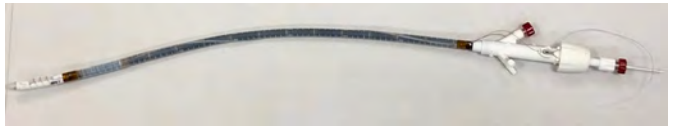
Procedures and Devices that are performed or placed in the GI tract for weight loss or glycemic control

Dartmouth Health

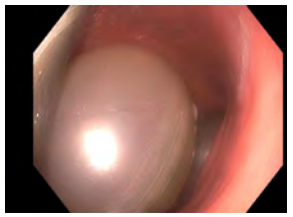
Project ECHO

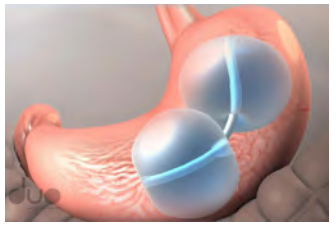
Bariatric and Metabolic Endoscopy

Suturing and Plication Devices

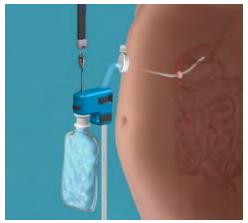


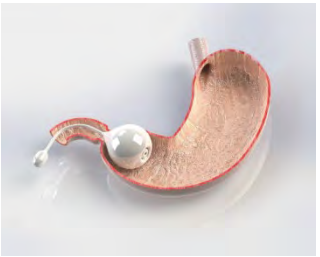
Space Occupying Devices



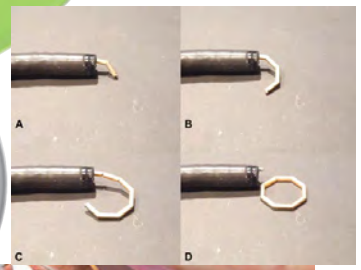


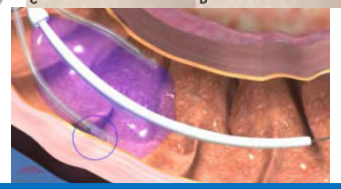
Non-IGB Gastric Devices



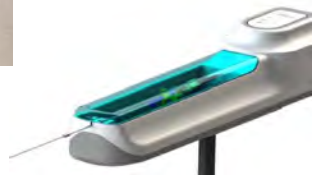


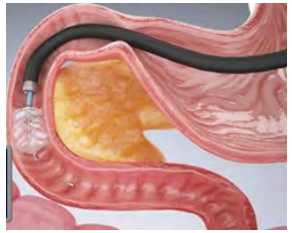
Small Bowel Therapies





Weight-Loss Independent Effects





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Project ECHO

Overstitch are specifically approved for endoscopic sleeve gastroplasty and revision of bariatric surgery for obesity treatment

Orbera Balloon approved for weight loss

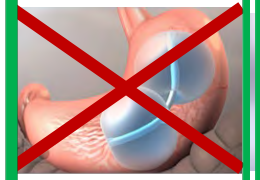
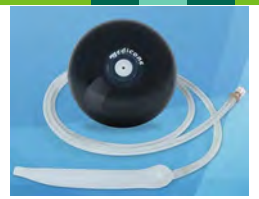
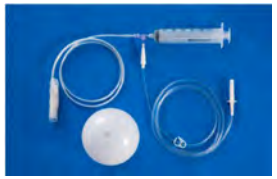
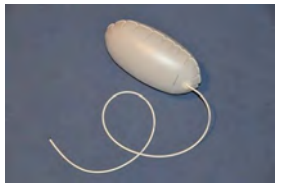
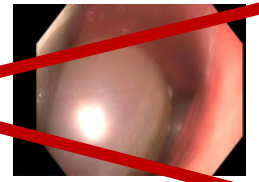
Spatz 3 Balloon approved for weight loss

FDA Approved And Current availability in the US

Dartmouth Health

Intragastric Balloons

Categorizing Intragastric Balloons

- IGB
  - Endoscopically Placed
    - Fluid Filled
      - Orbera Balloon 
      - ReShape Duo Balloon 
      - Spatz III Balloon 
      - Silimed Balloon 
      - Medicone Balloon 
    - Air Filled
      - Heliosphere BAG 
    - Air and Fluid Filled
      - Endalis End-Ball 
      - Easy Life Gastric Balloon 
  - Swallowable
    - Gas-Filled
      - Obalon Balloon System  
    - Fluid Filled
      - Allurion Intragastric Balloon 

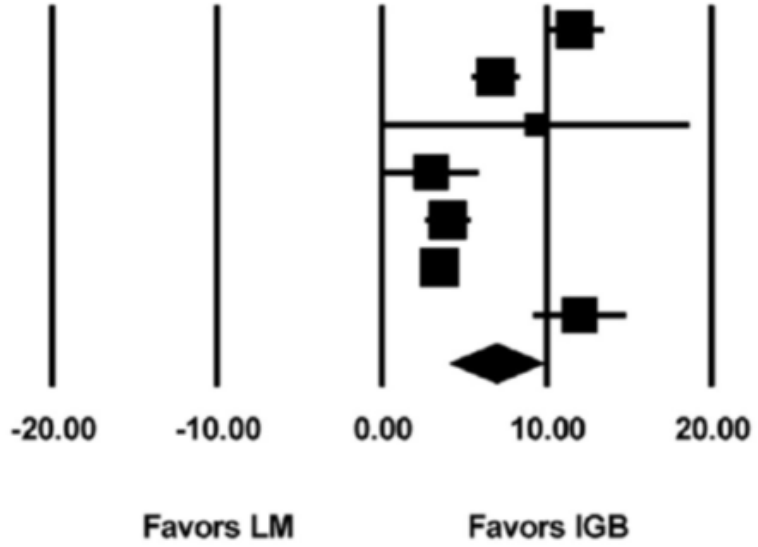
ASGE/ESGE EBMT Guideline: Placebo Subtracted IGB Efficacy

Mean Difference in %TWL at 6-8 Months Following IGB Placement

Study name	Difference in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
Abu Dayyeh 2021	11.700	0.906	0.821	9.925	13.475	12.916	0.000
Courcoulas 2017	6.900	0.730	0.533	5.470	8.330	9.455	0.000
Fuller 2013	9.400	4.724	22.316	0.141	18.659	1.990	0.047
Ponce 2013	3.000	1.462	2.138	0.134	5.866	2.052	0.040
Ponce 2015	4.000	0.691	0.478	2.645	5.355	5.788	0.000
Sullivan 2018	3.500	0.540	0.292	2.442	4.558	6.482	0.000
Vicente Martin 2019	12.000	1.445	2.089	9.167	14.833	8.302	0.000
	6.946	1.413	1.997	4.177	9.716	4.916	0.000

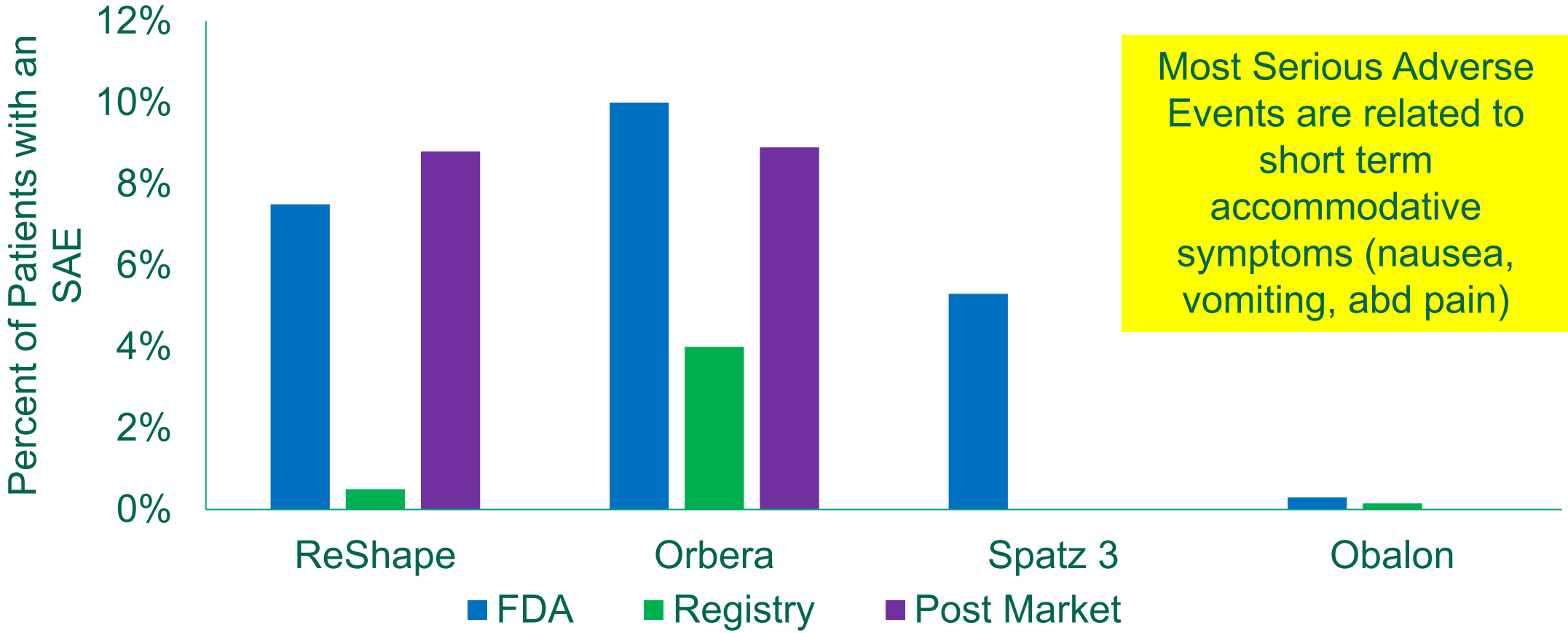
Statistics for each study

Difference in means and 95% CI



Jirapinyo P. GIE. 2024;99(6):867-885

Intragastric Balloon: Serious Adverse Events in the US



Most Serious Adverse Events are related to short term accommodative symptoms (nausea, vomiting, abd pain)

Ponce J. *Surgery for Obesity and Related Diseases*. 2015;11(4):874-881
Agnihotri A. *Clinical Gastroenterology and Hepatology* 2018;16:1081–1088
Courcoulas A. *Int J Obes*. 2017;41:427-433
Vargas EJ. Clinical Gastroenterology and Hepatology 2018;16:1073–1080
Sullivan S. Surgery for Obesity and Related Diseases. 2018; 14(12):1876-188
Moore R. Surgery for Obesity and Related Diseases. 2019 Mar;15(3):417-423
https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfpma/pma_pas.cfm?c_id=3557&t_id=538679
Moore R. Obesity Surgery. 2020 Nov;30(11):4267-4274
Abu Dayyeh B. The Lancet. 2021;398:1965-1973

ASGE/ESGE EBMT Guideline: IGB

Recommendation	Strength of Recommendation	Evidence
In adults with obesity, the ASGE-ESGE suggests the use of an IGB plus LM over LM alone	Conditional	Moderate
In adults with obesity undergoing IGB placement, the ASGE-ESGE suggests the use of antiemetics periprocedurally	Conditional	Very Low
In adults with obesity undergoing IGB placement, the ASGE-ESGE suggests the use of pain medication periprocedurally	Conditional	Very Low
In adults with obesity undergoing IGB placement, the ASGE-ESGE suggests the use of proton pump inhibitors while the IGB is in place	Conditional	Very Low

Jirapinyo P. GIE. 2024;99(6):867-885

AGA Clinical Practice Guidelines on Intragastric Balloons in the Management of Obesity	Strength of Rec	Quality of evidence
1. In individuals with obesity seeking a weight-loss intervention who have failed a trial of conventional weight-loss strategies, AGA suggests the use of IGB therapy with lifestyle modification over lifestyle modification alone.[a], [b]	Conditional	Moderate
2. In individuals with obesity undergoing IGB therapy, AGA recommends moderate- to high-intensity concomitant lifestyle modification interventions to maintain and augment weight loss.	Strong	Moderate
3. In individuals undergoing IGB therapy, AGA recommends prophylaxis with PPIs.	Strong	Moderate
4. In individuals undergoing IGB therapy, AGA suggests using the intraoperative anesthetic regimens associated with the lowest incidence of nausea along with perioperative antiemetics. AGA suggests a scheduled antiemetic regimen for 2 week after IGB placement.[c]	Conditional	Low
5. In individuals undergoing IGB therapy, AGA suggests against perioperative laboratory screening for nutritional deficiencies.	Conditional	Low
6. AGA suggests daily supplementation with 1–2 adult dose multivitamins after IGB placement.	Conditional	Very low
7. After IGB removal, AGA suggests subsequent weight-loss or maintenance interventions that include dietary interventions, pharmacotherapy, repeat IGB, or bariatric surgery.		

Patient Selection

- **Failed lifestyle therapy**
- **BMI – FDA labelling is 30-40 kg/m2, no difference in safety or percent total body weight loss outside of that range**
- **Interested in a removal device**
- **Willing to abstain from NSAIDs and not on anticoagulation**
- **Willing to take PPI during balloon implantation**
- **Willing to participate in lifestyle therapy**

Contra-indications

- Prior foregut surgery
- Cirrhosis
- Esophageal stricture
- Large hiatal hernia
- Need for anticoagulation
- History of PUD with unknown cause

Cautions

- Gastroparesis
- Poorly controlled GERD

Considerations

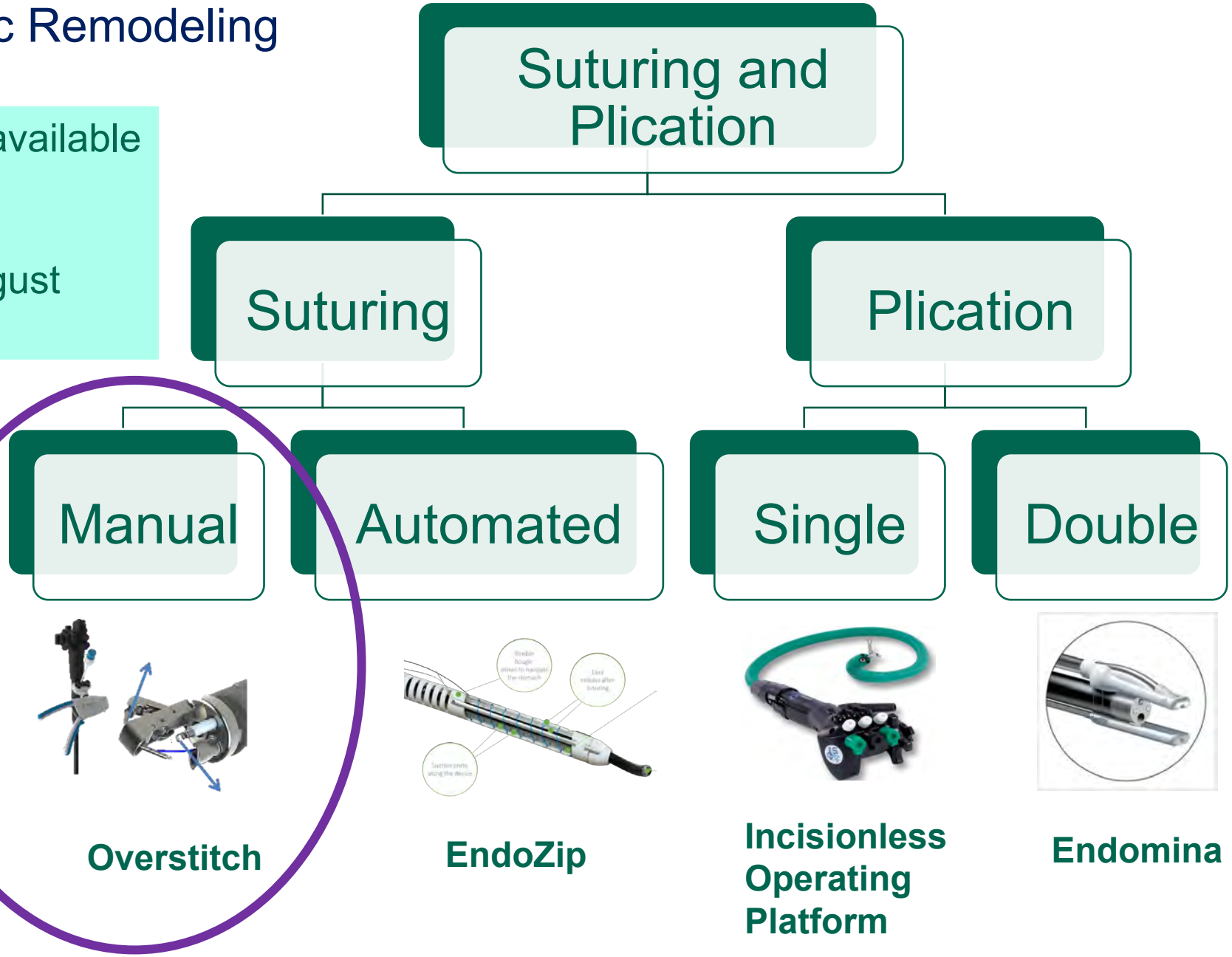
- More accommodative symptoms with fluid filled compared with gas-filled
- Gas-filled not currently available

Dartmouth Health

Endoscopic Gastric Remodeling

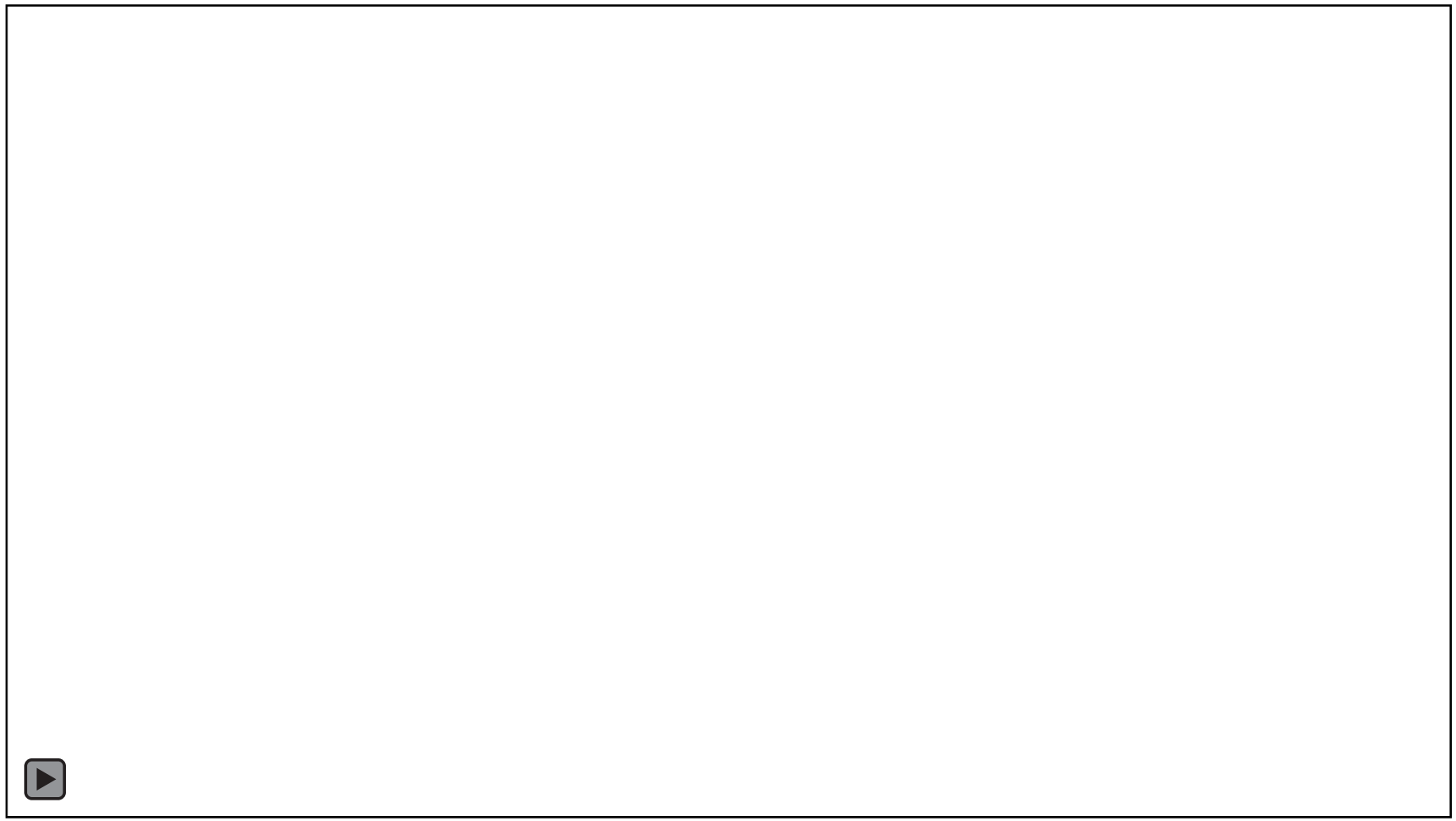
Endoscopic Gastric Remodeling

- CPT Code will be available Jan 1, 2026
- Cigna announced coverage as of August 15,2025



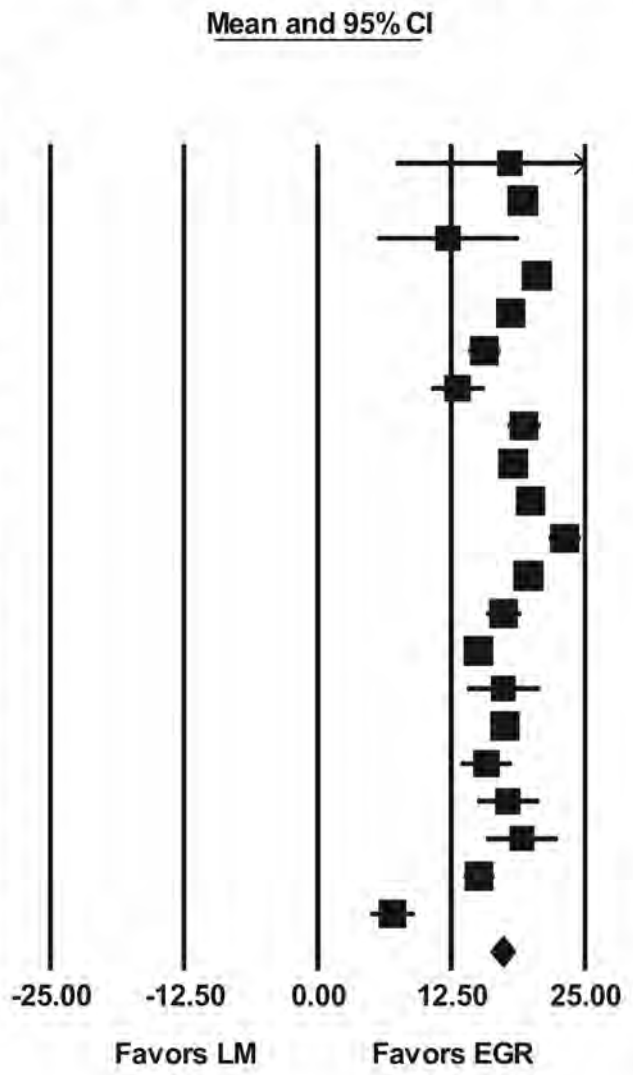
Endoscopic Gastric Remodeling

- Endoscopic Sleeve Gastroplasty
- Overstitch Device
- Most common EGR procedure in the US and around the world



%TWL at 12 Months Following EGR (Observational Studies Only)

Study name	Mean	Standard error	Lower limit	Upper limit	p-Value
Carr 2022 (ESG)	18.0	5.430	7.4	28.6	0.0
Alqahtani 2022 (ESG)	19.2	0.160	18.9	19.5	0.0
Li 2021 (ESG)	12.2	3.360	5.6	18.8	0.0
Badurdeen 2021 (ESG)	20.5	0.330	19.9	21.2	0.0
Jagtap 2021 (ESG)	18.1	0.660	16.8	19.4	0.0
Sharaiha 2021 (ESG)	15.6	0.770	14.1	17.1	0.0
Pizzicannella 2020 (ESG)	13.1	1.270	10.6	15.6	0.0
Farha 2020 (ESG)	19.3	0.790	17.8	20.8	0.0
Boskoski 2020 (ESG)	18.3	0.610	17.1	19.5	0.0
Bhandari 2020 (ESG)	19.9	0.670	18.6	21.3	0.0
James 2020 (ESG)	23.1	0.750	21.6	24.6	0.0
Galvao Neto 2020 (ESG)	19.7	0.370	19.0	20.4	0.0
Lopez Nava 2019 (ESG)	17.4	0.830	15.8	19.0	0.0
Barrichello 2019 (ESG)	15.1	0.470	14.1	16.0	0.0
Kumar 2018 (ESG)	17.4	1.740	14.0	20.8	0.0
Graus Morales 2018 (ESG)	17.5	0.620	16.3	18.7	0.0
Jirapinyo 2022 (POSE)	15.8	1.200	13.4	18.2	0.0
Lopez-Nava 2021 (POSE)	17.8	1.470	14.9	20.7	0.0
Espinos 2016 (POSE)	19.1	1.700	15.8	22.4	0.0
Lopez Nava 2015 (POSE)	15.1	0.720	13.7	16.5	0.0
Huberty 2018 (Endomina)	7.0	1.040	5.0	9.0	0.0
	17.3	0.565	16.2	18.4	0.0



A

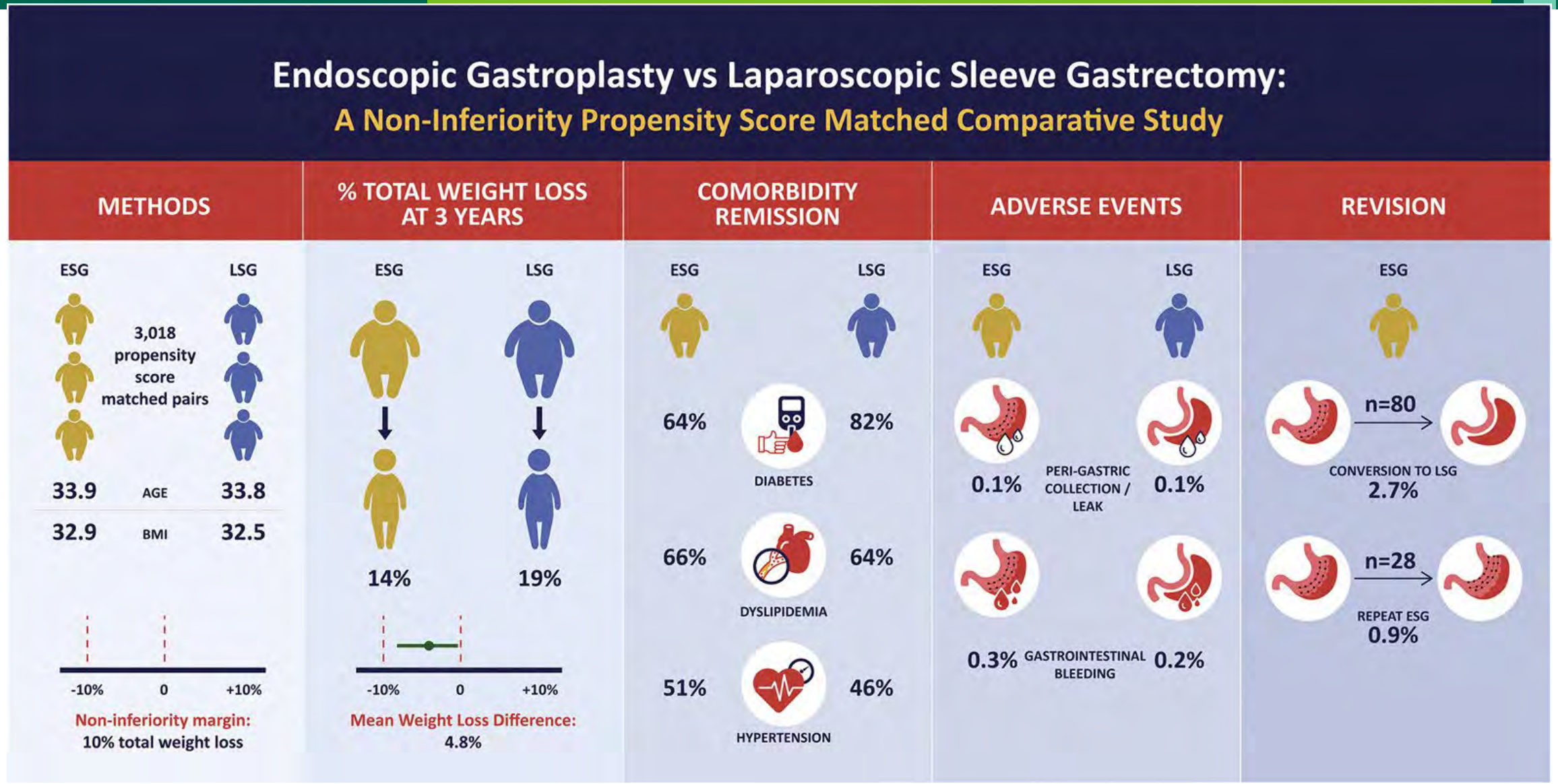
Jirapinyo P. GIE. 2024. epub 4.19.24

American Society for Gastrointestinal Endoscopy–European Society of Gastrointestinal Endoscopy guideline on primary endoscopic bariatric and metabolic therapies for adults with obesity

Jirapinyo P. GIE. 2024. epub 4.19.24

Recommendation	Strength of Recommendation	Quality of Evidence
In adults with obesity, the ASGE-ESGE suggests the use of Endoscopic Gastric Remodeling (EGR) plus LM over LM alone	Conditional	Moderate
In adults with obesity undergoing EGR, the ASGE-ESGE suggests the use of antiemetics periprocedurally	Conditional	Very Low
In adults with obesity undergoing EGR, the ASGE-ESGE suggests the use of pain medication periprocedurally	Conditional	Very Low
In adults with obesity undergoing EGR, the ASGE-ESGE suggests the use of prophylactic antibiotics periprocedurally	Conditional	Very Low
In adults with obesity undergoing EGR, the ASGE-ESGE suggests the use of short-term proton pump inhibitors while the IGB is in place	Conditional	Very Low

Endoscopic Gastroplasty vs Laparoscopic Sleeve Gastrectomy:
A Non-Inferiority Propensity Score Matched Comparative Study



Follow-up:
ESG 78%-87% (85% at 3 years)
LSG 71-87% (71% at 3 years)

Alqahtani AR. GIE. 2022;96:44-50

Cost Effectiveness Analysis: Semaglutide vs ESG

Table 2. Base-Case Results Over Different Time Horizons

No. of months	Strategy	Costs, $ Cumulati				($/QALY)	NMB, $	BMI
60	No semaglutide or ESG	NA					NA	37.8
12	ESG	17 229				265	54 996	32.2
12	Semaglutide	11 742					60 255	32.9
24	ESG	19 685					127 288	32.2
24	Semaglutide	22 848				584	123 216	32.9
36	ESG	19 685					202 853	31.6
36	Semaglutide	33 688				580	186 515	32.9
48	ESG	19 685					275 691	31.7
48	Semaglutide	43 814	24 129	2.92	−0.04	−617 831	247 653	32.9
60	ESG	19 685		3.66		0	345 854	31.7
60	Semaglutide	53 268	33 583	3.60	−0.06	−595 532	306 632	33.0

For non-dominance with an ESG cost of $16360, Semaglutide must cost $3591 or less with 20% or less drop out over 5 years

Abbreviations: BMI, body mass index (calculated as weight in kilograms divided by height in meters squared); ESG, endoscopic sleeve gastroplasty; ICER, incremental cost-effectiveness ratio; NA, not applicable; NMB, net monetary benefit; QALY, quality-adjusted life-year.

Haseeb M. Jama Netw Open. 2024;7(4):e246221

Patient Selection

- **Failed lifestyle therapy**
- **BMI – FDA labelling is 30-50 kg/m^2, but current guidelines are BMI 27-29.9 kg/m^2 with co-morbidity or 30 kg/m^2 and above**
- **Interested in a semi-permanent procedure**
- **Willing to comply with post procedure diet**
- **Willing to participate in lifestyle therapy**
- **Can abstain from NSAIDs and anticoagulants during the post-op period**

Contra-indications

- Cirrhosis
- Esophageal stricture
- Large hiatal hernia
- Need for surveillance of gastric mucosa (history of advanced dysplasia or gastric cancer, genetic diseases)

Cautions

- Gastroparesis
- Poorly controlled GERD
- Family history of gastric cancer

Considerations

- Less accommodative symptoms than the endoscopically placed fluid filled intragastric balloons

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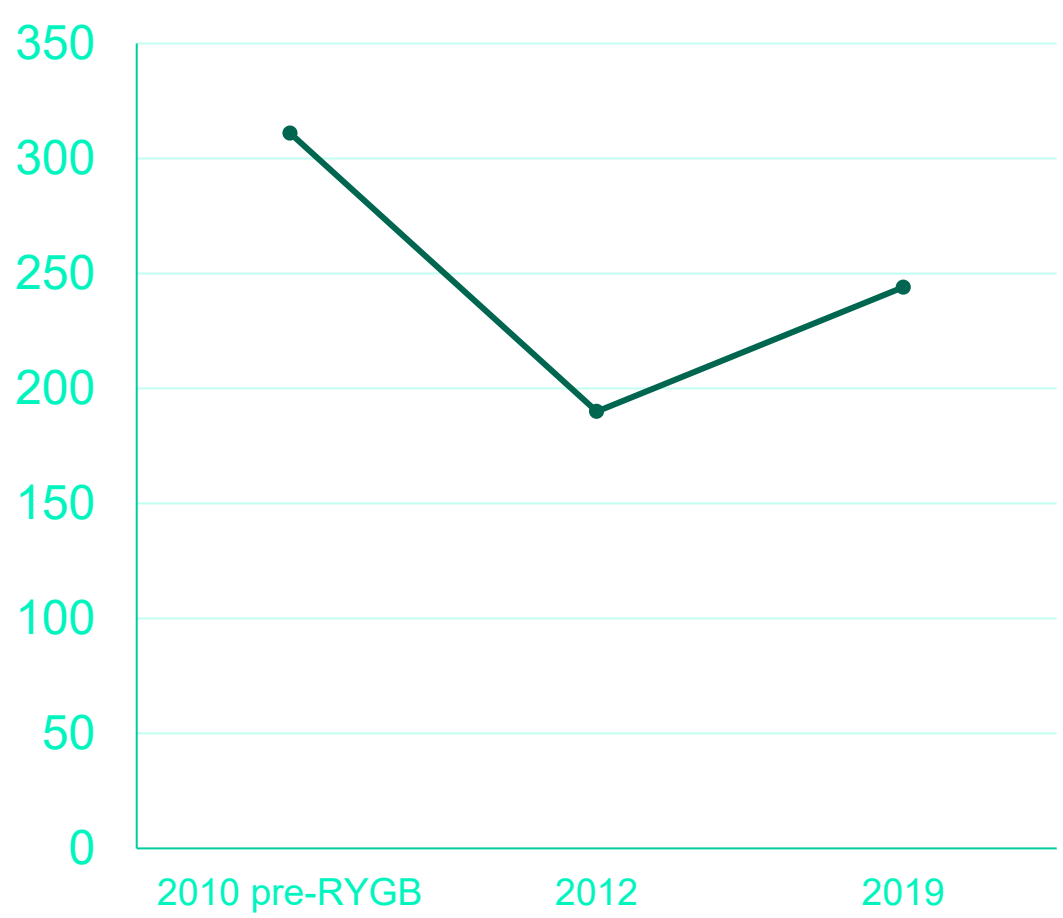
Revision after Bariatric Surgery

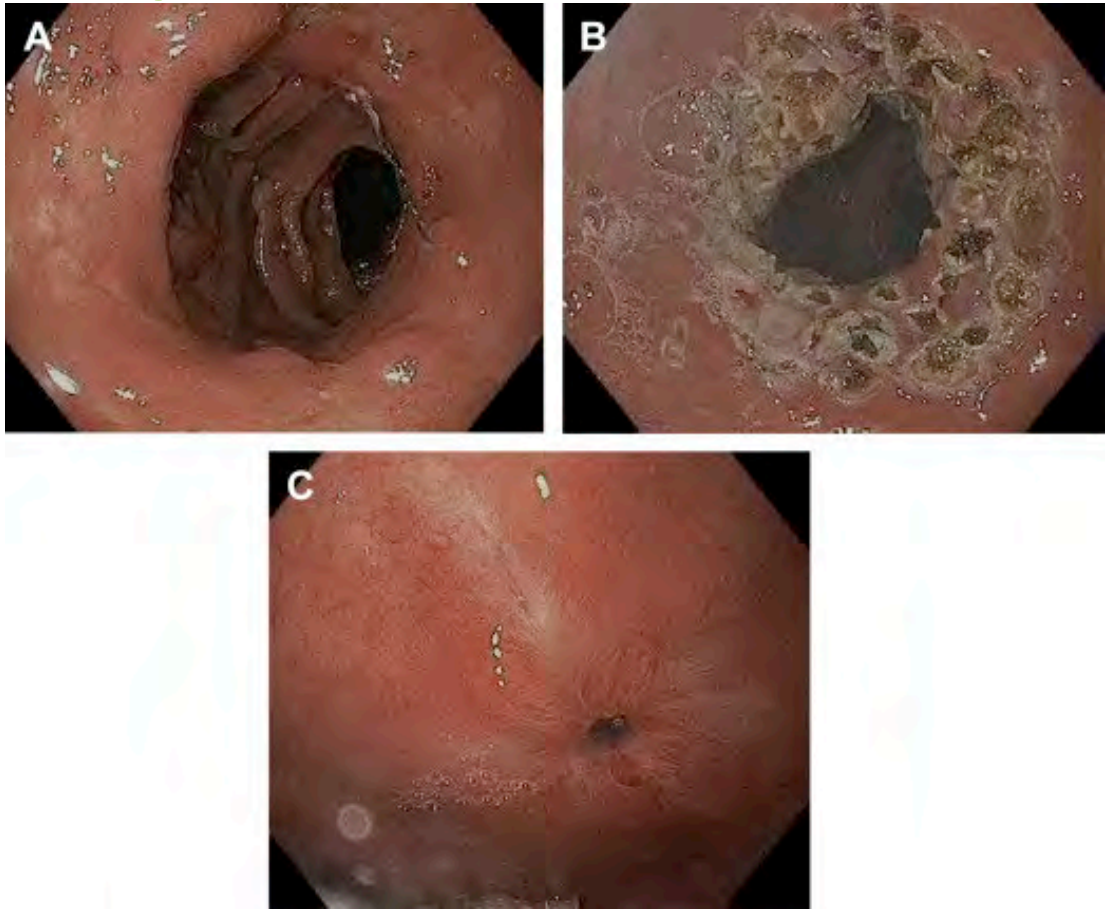
Weight Regain after RYGB: Case Presentation

- 47 yo woman with history of class III obesity, migraines and RA
- RYGB in 2010 at weight of 311 lbs
- Lost 121 lbs (39% TBWL), weight nadir 190 lbs
- Started regaining weight in 2014
- Regained 54 lbs (44.6% weight regain) by July 2019
- Reports being able to eat 3 times as much at a meal compared with the first few years after surgery, does not feel restriction



Argon Plasma Coagulation (APC) Resurfacing Technique

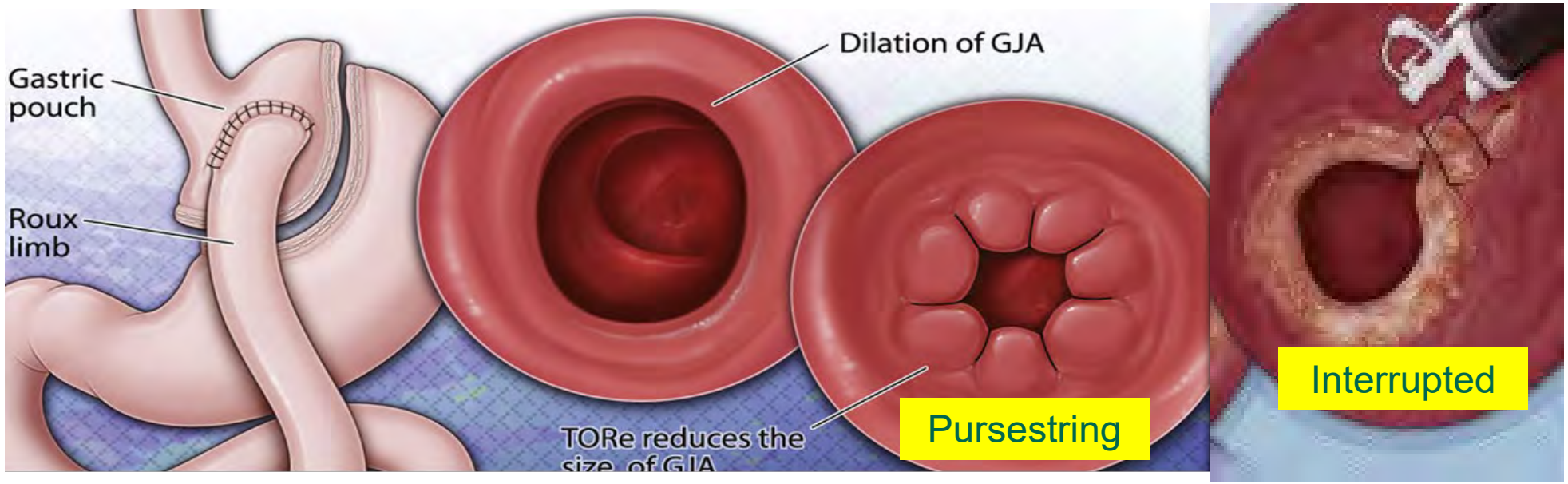
- Low flow, high watts
- 2 to 3 rings on the gastric side of the anastomosis
- BID PPI therapy (and sucralfate) and liquid diet for 45 days after procedure
- Repeat every 8-10 weeks until stoma is reduced



Storm AC. Gastrointestinal Endoscopy Clinics of North America. 2017;27:233-244

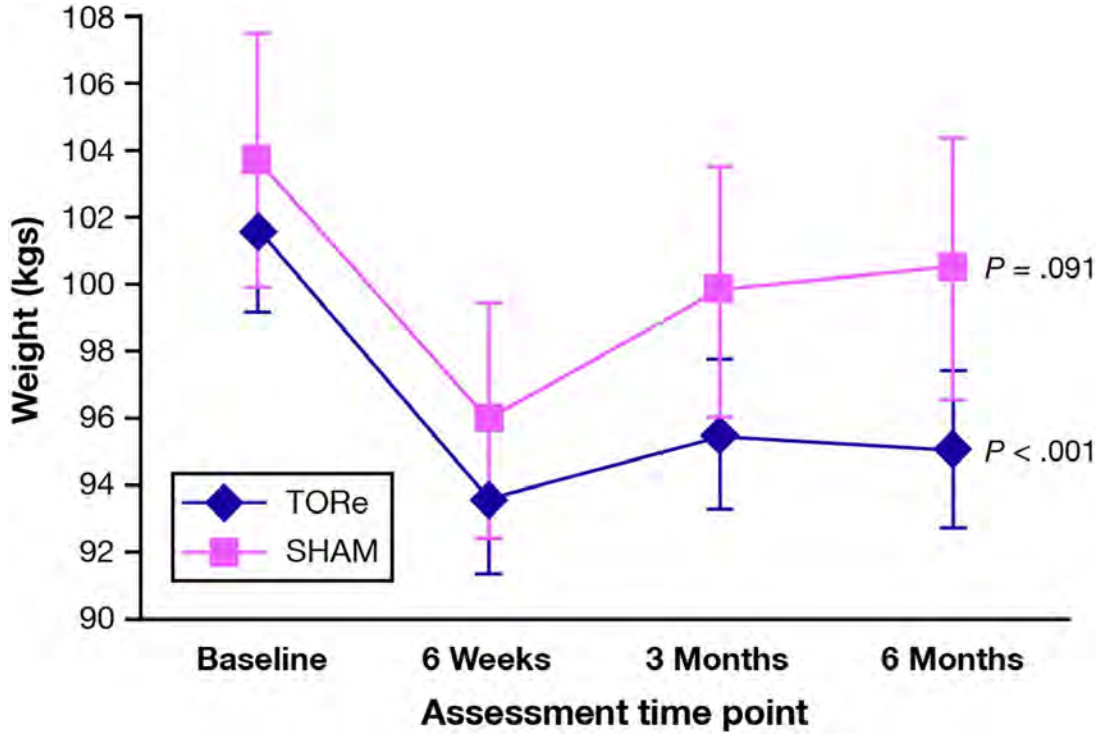
Transoral Outlet Reduction (TORe) Technique

- Prep of the gastric side of the anastomosis with APC or ESD
- Types of suturing
  - Interrupted
  - Purse-String



Vargas EJ. Surgical Endoscopy. 2018:32:252-259
Jirapinyo P. Gastrointestinal Endoscopy. 2020;91:1067-1073
Jaruvongvanich V. Gastrointestinal Endoscopy. 2020;92(6):1164-1175

Endoscopic Transoral Outlet Reduction (TORe): RESTORe Trial



- Randomized Sham Controlled trial
  - TORe n=50
  - Sham control n=27
- Non-full thickness suturing system
- APC to the anastomosis
- Achieved weight loss or weight maintenance
  - Active 96% and Sham control 77.8%, p=0.019

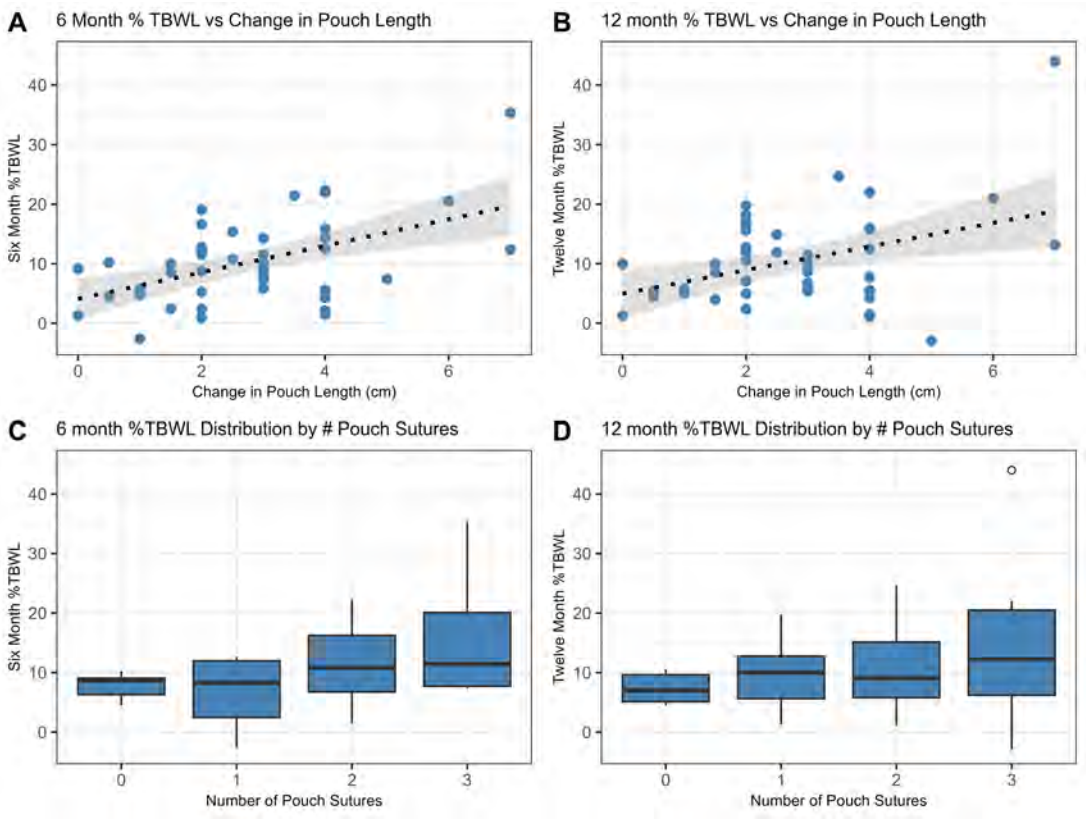
Thompson CC. Gastro. 2013;145:129-137

TORe Data from University of Colorado

Post – Procedure Weight Loss Outcomes		
Group	**6-month %TBWL**	**12-month %TBWL**
All (intention-to-treat)	10.2 ± 6.9%	10.3 ± 7.7%
All (per-protocol)	11.3±7.6% (n=29)	12.2±9.2% (n=26)
Purse-String	12.3±8.5% (n=21)	13.5±9.2% (n=21)
Non-Purse String	8.7±3.7% (n=8)	7.0±7.9% (n=5)

Two Serious Adverse events:

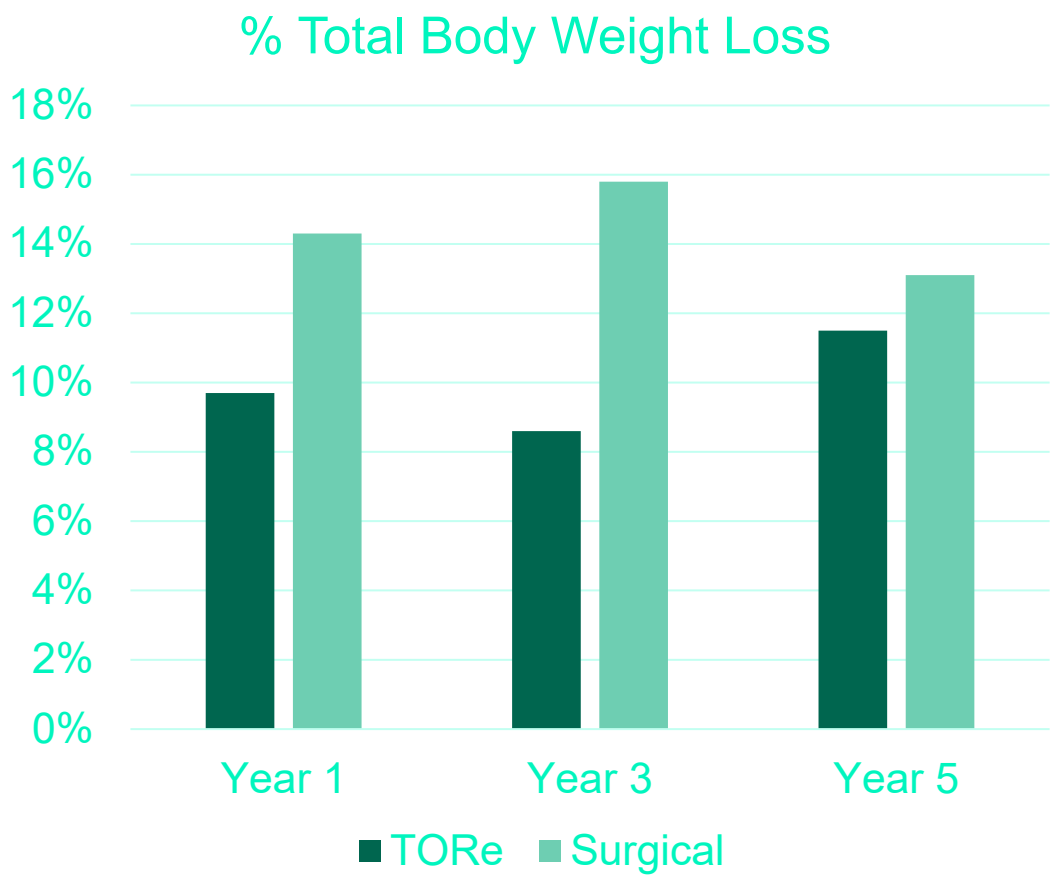
- Perforation in a patient not compliant with medications or diet
- Bleeding in a patient getting heparin with dialysis



Meyers MH. *Journal of Gastrointestinal Surgery.* 2023;27:1587-1593.

Comparison to Surgical Revision: Retrospective Matched Cohort

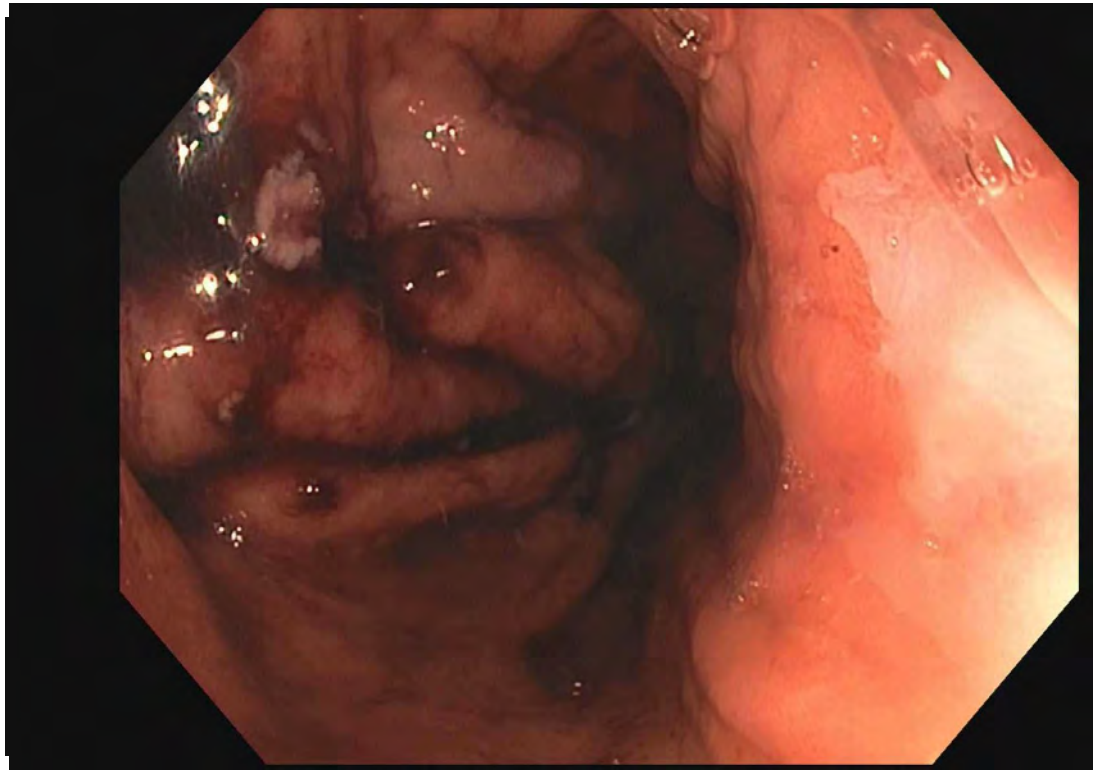
	Endoscopic (n = 31)	Surgical (n = 31)	*P* value
Age, y	48.6 (9.5)	48.1 (8.4)	.84
Female gender, n (%)	26 (83.9)	26 (83.9)	1.0
Time since RYGB, y	9.1 (3.2)	6.7 (4.1)	.01
Total weight loss from RYGB (%)	40.8 (8.7)	37.1 (12.7)	.2
Weight regain (%)	52.8 (34.1)	55.3 (29.5)	.77
Weight (kg)	111.1 (29.3)	114.6 (30.3)	.65
BMI (kg/m^2)	40.5 (9.4)	41.5 (9.1)	.68
Adverse Events (%)	2 (6.5)	9 (29)	0.043
Serious Adverse Events	0 (0)	6 (19.4)	0.024



Dolan RD. Gastrointestinal Endoscopy. 2021;94(5):945-950

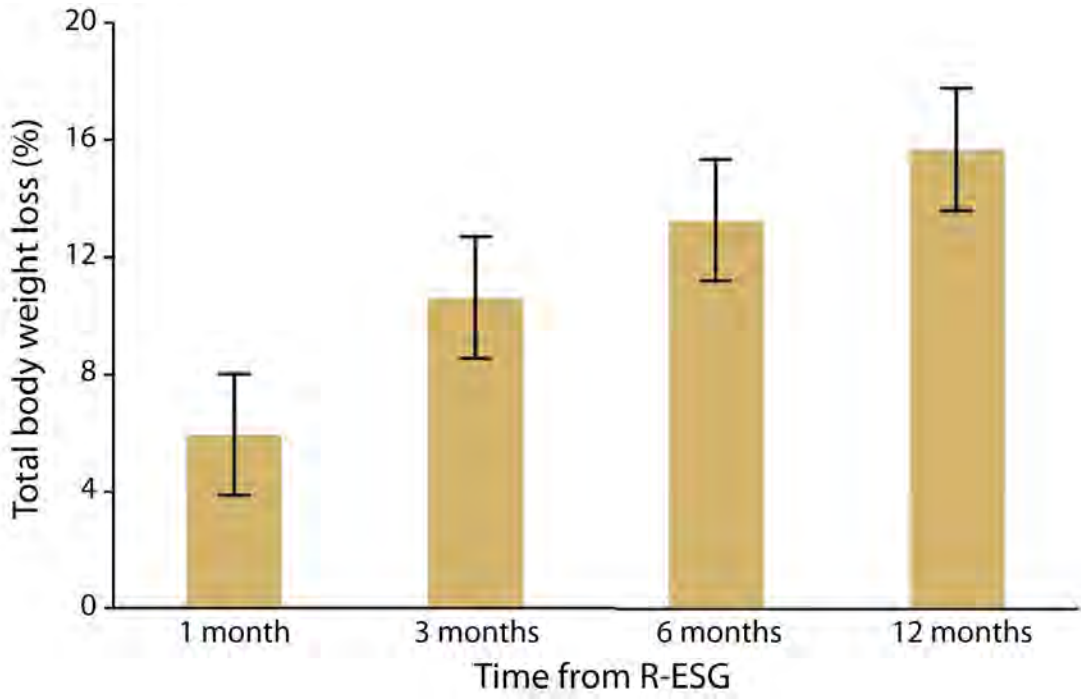
Sleeve Revision

- 59 yo woman with h/o class 2 severe obesity
  - Sleeve gastrectomy in 2008
  - 45 lbs weight loss (19% TBWL)
  - 107% weight regain
- Weight loss medications
  - Saxenda – no significant weight loss
- Endoscopic sleeve revision performed
  - 13.2% TBWL at 7 months follow-up



Endoscopic Sleeve Revision

- Retrospective study
  - N=82
  - Weight regain: 27.9 ± 20.7 kg
  - Weight at revision: 128.2 ± 57.5 kg
- Revision
  - Endoscopic sleeve gastroplasty within the dilated sleeve
- Adverse events:
  - Narrowed GEJ treated with dilation



Maselli DB. Gastrointestinal Endosocopy. 2021;93(1):122-130

Patient Selection

- Weight loss failure:
  - Weight regain of at least 20% of the weight lost
  - <50% excess weight loss from the time of surgery
- Interested in a permanent procedure
- Willing to comply with post procedure diet
- Willing to participate in lifestyle therapy
- Can abstain from NSAIDs and anticoagulants during the post-op period

- Contra-indications
  - Cirrhosis
  - Esophageal stricture
  - Large hiatal hernia
- Cautions
  - Poorly controlled GERD
- Considerations
  - RYGB - Any medical issues that could be in the small bowel or remnant stomach should be evaluated before revision
  - SG – moderately controlled GERD or risk for Barrett’s esophagus.

Conclusions

- Lifestyle therapy alone achieves only modest weight loss
- Lifestyle therapy maximizes weight loss with all adjunctive therapies
  - Anti-obesity medications
  - Endoscopic Bariatric Therapies
  - Bariatric Surgery
- Components
  - Diet
  - Exercise
  - Behavior Modification
- Can be done in a primary care practice – if time is limited, focus on one goal at a time

WELCOME to the *Obesity Care in All Ages ECHO*

Session 8, Pediatric Anti-Obesity Medications and Bariatric Surgery

- October 21st

This ECHO is supported by the Walter and Carole Young Center for Digestive Health

Dartmouth Health Children's

Pediatric Weight Program

Center for Digestive Health

Pediatric Obesity Pharmacotherapy and Bariatric and Metabolic Surgery

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Drs. Hofley, McClure have no conflicts of interest

Off label use of medication will be discussed

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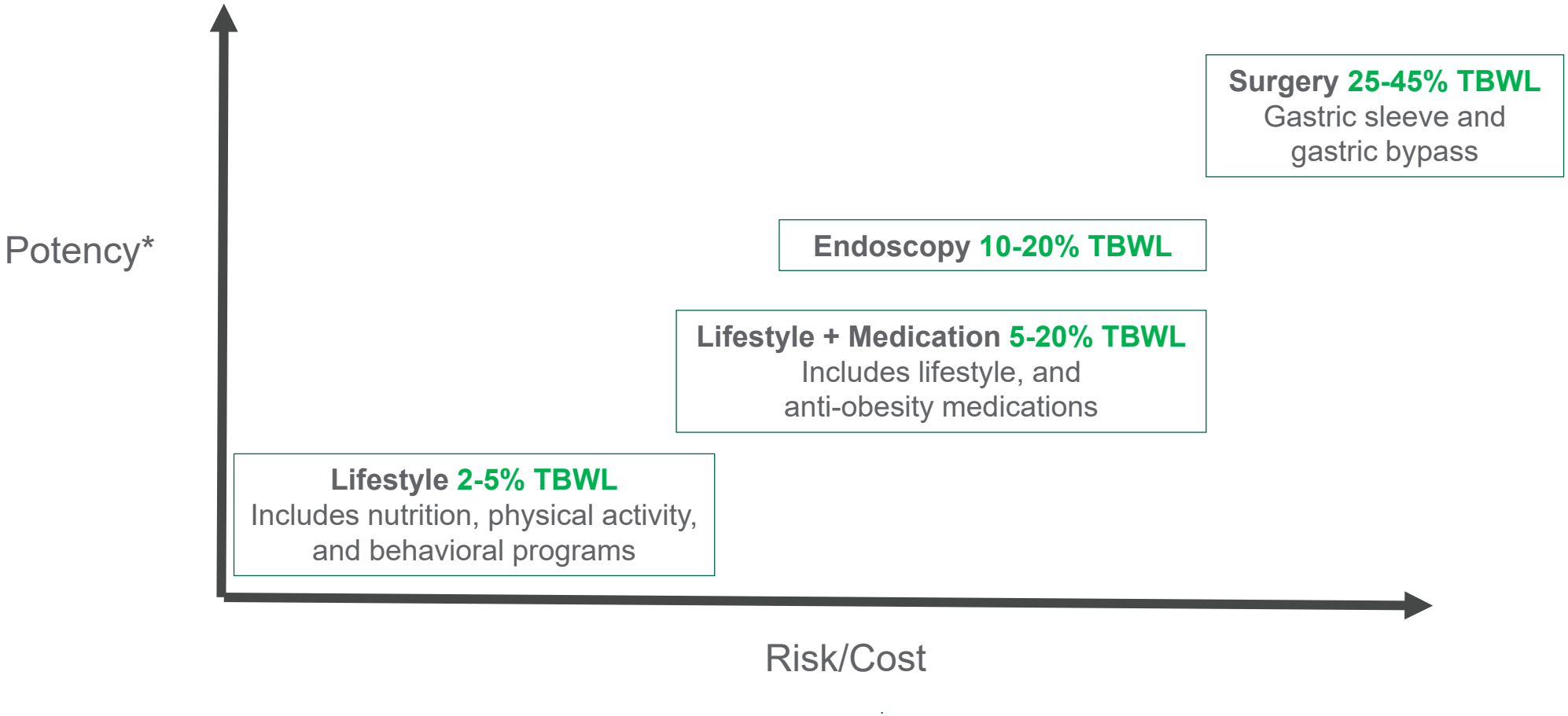
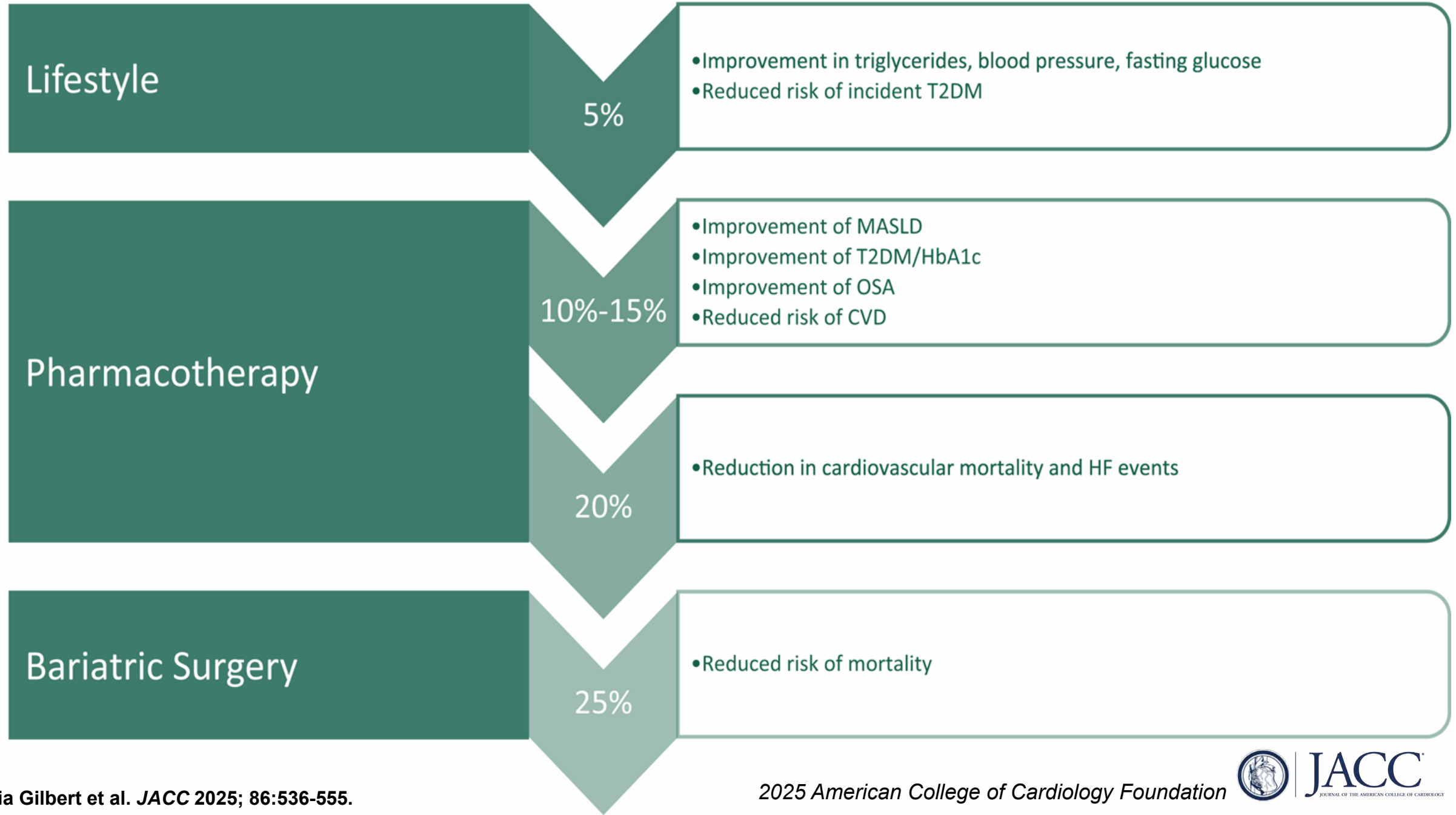
Treatment Choices





Olivia Gilbert et al. *JACC* 2025; 86:536-555.

JACC JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY

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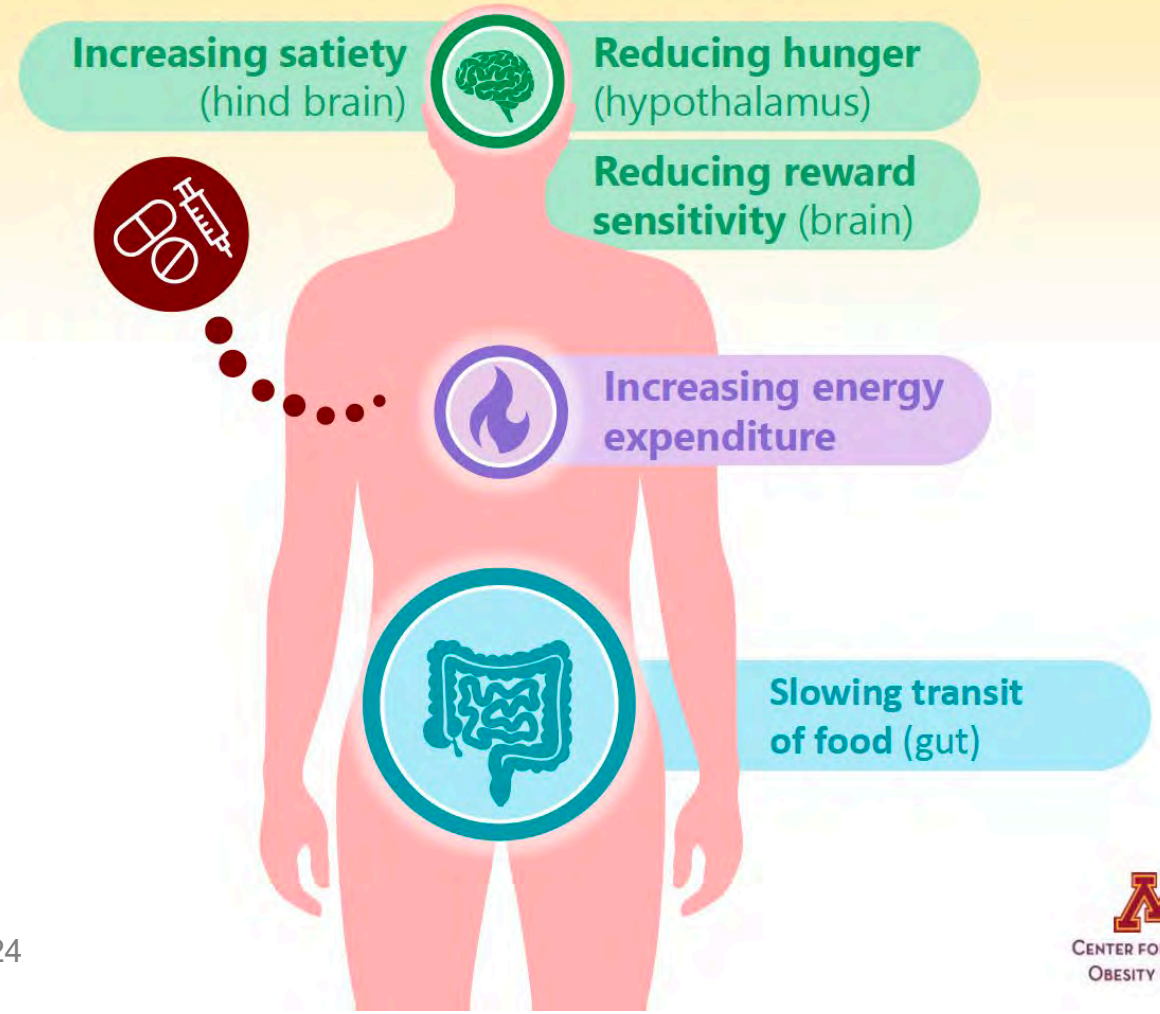
The Rationale For Obesity Pharmacotherapy

- Filling the treatment gap
- Ability to target underlying biological pathways regulating energy balance
- Potential for enhancement of weight loss maintenance
- Potential to scale up



Claudia K. Fox, M.D., M.P.H. and Aaron S. Kelly, Ph.D.
Center for Pediatric Obesity Medicine. University of Minnesota
Slide: Advanced Therapies in Pediatric Obesity Conference 2024

Center for Pediatric Obesity Medicine

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Obesity Pharmacotherapy

Adjunct to nutritional, physical activity, and behavioral therapies

Objectives:

- Treat disease:
  - Adiposopathy or sick fat disease (SFD)
  - Fat mass disease (FMD)
- Facilitate management of eating behavior
- Slow progression of weight gain/regain
- Improve the health, quality of life, and body weight of the patient with overweight or obesity

5-10 percent weight loss may improve both metabolic and fat mass disease

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Obesity Pharmacotherapy – Who and When to Treat?

Risk vs benefit

- Severity of obesity
- Age
- Comorbidities
- Safety/efficacy of AOM
- BMI trajectory
- Child/family preference
- Response to LST
- Insurance / availability

Timing

- AAP Guidelines emphasize no more watchful waiting; however, no clear guidelines on when to trial Lifestyle (LST), or when to start medication

- Early treatment with lifestyle predicts long-term response
  - Most respond within 1 month
  - Few adolescents with severe obesity (<10%) will have a significant drop in BMI with LST alone

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Suggested Indications for Using Obesity Pharmacotherapy

		0-5 years	6-11 years	12+ years
Class I Obesity	Comorbidity +		✓	✓
	Comorbidity -			✓
Class II Obesity	Comorbidity +	✓	✓	✓
	Comorbidity -		✓	✓
Class III Obesity	Comorbidity +	✓	✓	✓
	Comorbidity -		✓	✓

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Challenges in Pediatric Pharmacotherapy

- Limited FDA-approved options, particularly for patients < 12 years of age
- Difficulties with insurance coverage, even for approved medications
- Shortages – no longer an issue
- Knowledge gaps in treatment of obesity/access to care
- Parent/patient comfort
  - Concept of anti-obesity medications
  - Use of injectable medications

Obesity Pharmacotherapy: Current Options in 2025

FDA Approved for ages ≥ 12 years

- Orlistat (Alli, Zenecol)
- Phentermine + topiramate (Qsymia)
- Liraglutide (Saxenda)
- Semaglutide (Wegovy)

FDA Approved ≥ 18 years of age

- Phentermine (≥ 17 years of age)
- Tirzepatide (Zepbound)
- Bupropion + naltrexon (Contrave)

Off-label use – can be considered at most ages

- Metformin
- Topiramate
- Phentermine
- Bupropion
- Lisdexamfetamine (Vyvanse)

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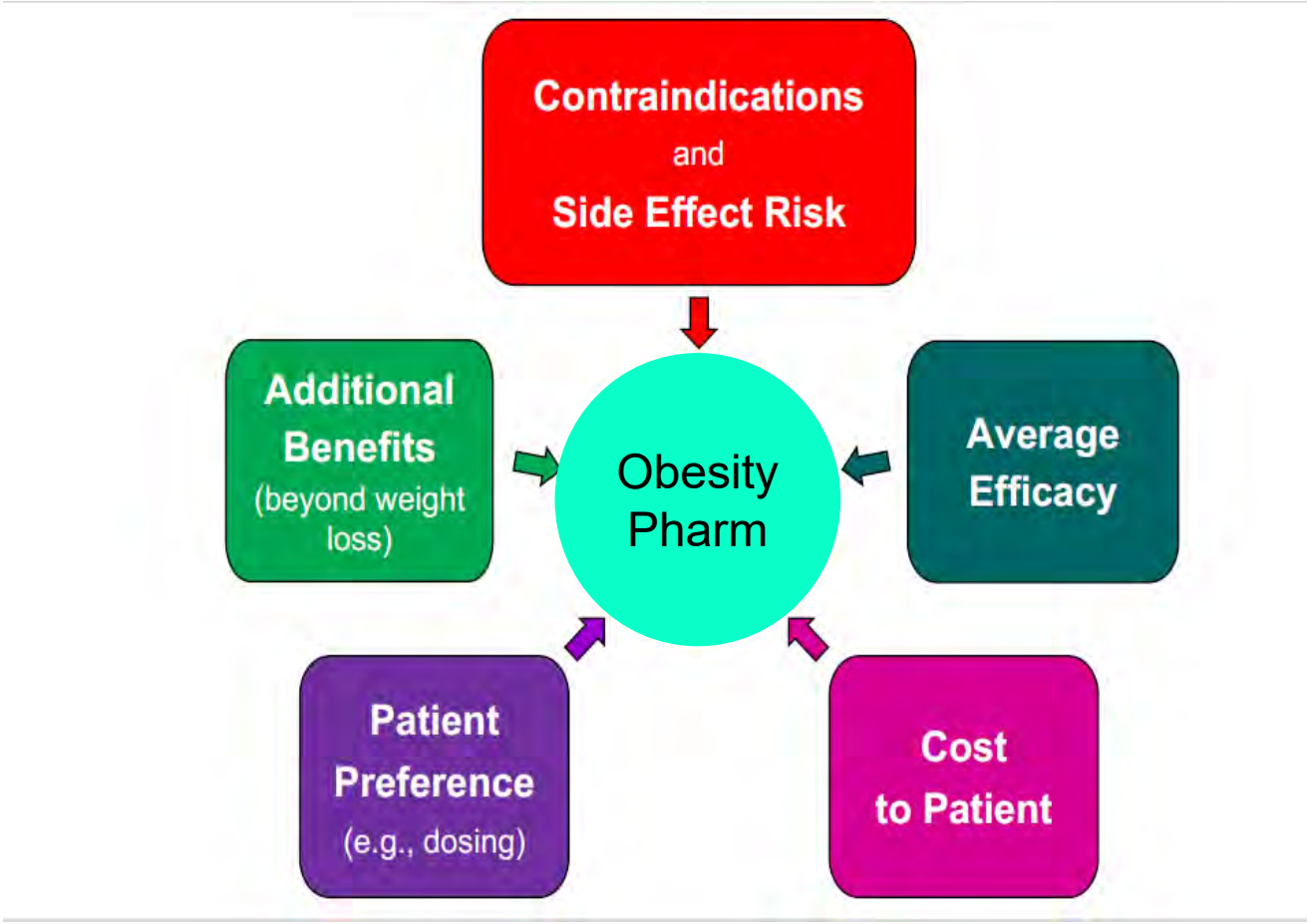
Choosing Obesity Pharmacotherapy Medications



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Commonly Asked Questions by Parent/Guardian/Patient

1. What is the best medication?

2. Is this medication for life?

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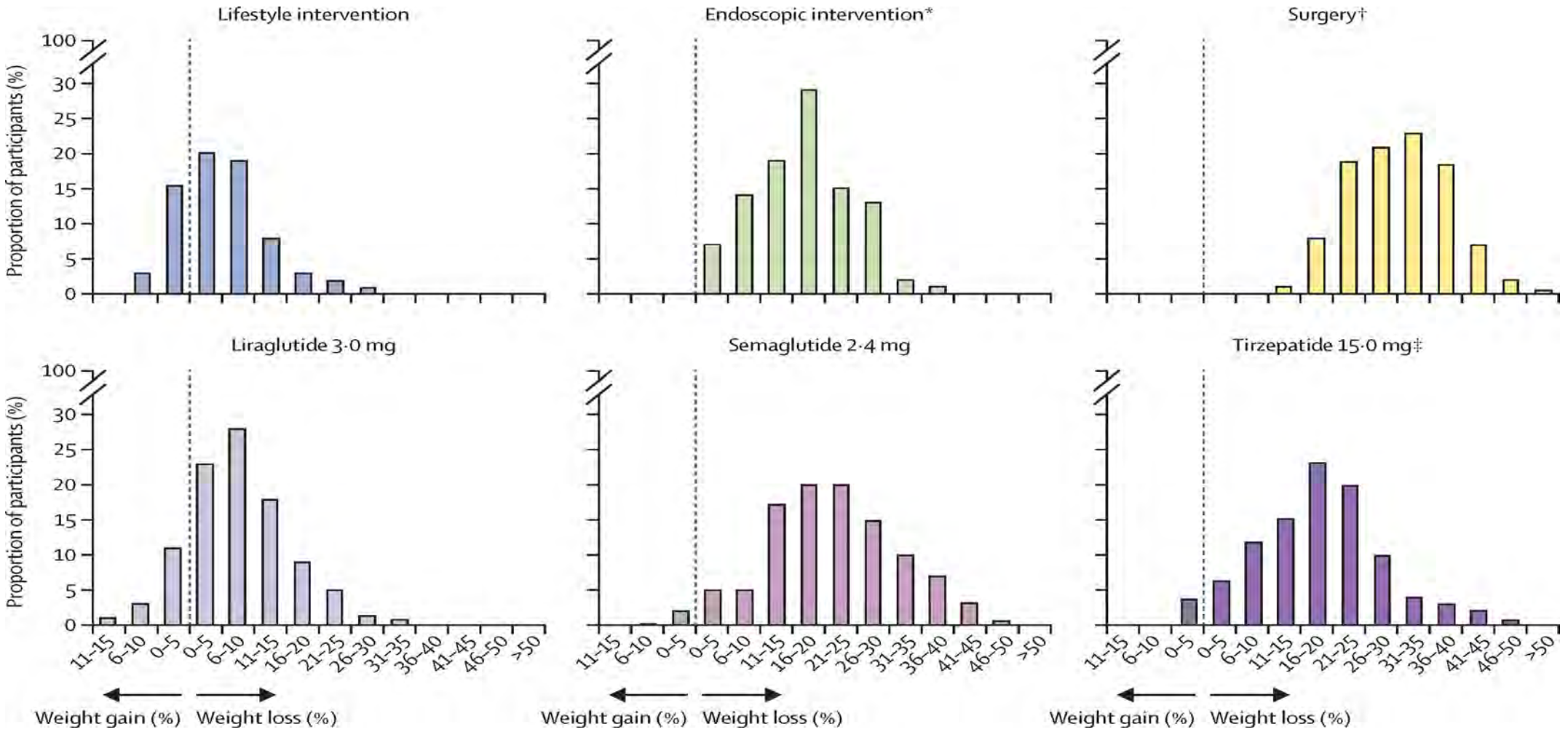
Heterogeneity of Response to Weight Loss Interventions



Contemporary medical, device, and surgical therapies for obesity in adults Carolina M Perdomo, Ricardo V Cohen, Priya Sumithran, Karine Clément, Gema Frühbeck Lancet 2023; 401: 1116–30 Published Online February 9, 2023

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What Medication is Best for a Particular Patient?

- There is no clear answer
- All medication studies show a bell-shaped response curve
  - The majority of patients lose an expected amount of weight over a certain amount of time
  - However, some patients do not lose weight – non-responders
  - Some patients lose at a significantly faster rate than expected – super responders.

- Unpredictable for a given individual

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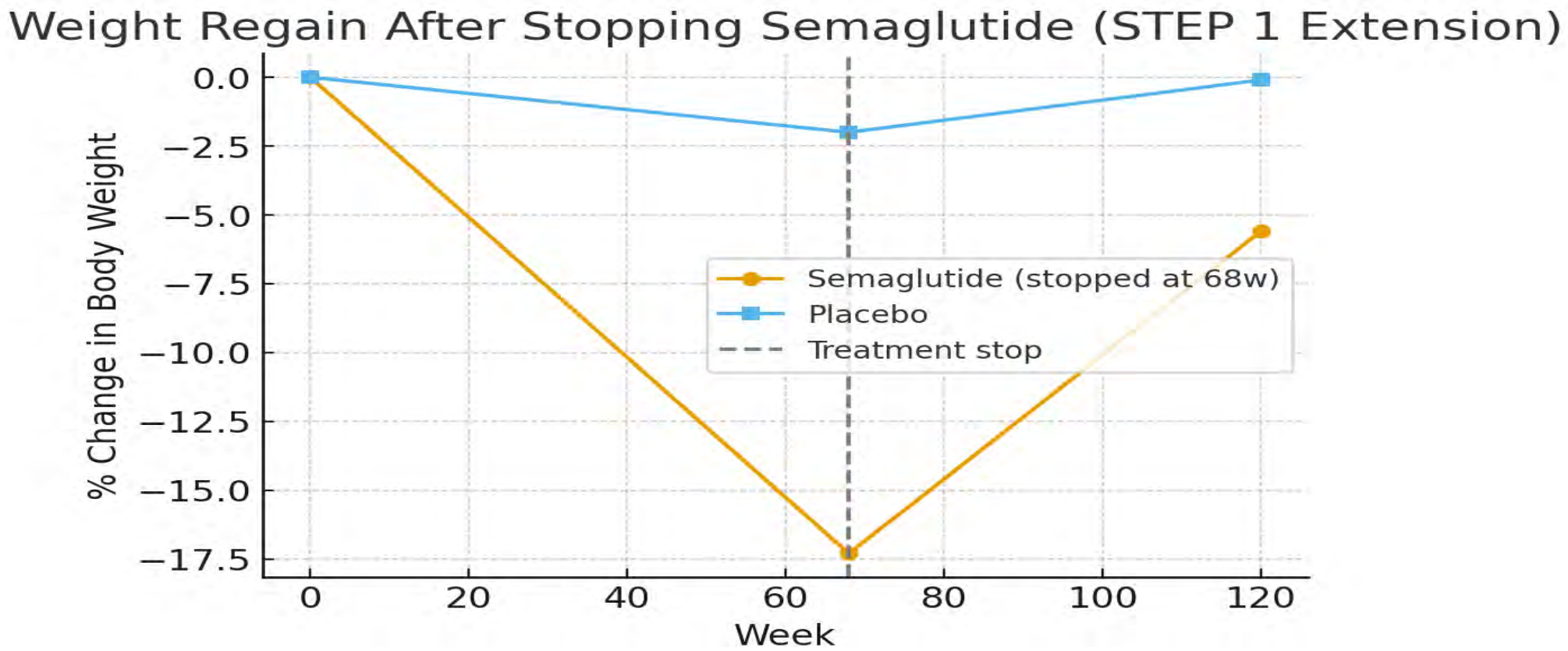
Is Obesity Pharmacotherapy Medication Meant for Lifelong Use?



Source: Wilding JPH et al., JAMA 2022 (STEP 1 Extension Trial)

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Is Obesity Pharmacotherapy Medication Meant for Lifelong Use?

- Is this true in the pediatric population?
- Is there an age at which permanent metabolic changes are established?

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Metformin

PEDIATRICS
OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

Commentary

Is There a Role for Metformin in the Treatment of Childhood Obesity?

Paul Kaplowitz

Pediatrics July 2017, 140 (1) e20171205; DOI: https://doi.org/10.1542/peds.2017-1205

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Metformin

Childhood Obesity, Vol. 16, No. 3 | Review Articles

Free Access

Metformin Therapy Reduces Obesity Indices in Children and Adolescents: A Systematic Review and Meta-Analysis of Randomized Clinical Trials

Alireza Sadeghi, Seyed Mohammad Mousavi, Tahereh Mokhtari, Mohammad Parohan, and Alireza Milajerdi

Published Online: 19 Mar 2020 | https://doi.org/10.1089/chi.2019.0040

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Metformin

- FDA approved for T2DM age ≥10
  - Off-label use for everything else, including PCOS
- Immediate release: age ≥ 6 years
  - Start with 500 mg once daily and can titrate up every two weeks to 1000 mg twice daily
- Extended-release: adolescents
  - Start with 500 mg once daily and can titrate up every two weeks to 2000 mg daily

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Metformin

- Consider in conditions associated with insulin resistance
  - PCOS
  - MASLD
  - Pre-diabetes
- Consider with atypical antipsychotic medications

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Metformin

Adverse Effects:

- Chest congestion, palpitations, flushing
- Abdominal discomfort, dyspepsia
- Headaches, dizziness
- Chills
- Decreased appetite
- Diarrhea
- Dyspnea
- Flu-like symptoms
- Hypoglycemia

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Orlistat

- FDA approved age ≥12 years in January 2011.
- Decreases hydrolysis of ingested triglycerides.
- Reduce gastrointestinal fat absorption by approximately 30% via inhibition of intestinal lipases.
- Negligible absorption in the small intestine.

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Orlistat

- A 120-mg dose of orlistat given 3 times daily.
- Studies show a decreased BMI by 0.5 to 4.2 kg/m^2 compared with placebo.

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Orlistat

- Unabsorbed fat excreted in feces can cause transient diarrhea, abdominal discomfort, and flatulence.
  - Challenging for adolescents at school to self-regulate fat in a given meal.
- Concomitant prescription of natural dietary fibers or a diet containing approximately 30% of calories from fat is recommended.
- Take with a multivitamin containing ~5000 IU of vitamin A, 400 IU of vitamin D, 300 IU of vitamin E, and 25 µg of vitamin K.

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First and Second Generation AOMs

	Phentermine	Orlistat	Qsymia (phentermine/topiramate)	Bupropion
AVOID IN	Seizures Glaucoma ESRD Pregnancy/breast feeding Stimulants – use with caution	Bariatric surgery Liver disease Pregnancy/ breastfeeding	Seizures Glaucoma Kidney stones ESRD on HD Pregnancy/breastfeeding	Depression due to increase suicide ideation Abrupt discontinuation of alcohol, benzodiazepines, Antiepileptics
CONTRAINDCATIONS	Substance Use Disorder	Malabsorption syndromes	Lack of highly effective pregnancy prevention	Seizure disorder Bulimia Anorexia nervosa
WT LOSS	3.6kg	0.5 – 4.2 kg/m^2	4.8 – 7.1 kg/m^2	71.-10% TBW
Adverse effects	Jitteriness Tremor Increased BP Tachycardia Dry mouth Insomnia Constipation	Diarrhea Flatus with discharge Fecal urgency Fatty stool (Steatorrhea) Oily evacuation Fecal incontinence Rare liver injury	Same as phentermine plus Dizziness Abnormal taste (soda) Paresthesia Kidney stones (Ca++) "Dopamax" effect	Tachycardia Constipation Headaches, insomnia Blurred vision

With permission: Dr. Sarah Finn, DHMC

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Qsymia

- Combination of phentermine and topiramate.
- FDA approved age ≥ 12 years on June 27, 2022

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Qsymia

A Phase IV, Multi-Center, Randomized, Double-Blind, Placebo-Controlled, Parallel-Design Study to Determine the Safety and Efficacy of VI-0521(Qsymia) in Obese Adolescents

- 56 weeks, 233 participants ages 12 to ≤ 17 years old with BMI > 95th percentile
- At the end of the study:
  - Participants taking Qsymia 7.5/46 mg lost, on average, 4.8% of their BMI
  - Participants taking Qsymia 15 mg/92 mg lost 7.1% of their BMI
  - While individuals receiving the placebo gained an average of 3.3% of their BMI

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Qsymia

- DEA Class IV.
- Increased risk of cleft lip and palate.
- Only available through Qsymia Risk Evaluation and Mitigation Strategy (REMS) program:
  - Increased risk of congenital malformation, specifically orofacial clefts, in infants exposed to Qsymia during the first trimester of pregnancy.
  - Importance of pregnancy prevention for patients of reproductive potential receiving Qsymia.
  - Need to discontinue Qsymia immediately if pregnancy occurs.

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Qsymia

Side Effects ~ 5%

- Dizziness
- Insomnia
- Constipation
- Dry mouth
- Dysgeusia (taste distortion/perversion)
- Paresthesia

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First and Second Generation AOMs

	Phentermine	Orlistat	Qsymia (phentermine/topiramate)	Bupropion
AVOID IN	Seizures Glaucoma ESRD Pregnancy/breast feeding Stimulants – use with caution	Bariatric surgery Liver disease Pregnancy/ breastfeeding	Seizures Glaucoma Kidney stones ESRD on HD Pregnancy/breastfeeding	Depression due to increase suicide ideation Abrupt discontinuation of alcohol, benzodiazepines, Antiepileptics
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Adverse effects	Jitteriness Tremor Increased BP Tachycardia Dry mouth Insomnia Constipation	Diarrhea Flatus with discharge Fecal urgency Fatty stool (Steatorrhea) Oily evacuation Fecal incontinence Rare liver injury	Same as phentermine plus Dizziness Abnormal taste (soda) Paresthesia Kidney stones (Ca++) "Dopamax" effect	Tachycardia Constipation Headaches, insomnia Blurred vision

With permission: Dr. Sarah Finn, DHMC

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Topiramate Alone

- FDA-approved in children for seizures age ≥ 2.
- Off-label use as obesity pharmacotherapy.
- Multiple retrospective studies suggest benefit.[1]
- Topiramate has shown efficacy in limiting weight gain associated with the initiation of olanzapine (adult study[2]).
- No randomized double-blinded placebo controlled studies.

- 1. Topiramate for Weight Management in Children with Severe Obesity. Chid Obes. 2022 June 29
- 2. Kim JH, Yim SJ, Nam JH. A 12-week, randomized, open-label, parallel-group trial of topiramate in limiting weight gain during olanzapine treatment in patients with schizophrenia. *Schizophrenia research.* 2006;82(1):115–7.

Dartmouth Health Children's

Topiramate

- Risk of cleft lip and palate
  - Birth control and monitoring for pregnancy.
- Sedative effects – dose related.
- Cognitive impairment – dose related.
- Metabolic acidosis/Nephrolithiasis
  - Risk with a ketogenic diet.

Dartmouth Health Children's

Phentermine Alone

- FDA approved ≥17 years since 1959
  - 12-week course (original concerns for potential for abuse and dependence but never materialized).
- Weight loss tends not to be sustained.

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Phentermine

Adverse effects:

- Elevated BP
- Prolong QT interval (?obtain EKG before initiation if history of any rhythm issues)
- Anxiety
- Insomnia
- Irritability

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First and Second Generation AOMs

	Phentermine	Orlistat	Qsymia (phentermine/topiramate)	Bupropion
AVOID IN	Seizures Glaucoma ESRD Pregnancy/breast feeding Stimulants – use with caution	Bariatric surgery Liver disease Pregnancy/ breastfeeding	Seizures Glaucoma Kidney stones ESRD on HD Pregnancy/breastfeeding	Depression due to increase suicide ideation Abrupt discontinuation of alcohol, benzodiazepines, Antiepileptics
CONTRAINDCATIONS	Substance Use Disorder	Malabsorption syndromes	Lack of highly effective pregnancy prevention	Seizure disorder Bulimia Anorexia nervosa
WT LOSS	3.6kg	0.5 – 4.2 kg/m^2	4.8 – 7.1 kg/m^2	71.-10% TBW
Adverse effects	Jitteriness Tremor Increased BP Tachycardia Dry mouth Insomnia Constipation	Diarrhea Flatus with discharge Fecal urgency Fatty stool (Steatorrhea) Oily evacuation Fecal incontinence Rare liver injury	Same as phentermine plus Dizziness Abnormal taste (soda) Paresthesia Kidney stones (Ca++) "Dopamax" effect	Tachycardia Constipation Headaches, insomnia Blurred vision

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Contrave (Naltrexone/Bupropion)

- Not FDA-approved in pediatric patients < 18 years.

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Bupropion

- Off-label use.
- Dopamine-reuptake inhibitor.
- Bupropion SR 300 and 400 mg/d were well-tolerated by obese adults and were associated with a 24-week weight loss of 7.2% and 10.1% and sustained weight losses at 48 weeks
  - Obesity Volume 10, Issue 7 July 2002.

Dartmouth Health Children's

Bupropion

- Off-label use in pediatrics
- However, often used:
  - as an adjunct therapy of ADHD age ≥ 6 years.
  - Depression age ≥ 8 years (preparation dependent).
  - Smoking cessation adolescents age ≥ 14 years.

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Bupropion

Adverse effects:

- Suicidal thinking – increased risk with depression
- Tachycardia
- Constipation
- Headaches, insomnia
- Blurred vision

Dartmouth Health Children's

First and Second Generation AOMs

	Phentermine	Orlistat	Qsymia (phentermine/topiramate)	Bupropion
AVOID IN	Seizures Glaucoma ESRD Pregnancy/breast feeding Stimulants – use with caution	Bariatric surgery Liver disease Pregnancy/ breastfeeding	Seizures Glaucoma Kidney stones ESRD on HD Pregnancy/breastfeeding	Depression due to increase suicide ideation Abrupt discontinuation of alcohol, benzodiazepines, Antiepileptics
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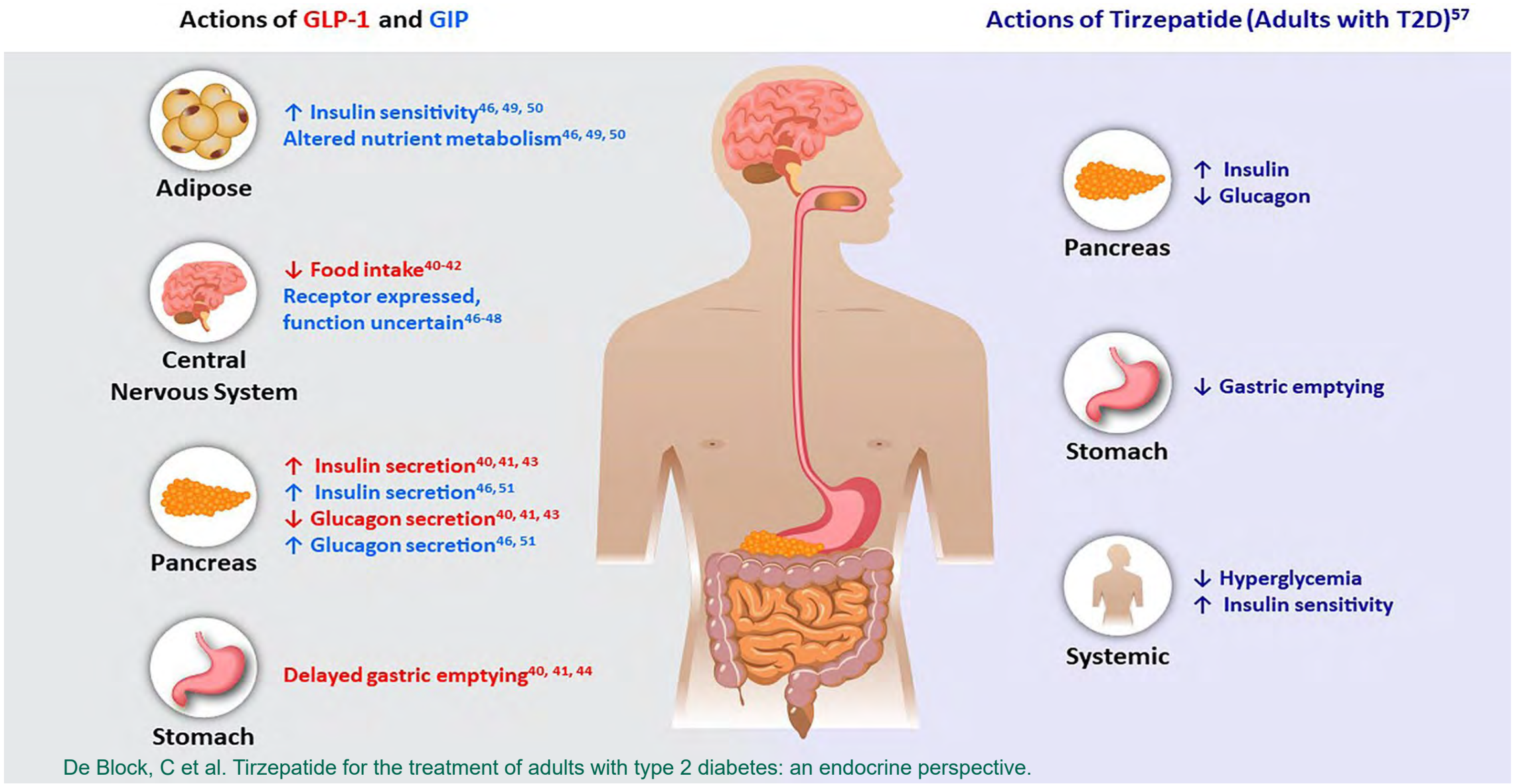
With permission: Dr. Sarah Finn, DHMC

Mechanism GIP/GLP-1Receptor Agonist



De Block, C et al. Tirzepatide for the treatment of adults with type 2 diabetes: an endocrine perspective. Diabetes Obesity and Metabolims 1.2023.25: (1). 3-17

Dartmouth Health Children's

Liraglutide

Pediatric OBESITY

WORLD OBESITY

ORIGINAL RESEARCH | Open Access

Liraglutide effects in a paediatric (7-11 y) population with obesity: A randomized, double-blind, placebo-controlled, short-term trial to assess safety, tolerability, pharmacokinetics, and pharmacodynamics

Lucy D. Mastrandrea ✉, Louise Witten, Kristin C. Carlsson Petri, Paula M. Hale, Hanna K. Hedman, Robert A. Riesenberg

First published: 17 January 2019 | https://doi.org/10.1111/ijpo.12495 | Citations: 13

Dartmouth Health Children's

Liraglutide

- Glucagon-like peptide-1 (GLP-1) receptor agonist.
- Reduces meal-related hyperglycemia (for 24 hours after administration) by increasing insulin secretion from pancreatic beta cells, delaying gastric emptying, and suppressing prandial glucagon secretion.
- FDA approved for T2DM treatment age ≥10 years (June 2019).
- FDA approved for obesity age ≥ 12 years (Dec 2020).

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Liraglutide

- Drug Enforcement Agency Schedule: Not a scheduled drug.
- Solution for subcutaneous injection, pre-filled, multi-dose pen that delivers doses of 0.6 mg, 1.2 mg, 1.8 mg, 2.4 mg, or 3 mg.
- Inject subcutaneously in the abdomen, thigh, or upper arm; the injection site and timing can be changed without dose adjustment.
- The recommended dose is 3 mg daily, any time of day, without regard to the timing of meals.
- Dosing: weekly titration in increments of 0.6 mg.

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Liraglutide

Contraindication:

- Family history of medullary thyroid cancer
- Pancreatitis
- MEN Type 2

Adverse reactions:

- Nausea – tends to reduce with time – consider use of ondansetron
- GI side effects (diarrhea, dyspepsia, constipation)
- Hypoglycemia - rare

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Liraglutide

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Liraglutide for Children 6 to <12 Years of Age with Obesity — A Randomized Trial

Authors: Claudia K. Fox, M.D., Margarita Barrientos-Pérez, M.D., Eric M. Bomberg, M.D., John Dcruz, M.D., Inge Gies, Ph.D., Nina M. Harder-Lauridsen, Ph.D., Muhammad Yazid Jalaludin, M.D., Kushal Sahu, M.Sc., Petra Weimers, Ph.D., Thomas Zueger, M.D., and Silva Arslanian, M.D., for the SCALE Kids Trial Group* Author Info & Affiliations

Published September 10, 2024 | N Engl J Med 2025;392:555-565 | DOI: 10.1056/NEJMoa2407379

VOL. 392 NO. 6 |

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Liraglutide

Teva Announces FDA Approval and Launch of Generic Saxenda® (liraglutide injection) – First Generic GLP-1 Indicated for Weight Loss

August 28, 2025 8:30 AM

Dartmouth Health Children's

Semaglutide

WEGOVY

Dartmouth Health Children's

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Once-Weekly Semaglutide in Adolescents with Obesity

Daniel Weghuber, M.D., Timothy Barrett, Ph.D., Margarita Barrientos-Pérez, M.D., Inge Gies, Ph.D., Dan Hesse, Ph.D., Ole K. Jeppesen, M.Sc., Aaron S. Kelly, Ph.D., Lucy D. Mastrandrea, M.D., Rasmus Sørrig, Ph.D., and Silva Arslanian, M.D., for the STEP TEENS Investigators*

This article was published on November 2, 2022, at NEJM.org

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Once-Weekly Semaglutide in Adolescents with Obesity

Conclusion:

Among adolescents with obesity, once-weekly treatment with a 2.4-mg dose of semaglutide plus lifestyle intervention resulted in a greater reduction in BMI than lifestyle intervention alone.

Reduction in body weight — no. of participants/total no. (%) vs. placebo

- ≥10% reduction 81/131 (62) vs. 5/62 (8)
- ≥15% reduction 70/131 (53) vs. 3/62 (5)
- ≥20% reduction 49/131 (37) vs. 2/62 (3)

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Semaglutide (Wegovy)

Contraindications and Adverse Reactions:

- Similar to liraglutide

- Dose titration is weekly
  - Starting at 0.25 mg
  - Then 0.50 mg, next 1.0 mg, next 1.7 mg and max 2.4 mg

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Setmelanotide

- Setmelanotide is an MC4 receptor agonist.
- MC4 receptors in the brain are involved in regulation of hunger, satiety, and energy expenditure.

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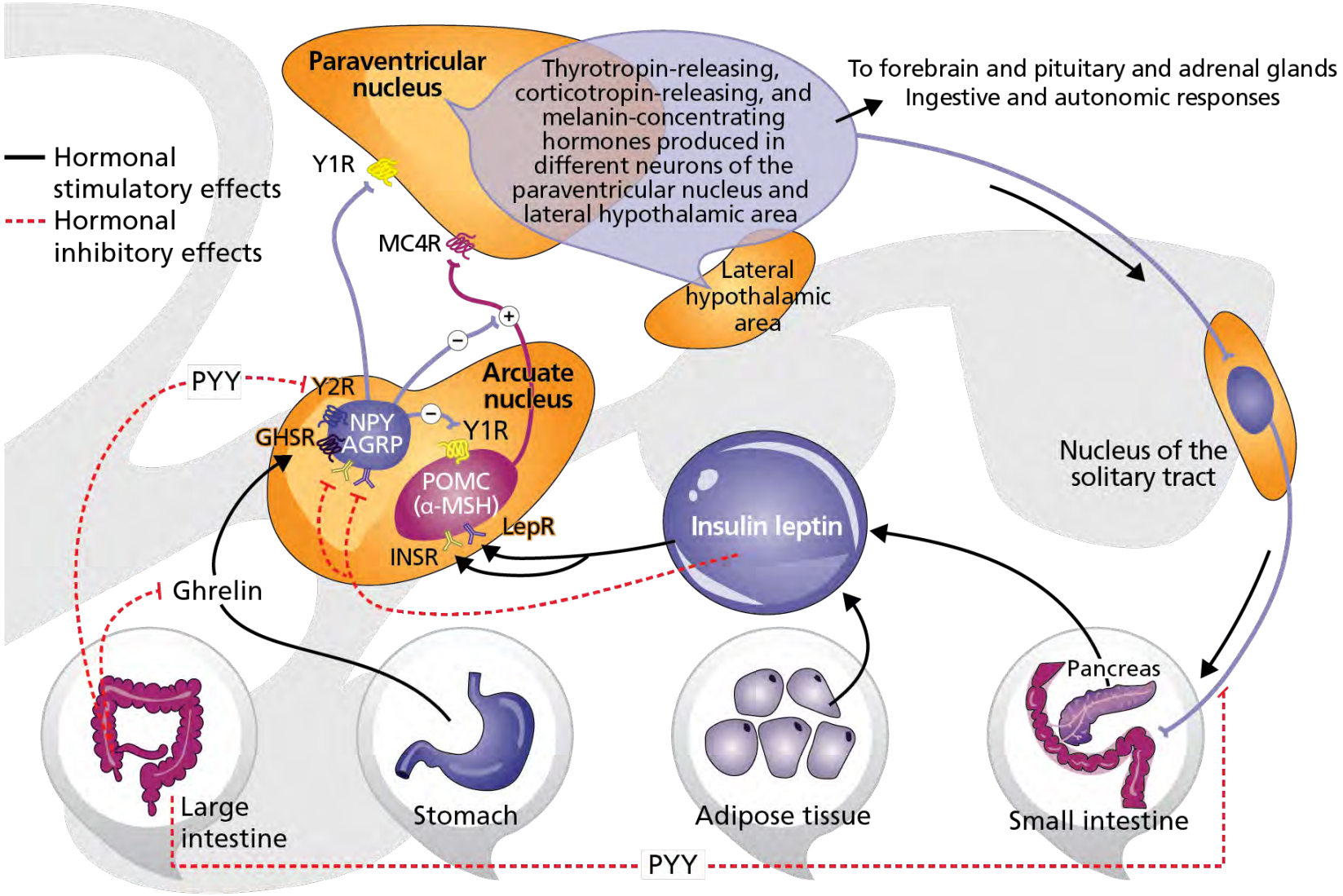

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Setmelanotide

- FDA approved 11/27/2020.
- For chronic weight management (weight loss and weight maintenance for at least one year).
- Patients 6 years and older with obesity due to three rare genetic conditions:
  - Pro-opiomelanocortin (POMC) deficiency
  - Proprotein subtilisin/kexin type 1 (PCSK1) deficiency
  - Leptin receptor (LEPR) deficiency
  - Confirmed by genetic testing demonstrating variants in POMC, PCSK1, or LEPR genes considered pathogenic (causing disease), likely pathogenic, or of uncertain significance.

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Setmelanotide

- Also approved to treat Bardet-Biedl syndrome
  - Age 2 and greater

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Tirzepatide

- FDA approved for T2DM in adults on May 13, 2022.
- FDA approved for obesity in adults on November 8, 2023
- Combination of a GIP (glucose-dependent insulinotropic polypeptide) and GLP-1 (glucagon-like peptide-1) receptor agonist.
- Once weekly injection.

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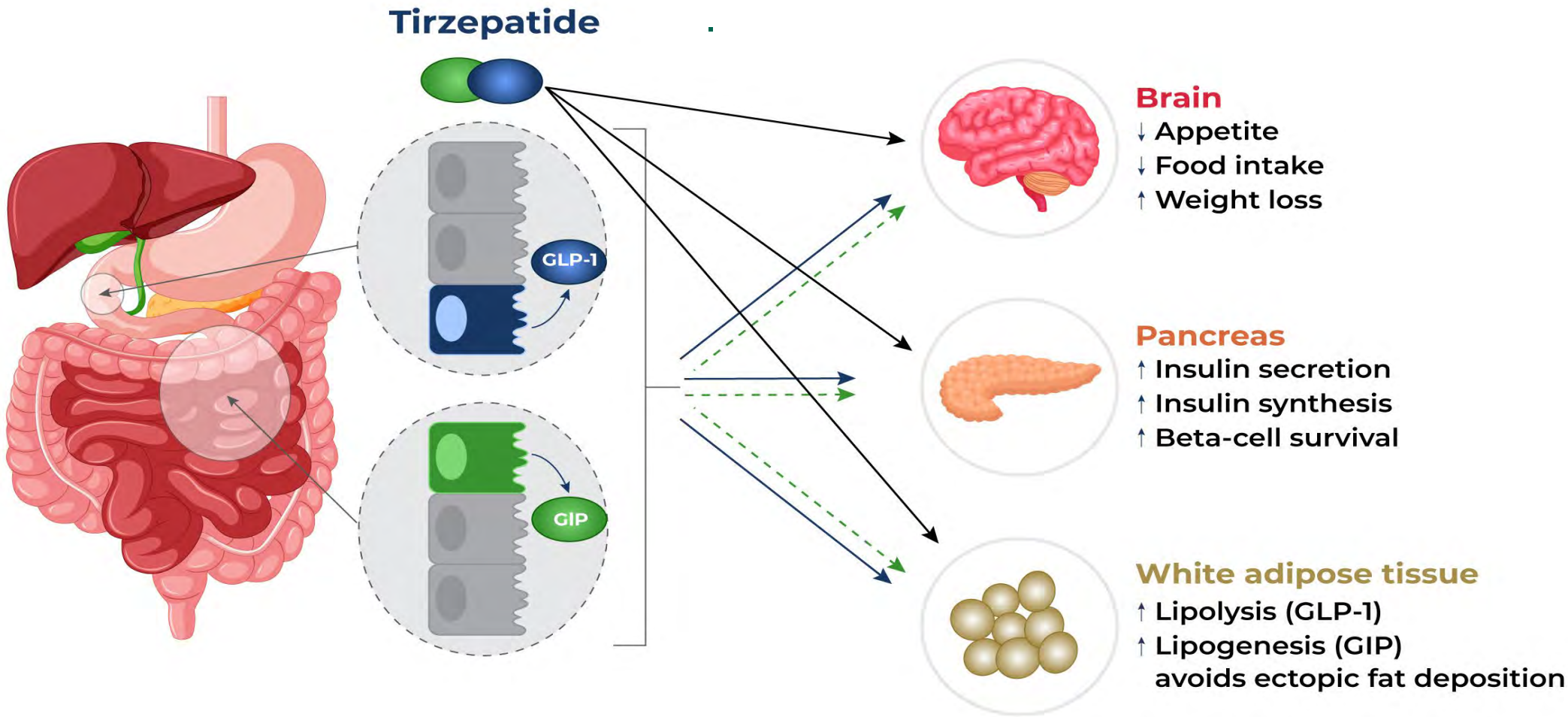
Tirzepatide



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Tirzepatide

SURMOUNT study[1]

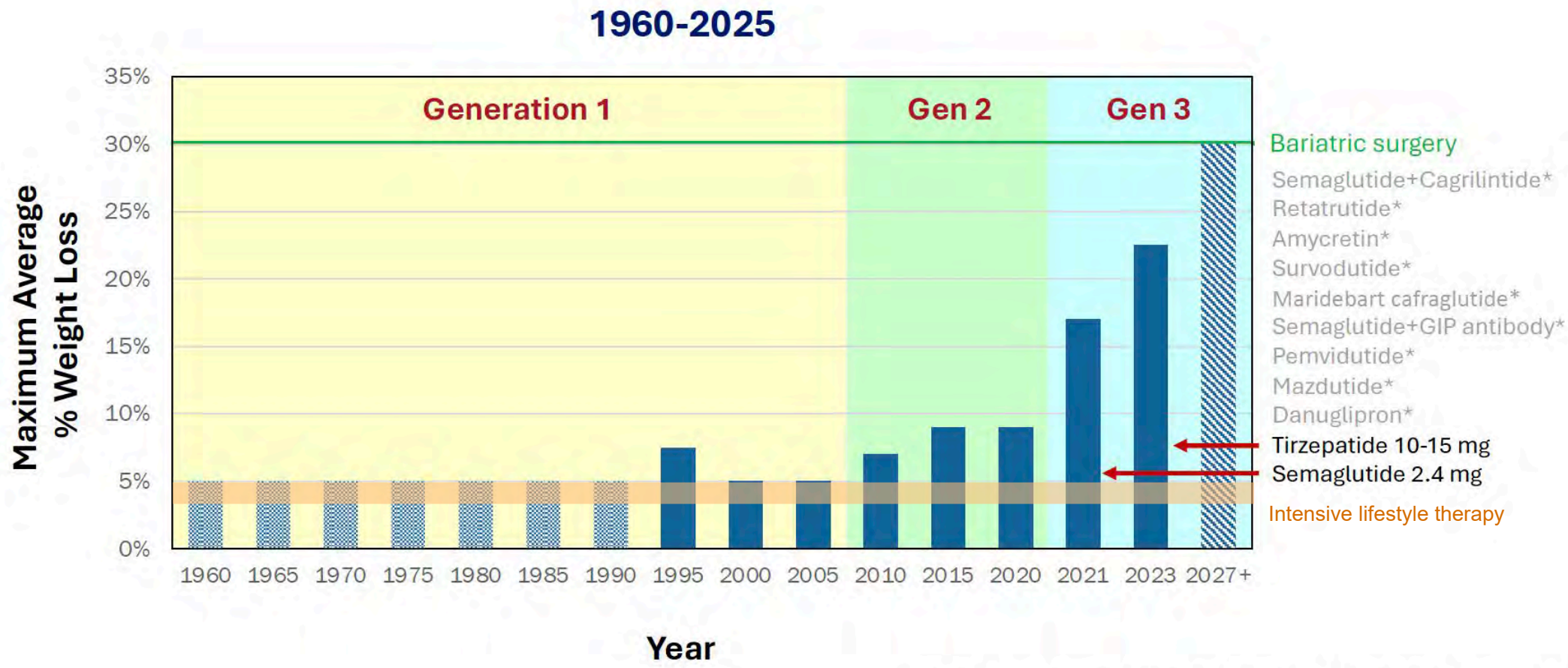
- Phase 3 clinical trial
- Involved ~ 2500 patients with tirzepatide
- 72 weeks

RESULT

- tirzepatide 5mg: lost 16% weight
- tirzepatide 10mg: lost 21.4% weight
- tirzepatide 15mg: lost 22.5% weight
- placebo only lost 2.4% body weight.

1. Jastreboff AM, le Roux CW, Stefanski A, et al. Tirzepatide for Obesity Treatment and Diabetes Prevention. The New England Journal of Medicine. 2025;392(10):958-971. doi:10.1056/NEJMoa2410819.

We have entered a rapidly expanding 3rd generation of anti-obesity medications



*These medications are not approved for the treatment of obesity

Kaplan LM, 2024

Dartmouth GEISEL SCHOOL MEDICIN

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What About Weaning Off Medications?

- Can consider once achieved goals
  - Reversal of co-morbidities – usually seen at 5-10% TBWL.
  - May need a BMI below the 85th percentile.
- Slow wean of dosage
- Monitor labs
- Assess for weight regain
- May need a certain maintenance dose

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Pediatric Metabolic and Bariatric Surgery

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The American Academy of Pediatrics Recommendations

- Adolescents aged 13 years and older with severe obesity
  - defined as a BMI ≥120% of the 95th percentile for age and sex

- Should be referred to a comprehensive multidisciplinary pediatric metabolic and bariatric surgery center for evaluation for metabolic and bariatric surgery

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Rationale

- The rationale for these recommendations is based on evidence that bariatric surgery in adolescents leads to significant and sustained weight loss, improvement or resolution of obesity-related comorbidities (such as type 2 diabetes and hypertension), and improved quality of life.[1]
- Average reduction of approximately 26% of baseline body weight at 5 years.
- Remission rates at 5 years are about 86% for type 2 diabetes and 68% for hypertension

1. Long-Term Results of Bariatric Surgery in Adolescents With at Least 5 Years of Follow-Up: A Systematic Review and Meta-Analysis. Wu Z, Gao Z, Qiao Y, et al. Obesity Surgery. 2023;33(6):1730-1745. doi:10.1007/s11695-023-06593-4.

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Pediatric Metabolic and Bariatric Surgery

- The primary surgical procedures considered are
  - Laparoscopic Roux-en-Y gastric bypass and
  - Vertical sleeve gastrectomy.

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Specifics Indications

- **Class 2 obesity** (BMI ≥35 kg/m² or ≥120% of the 95th percentile for age and sex, whichever is lower) **with at least one clinically significant comorbidity**:
  - Type 2 diabetes,
  - Obstructive sleep apnea,
  - Nonalcoholic steatohepatitis,
  - Hypertension,
  - Dyslipidemia,
  - Blount disease, slipped capital femoral epiphysis, GERD, or
  - Impaired quality of life.

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Specifics Indications

- **Class 3 obesity** (BMI ≥40 kg/m² or ≥140% of the 95th percentile for age and sex, whichever is lower), **regardless of comorbidities**

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Bariatric Surgery Complications

- **The majority are minor and occur early postoperatively (15%), such as nausea and dehydration.**
- **Major complications (e.g., reoperation) occur in about 8% of cases.**[1-2]
- Long-term, up to 25% may require subsequent related procedures within 5 years.
- Nutritional deficiencies—particularly iron and vitamin B12—are notable, affecting up to 59% of gastric bypass and 27% of sleeve gastrectomy recipients, necessitating lifelong monitoring and supplementation

1. Long-Term Outcomes Following Adolescent Metabolic and Bariatric Surgery. Beamish AJ, Ryan Harper E, Järvholm K, Janson A, Olbers T. The Journal of Clinical Endocrinology and Metabolism.

2. Clinical Practice Guideline for the Evaluation and Treatment of Children and Adolescents With Obesity2023;108(9):2184-2192. doi:10.1210/clinem/dgad155.

.Hampl SE, Hassink SG, Skinner AC, et al. Pediatrics. 2023;151(2):e2022060640. doi:10.1542/peds.2022-060640.

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Pediatric Resources

AAP Institute for Childhood Healthy Weight	https://www.aap.org/en/patient-care/institute-for-healthy-childhood-weight/clinical-practice-guideline-for-the-evaluation-and-treatment-of-pediatric-obesity/supporting-the-implementation-of-the-cpg-recommendations/
Obesity Medicine Association Pediatric Obesity Algorithm	https://obesitymedicine.org/childhood-obesity/ https://obesitymedicine.org/download-obesity-medicine-resources/
Clinical Practice Guideline for the Evaluation and Treatment of Children and Adolescents With Obesity	Hampl SE. Pediatrics. 2023 Feb 1;151(2):e2022060640. doi: 10.1542/peds.2022-060640. PMID: 36622115. https://doi.org/10.1542/peds.2022-060640
Motivational Interviewing – Change talk	https://kognito.com/products/change-talk-childhood-obesity

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Thank you!

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CASE DISCUSSION

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Presentation

13 yo with BMI 130th% of 95th percentile seen with concern for weight.

- Social History – lives with parents and sister, parents work, supportive household
- Family history
  - Obesity on mom's side, MGM with Type 2 DM and MASH
  - Mom says she works hard to stay healthy weight –no prediabetes, but had GDM
  - No Fhx of bariatric surgery or AOM use. Dad and sister are thin, "can eat anything"
- Past medical history / ROS – generally healthy, no asthma, constipation, headaches, snoring, mental health concerns. No medications

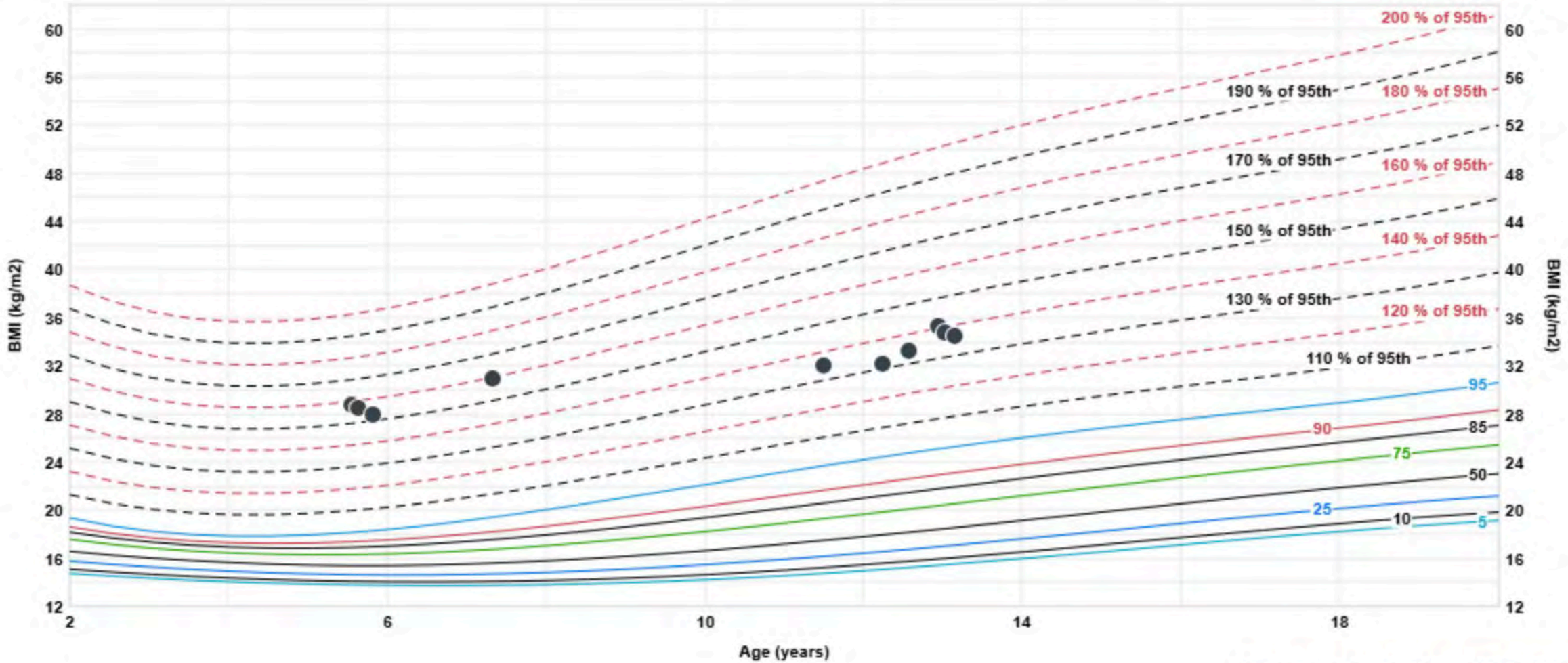
Growth Chart

BMI

Parents' Heights

BMI-for-age Percentiles (Boys, 2 to 20 years)

100 % | 100% | Zoom In | Zoom Out



Source: American Academy of Pediatrics, 2012

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Please Share Anything Else you feel is relevant to understanding the case

- Weight history
  - Parents say patient has always struggled with weight, even with intensive high school football, his weight drops some but then rebounds. Teen expresses frustration with being so active and not losing weight, being “stuck”. Would like to try a medication
- Review of health behaviors
  - Mom says they have a very healthy diet at home but Caleb is much pickier than her other children, tends to be hungry all the time. Likes 1-2 vegetables, likes fruit but doesn’t often choose it. Tends toward pasta, pizza, burgers, also snack foods which they have at home since younger sister needs to gain weight. They don’t have soda at home but he drinks sweet tea, and energy drinks, which he buys with his own money
  - Very active with football in fall, baseball in spring. No winter sport

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EVALUATION

Labs

- A1C 5.7
- ALT 50 / AST 36
- Lipids with HDL 33 / Trig 215 / LDL 79

Abdominal Ultrasound

- Diffuse increased echogenicity suggestive of steatosis. Normal gallbladder

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Question(s) raised:

- What would be the next step in addressing weight concern in this teen?

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Suggested Indications for Using Obesity Pharmacotherapy

		0-5 years	6-11 years	12+ years
Class I Obesity	Comorbidity +		✓	✓
	Comorbidity -			✓
Class II Obesity	Comorbidity +	✓	✓	✓
	Comorbidity -		✓	✓
Class III Obesity	Comorbidity +	✓	✓	✓
	Comorbidity -		✓	✓

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Obesity Pharmacotherapy: Current Options in 2025

FDA Approved for ages ≥ 12 years

- Orlistat (Alli, Zenecol)
- Phentermine + topiramate (Qsymia)
- Liraglutide (Saxenda)
- Semaglutide (Wegovy)

FDA Approved ≥ 18 years of age

- Phentermine (≥ 17 years of age)
- Tirzepatide (Zepbound)
- Bupropion + naltrexon (Contrave)

Off-label use – can be considered at most ages

- Metformin
- Topiramate
- Phentermine
- Bupropion
- Lisdexamfetamine (Vyvanse)

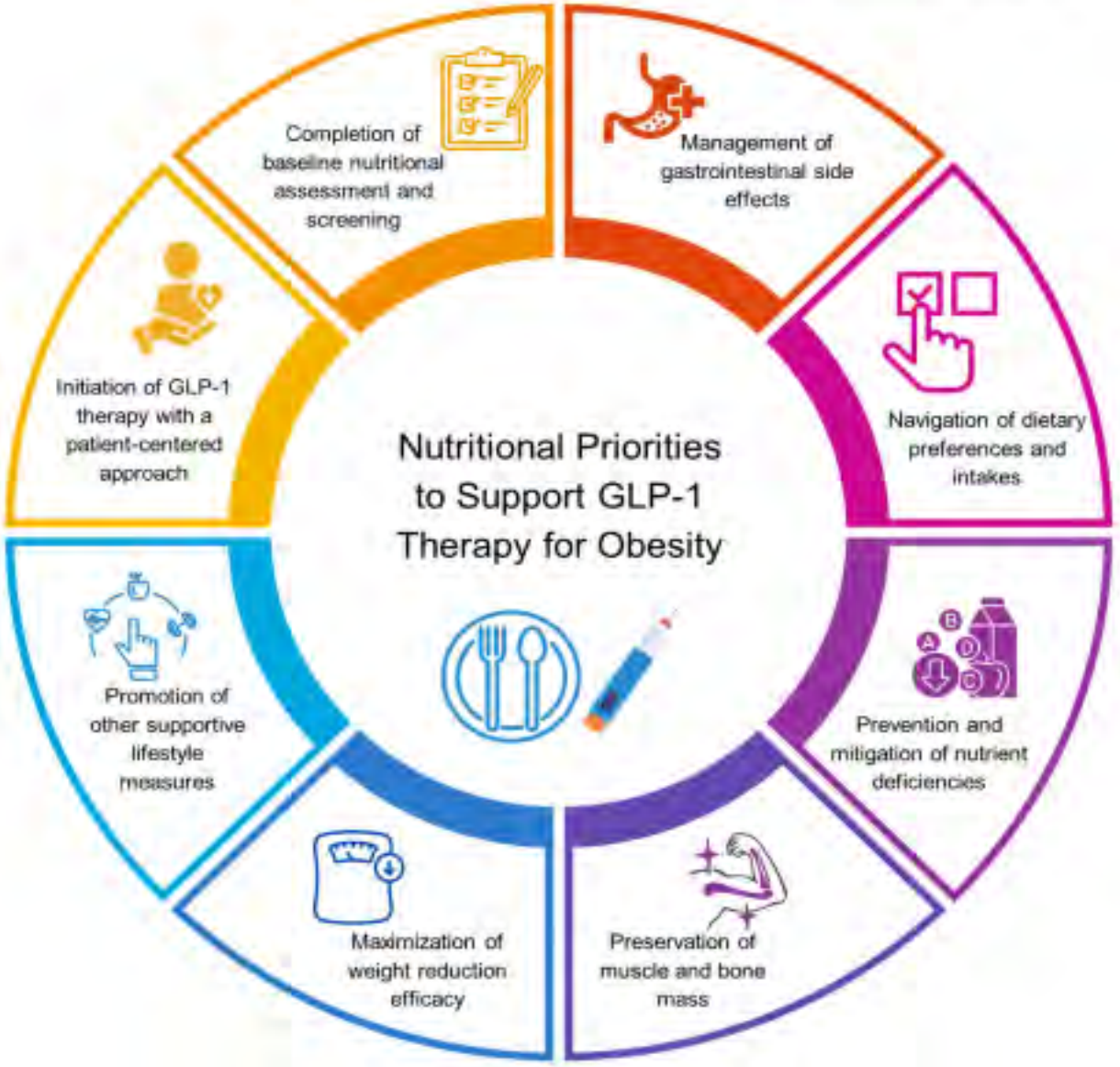

FIGURE 1. Key elements of nutritional priorities to support GLP-1 therapy for obesity.

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Elements of dietary support

- Regular meal patterns
- Lower volume intake
  - Nutrient density
- Lower drive to eat
  - Meal planning
- Shift in focus
  - What else is there beyond *eating for weight loss?*

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Challenges: Dietary Considerations

- Delayed gastric emptying
  - Similar to post-surgical patients (gastric bypass) some specific foods or types of foods may cause discomfort
    - High fat, high sugar
- Nutritional deficiencies due to caloric reduction
  - Iron, calcium
  - Vitamins ADEK are fat soluble
  - Protein drinks contain calcium and vitamins
- Muscle and bone loss
  - Consuming adequate protein does not build muscle (Strength training)
  - Very low calorie intake can decrease movement and exercise

WELCOME to the *Obesity Care in All Ages ECHO*

Session 9 - Metabolic-Bariatric Surgery: Who, When, Why, and Which One?

- November 04th

This ECHO is supported by the Walter and Carole Young Center for Digestive Health

Metabolic Bariatric Surgery: Who, When, Why, and Which One?

Sarah Billmeier MD, MPH

Dartmouth Health

Project ECHO

No Disclosures

Bariatric Surgery is still the best!

Bariatric Surgery: Who Qualifies?

Guidelines (2022 ASMBS/IFSO):

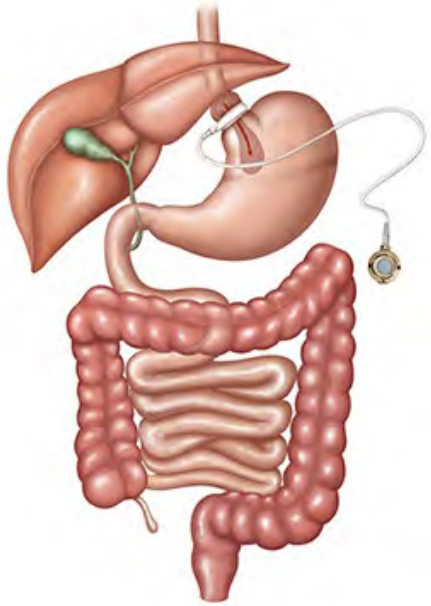
- **All patients w/ BMI ≥ 35**
- **BMI 30 – 34.9 w/ metabolic disease**
- Asian Population w/ ≥ BMI 27.5

What most insurance companies will cover:

- **BMI of ≥ 40 or**
- **BMI of 35 - 39.9 with metabolic disease** (sleep apnea, diabetes, hypertension, others)

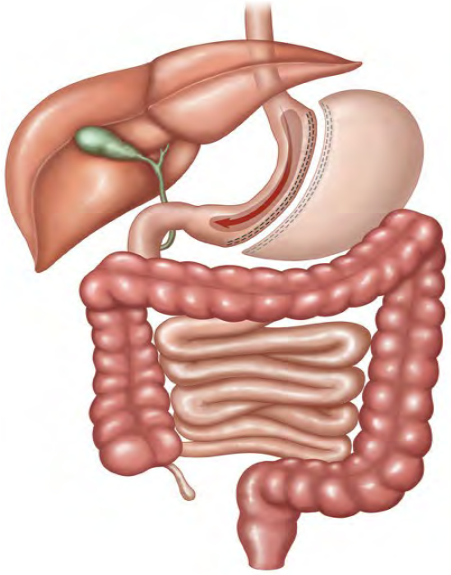
Which One: Bariatric Procedures

Laparoscopic Adjustable Gastric Band



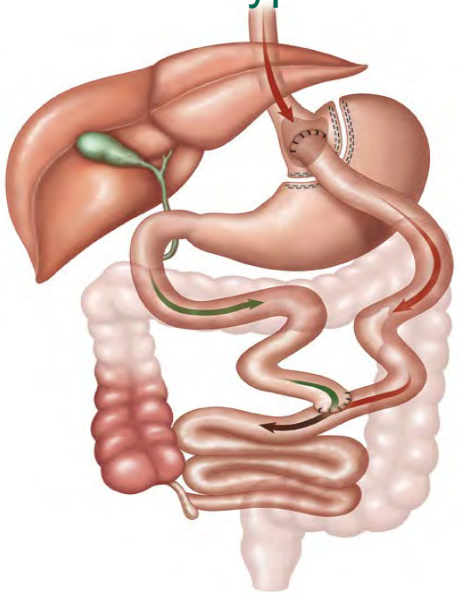
1%

Laparoscopic Sleeve Gastrectomy



69%

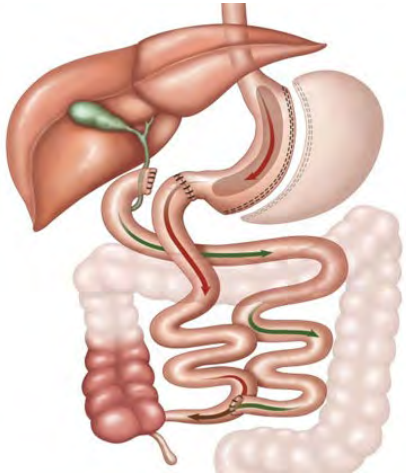
Laparoscopic Roux-en-Y Gastric Bypass



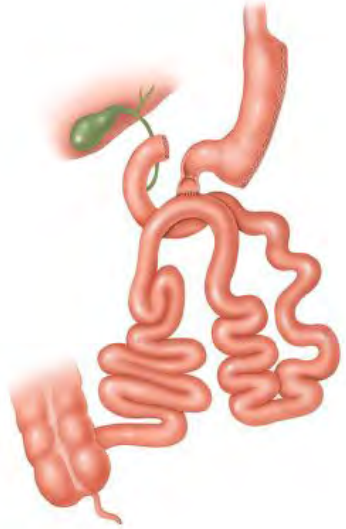
27%

Most Common

Biliopancreatic Diversion with Duodenal Switch



Single Anastomosis Duodenal Ileal Bypass

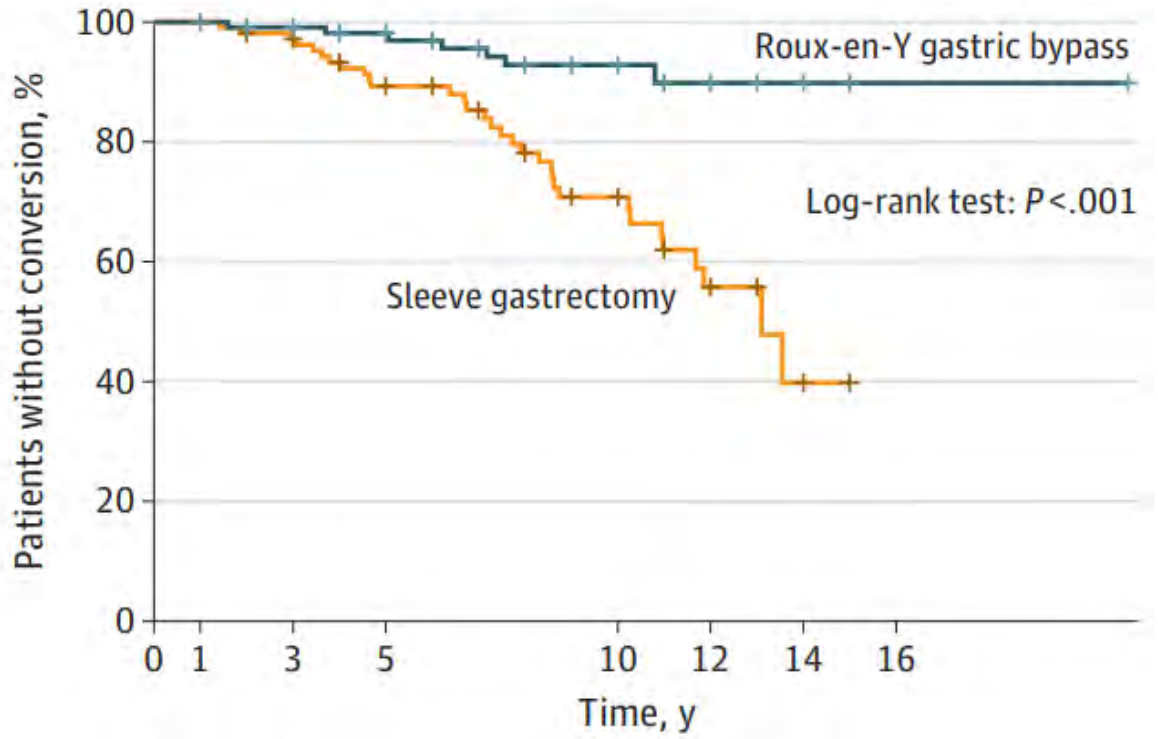


3%

A note on sleeves…

- 1/3 patients develop new GERD after LSG
- SM-BOSS 10+ year follow up
  - Superior weight loss in RYGB group
  - 30% of LSG underwent conversion primarily due to GERD

Figure 3. Time to Conversion Over the Study Period Up to 14 Years



Kraljevic M, Süsstrunk J, Wölnerhanssen BK, et al. Long-Term Outcomes of Laparoscopic Roux-en-Y Gastric Bypass vs Laparoscopic Sleeve Gastrectomy for Obesity: The SM-BOSS Randomized Clinical Trial. JAMA surgery. 2025.

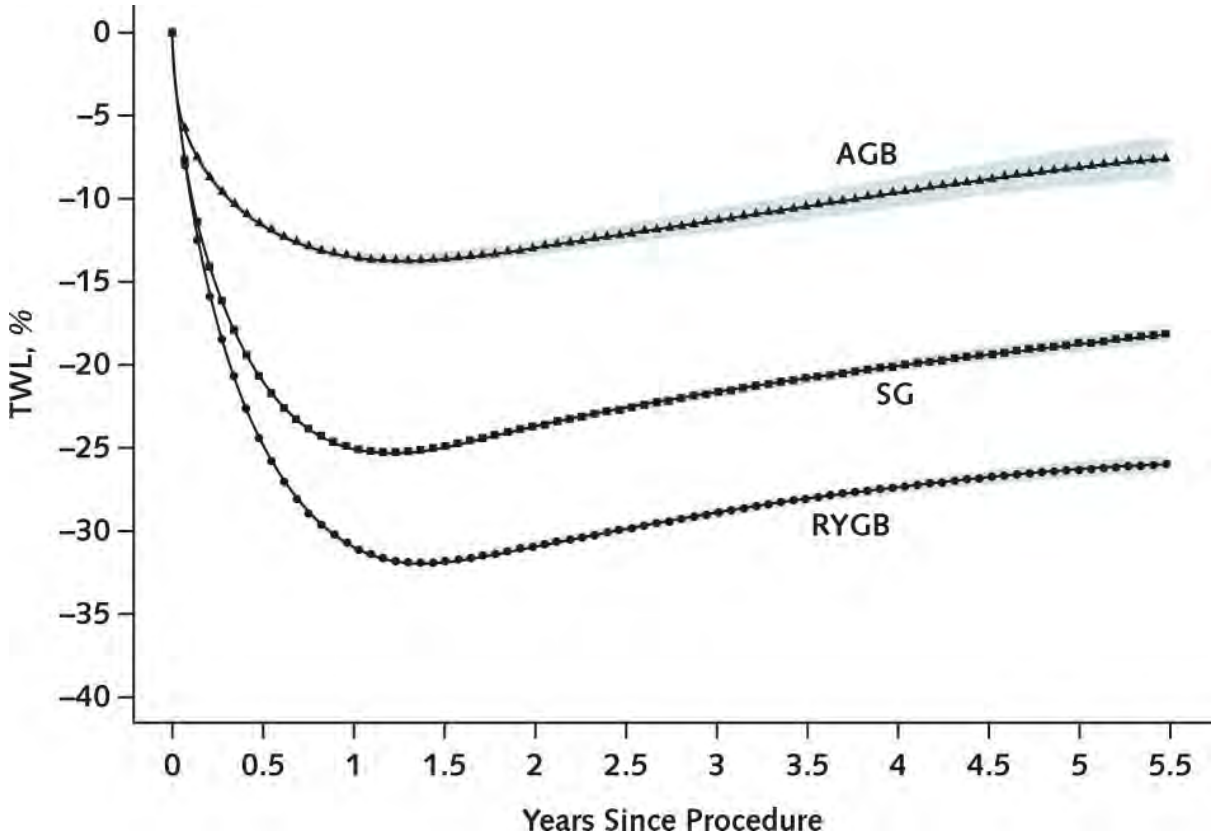
When: Optimal timing?

- Reduction of surgical risk: **preoperative optimization** of medical and mental health comorbidities
- Patient committed to **dietary/lifestyle changes** and lifelong follow-up
- Early surgery likely beneficial prior to development obesity related comorbidities
- In diabetics, **earlier surgery** (especially for duration of diabetes < 8 years) associated with:
  - Higher rates of diabetes remission
  - Better long term glycemic control
  - May prevent progression of diabetes related complications
- Early surgical intervention recommended by American Diabetes Association

Why: Because it works!

- Long-term, sustained weight loss
- Mortality benefit
- Comorbidity reduction/resolution
- Quality of life

Outcomes: Expected Weight Loss



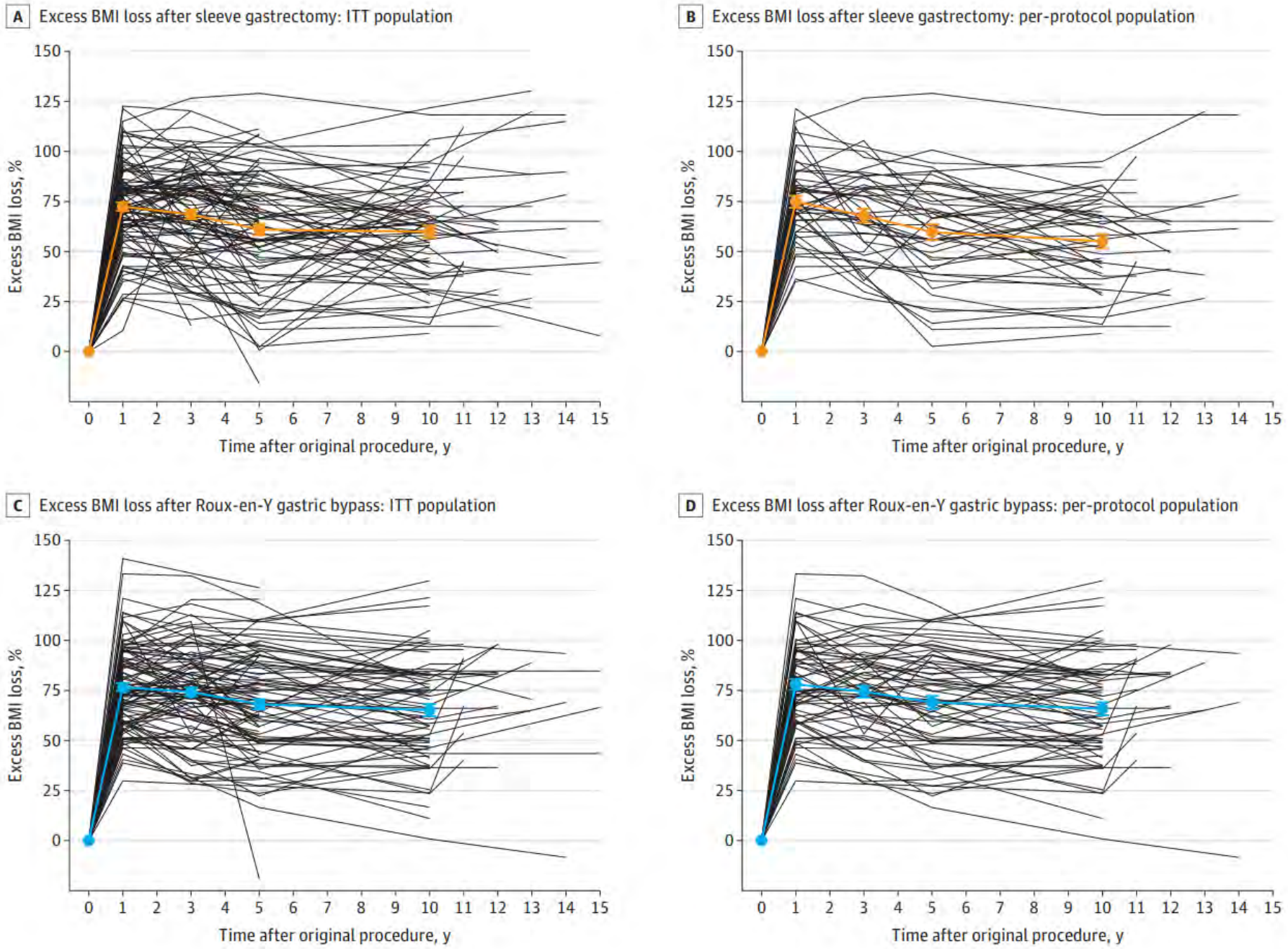
Arterburn et al. Ann Intern Med. 2018; 169(11):741-750

Total body weight loss at 10 years after surgery

- 22% with Sleeve gastrectomy
- 27% with Gastric bypass

Heterogeneity of treatment response

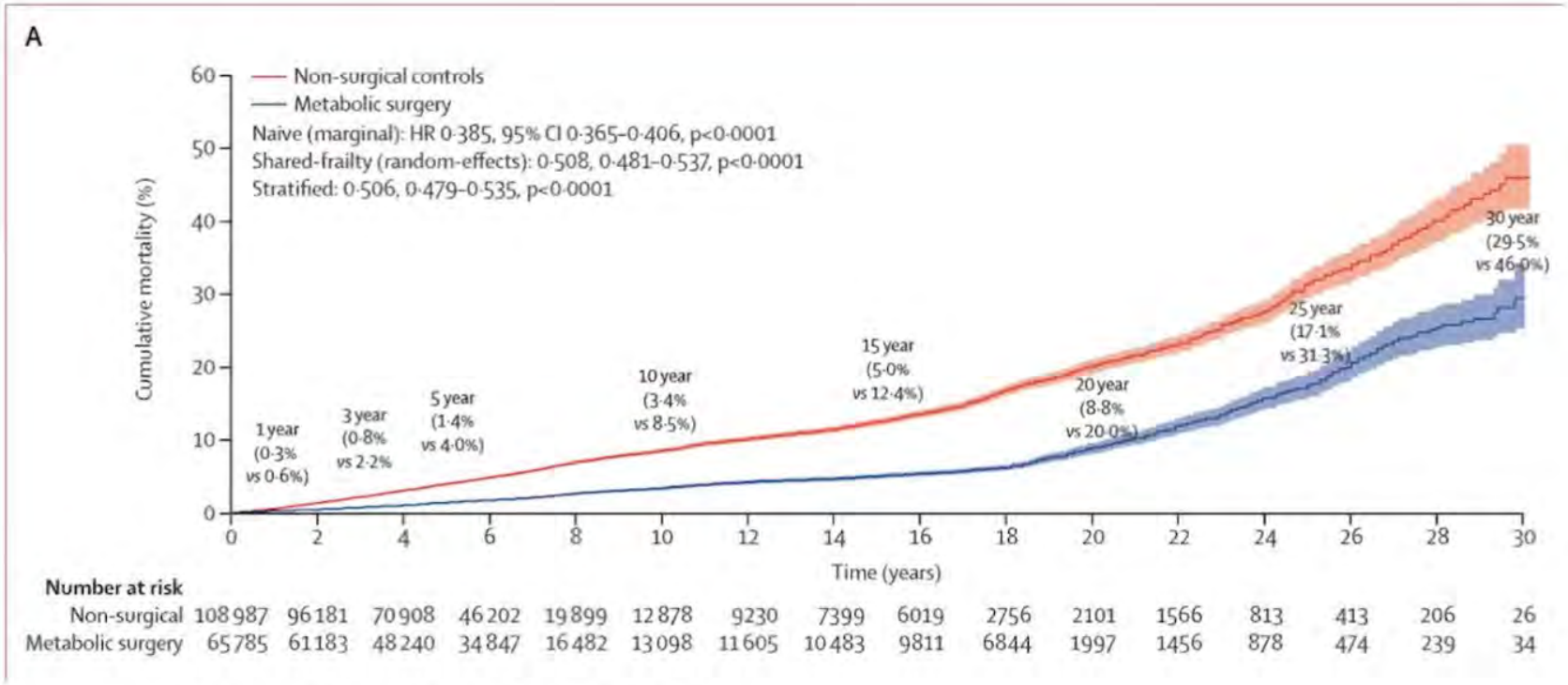
- SM-BOSS trial
- RCT LSG vs LRYGB with 10 year data



Kraljevic M, Süsstrunk J, Wölnerhanssen BK, et al.. JAMA surgery. 2025;160(4):369-377.

49% Mortality Risk Reduction with Bariatric Surgery (n=174,772)

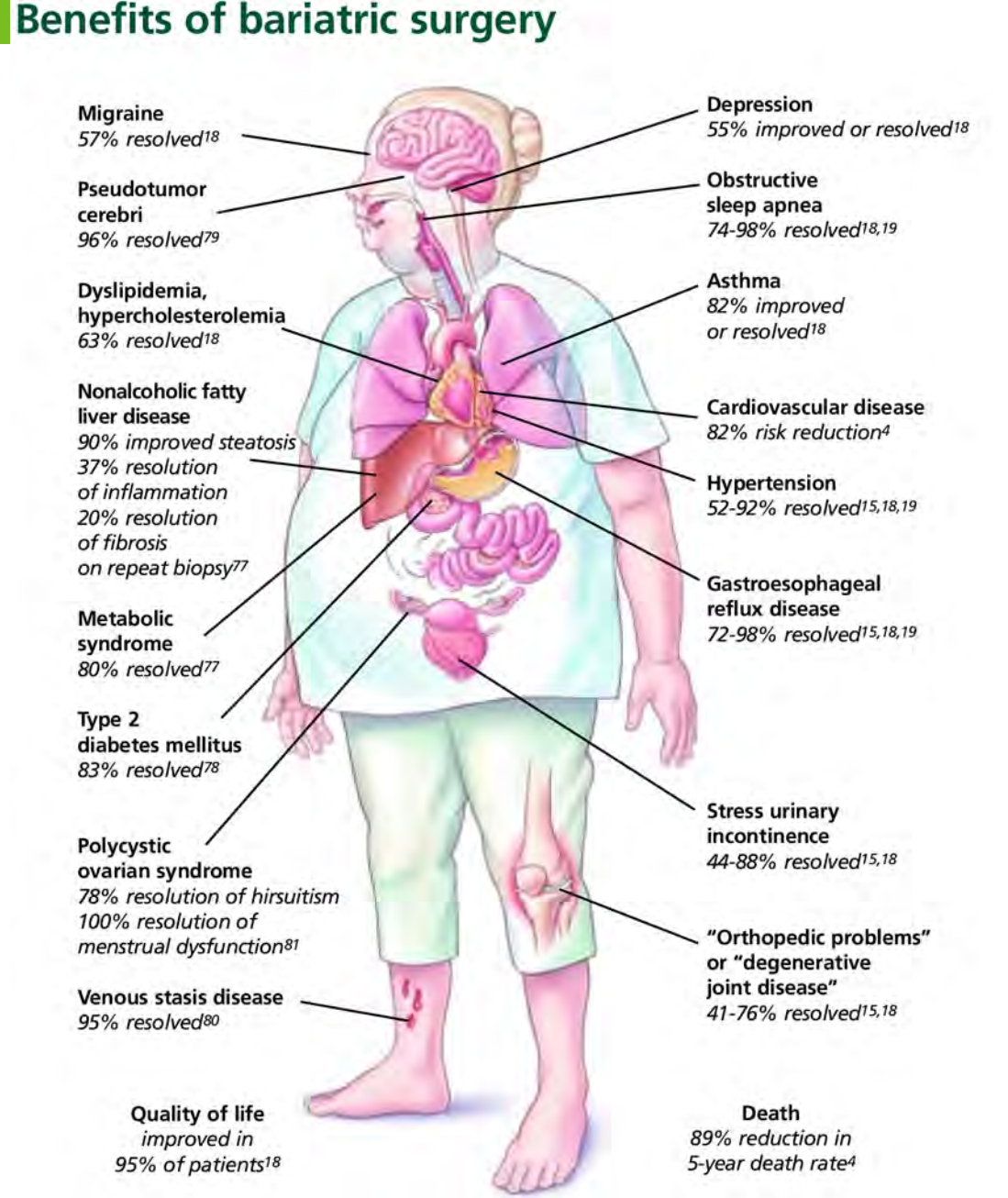
- Meta-analysis of RCTs and high quality matched cohort studies
- Median life expectancy **6.1 years longer** after bariatric surgery



Syn NL et al. Lancet, May 2021

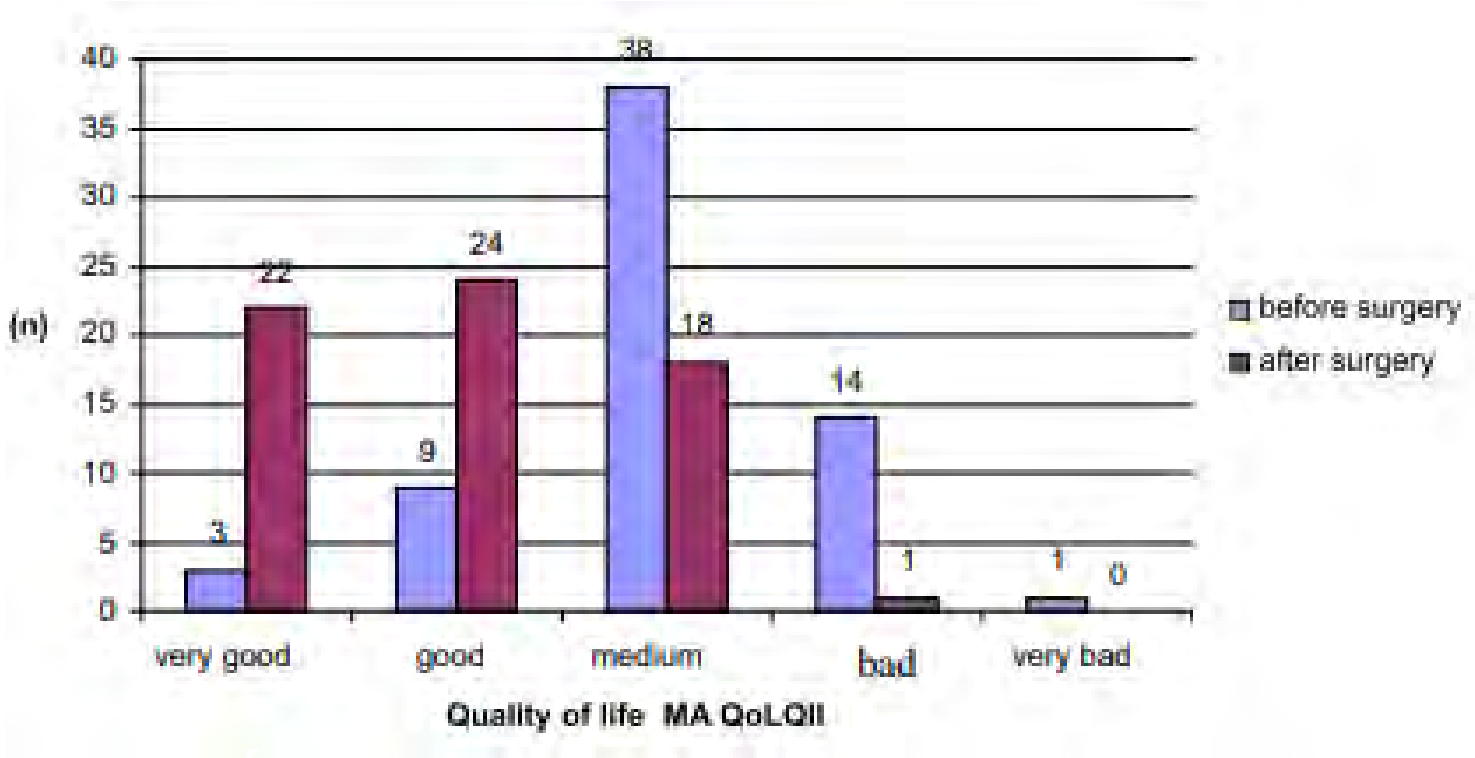
Outcomes: Comorbidities

- Improvement/resolution of:
  - Diabetes
  - Hypertension
  - OSA
  - Dyslipidemia
  - Infertility
- Lower incidence of cardiovascular events
  - MI, stroke, atrial fibrillation
- Lower incidence of cancer, particularly in women



Brethauer, Stacy Alan et al. "Risks and benefits of bariatric surgery: current evidence." *Cleveland Clinic journal of medicine* 73 11 (2006): 993-1007 .

Outcomes: Quality of Life



Major P, et al. Outcomes of Bariatric Surgery: A Systematic Review. *Obes Surg.* 2015

Complications of Surgery Decreasing

Campos et al *Annals of Surgery* • Volume 271, Number 2, February 2020

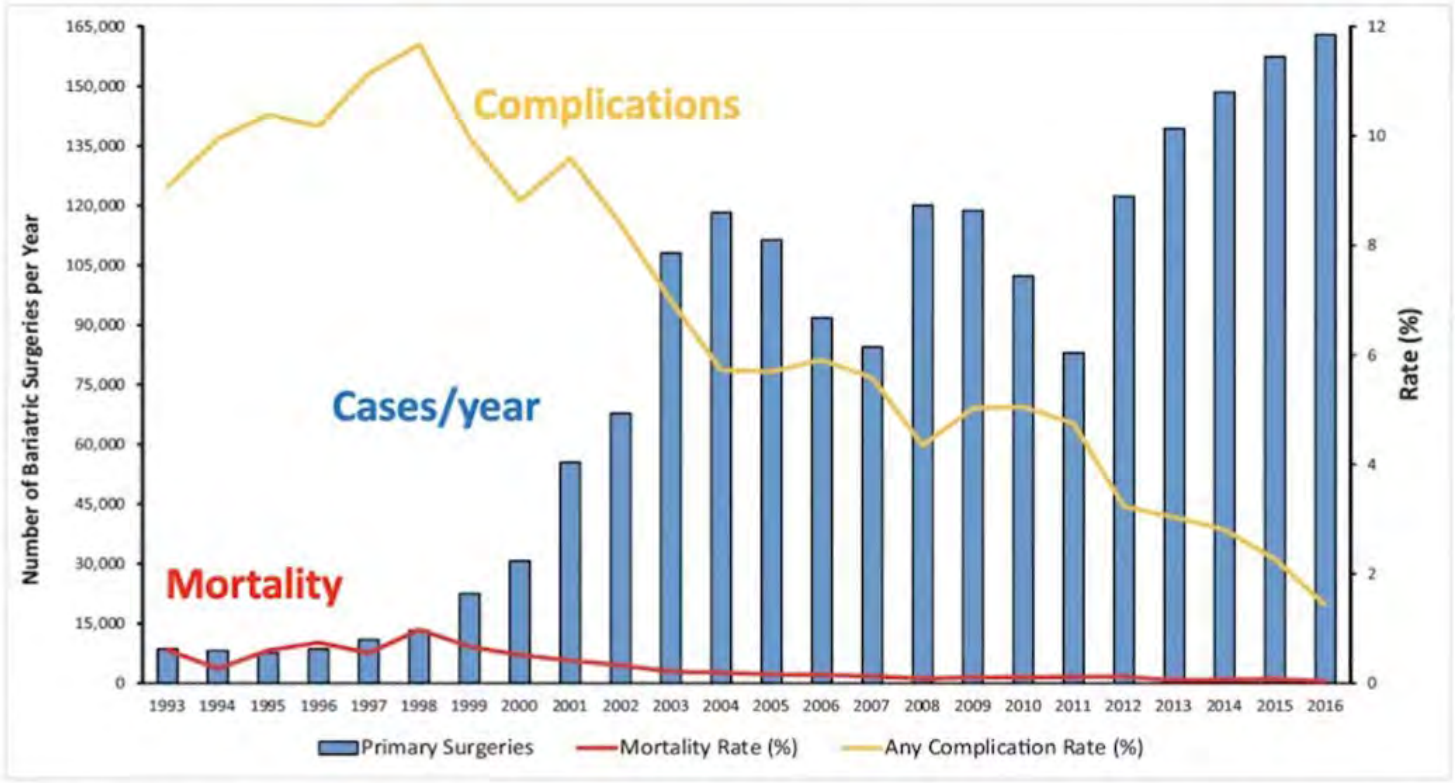
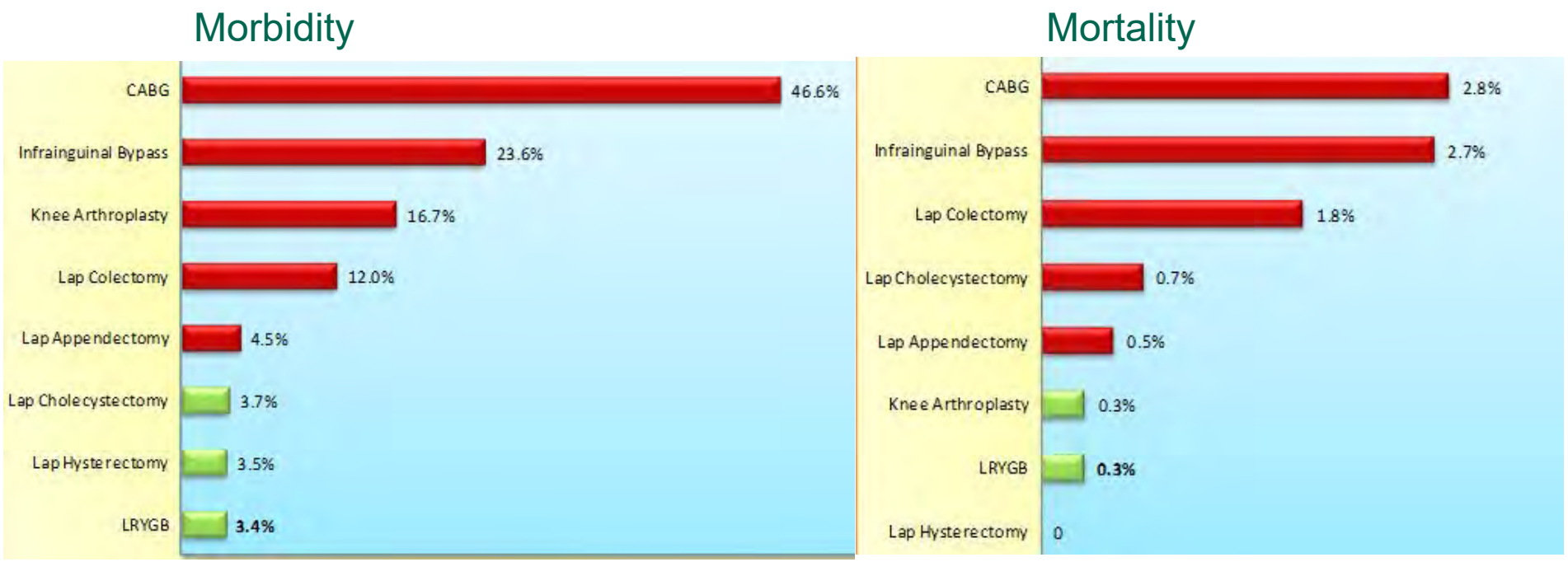


FIGURE 2. Number of inpatient primary bariatric surgery procedures and initial admission complication and mortality rates in the United States from 1993 to 2016.

Comparative Risk of LRYGB



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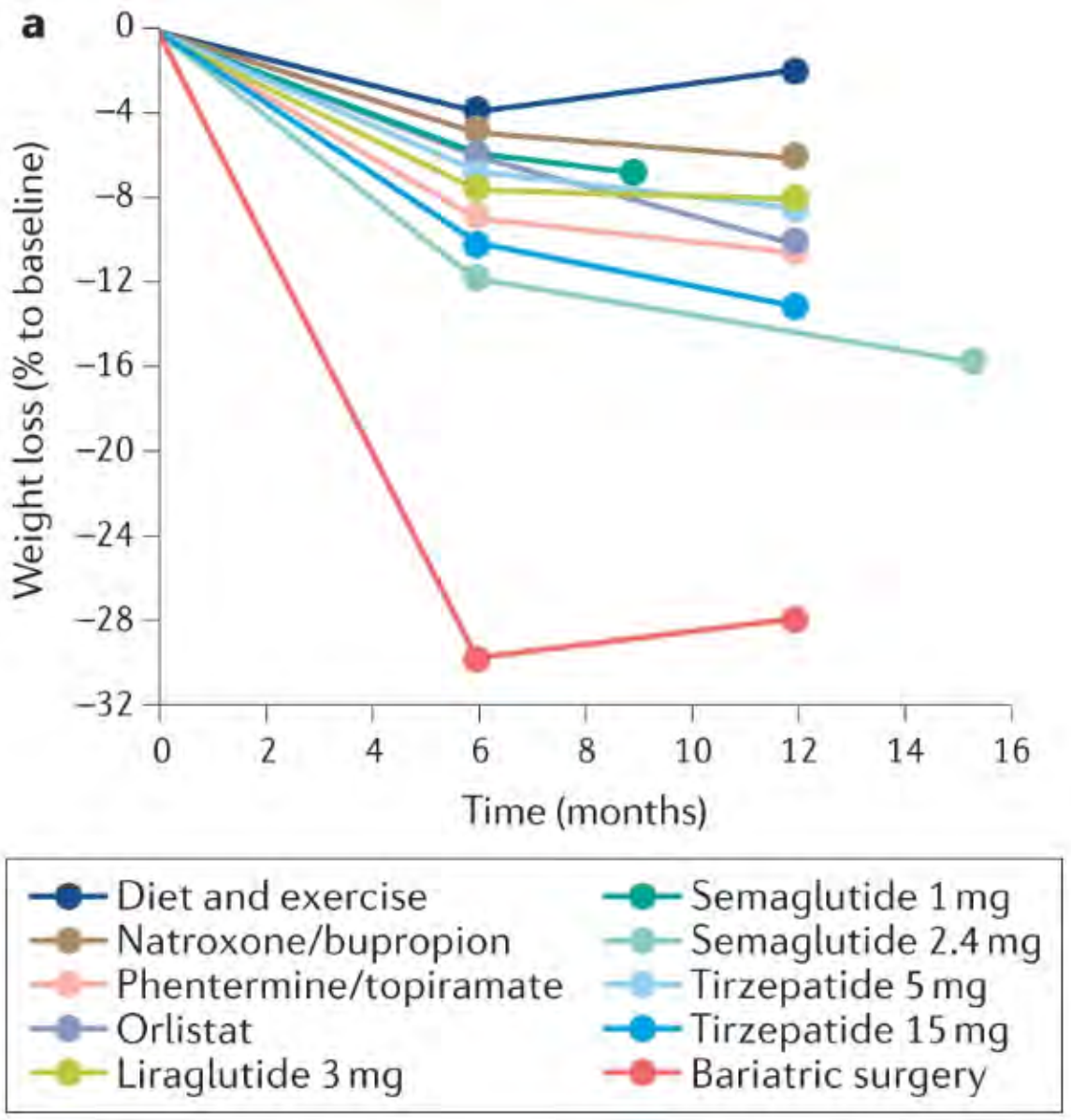
GLP-1 RA vs. MBS: Effectiveness

- Will take time to obtain longer term data

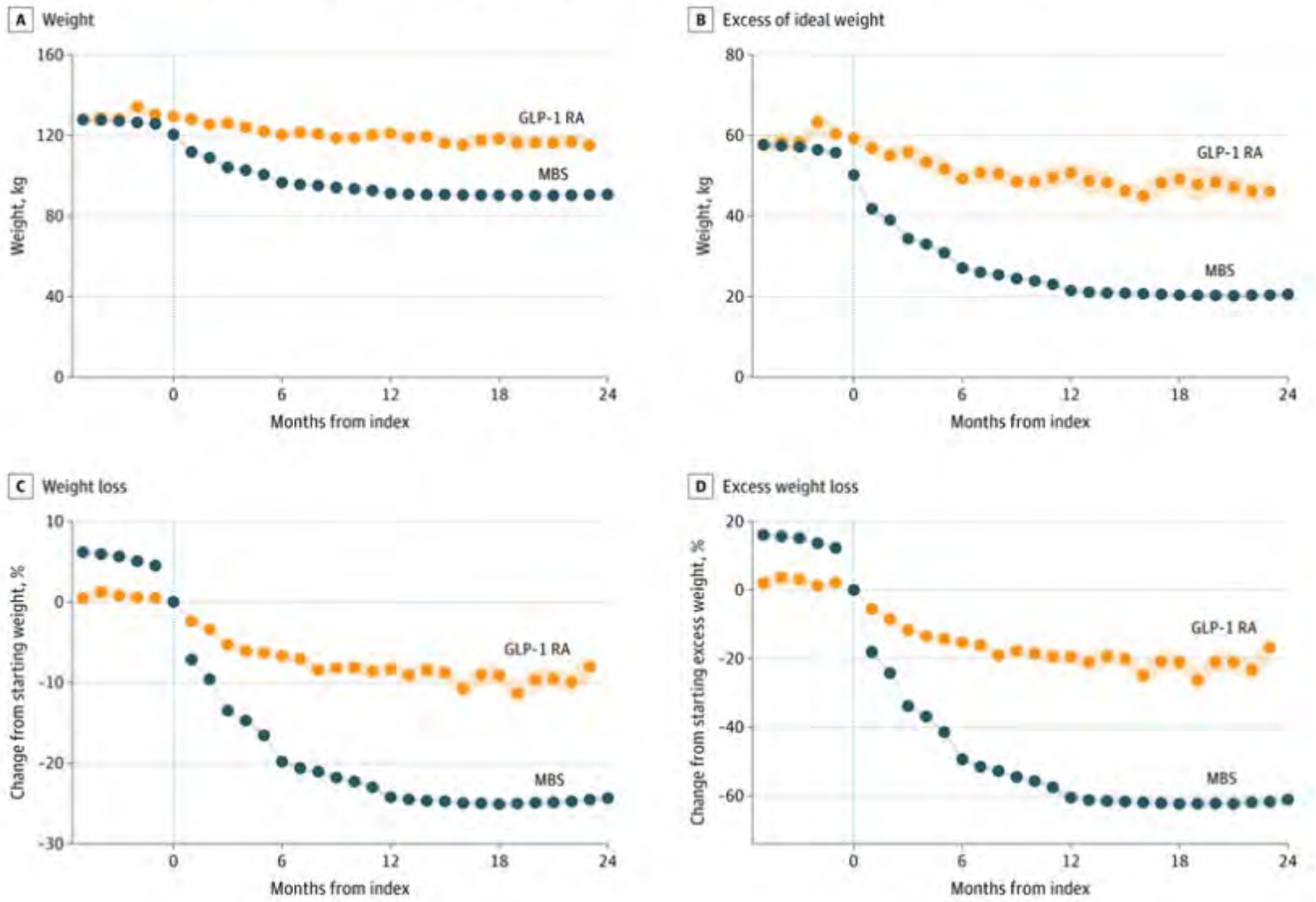


Müller, T.D., Blüher, M., Tschöp, M.H. *et al.* Anti-obesity drug discovery: advances and challenges. *Nat Rev Drug Discov* **21**, 201–223 (2022).

GLP-1 RA vs. MBS: Effectiveness

- Real world data
- 14,101 MBS vs. 16,357 GLP-1 RA w/ filled prescriptions for at least 1 year
- Total weight loss 28.3% MBS vs 10.3% GLP-1

Figure 2. Mean Weight Loss Outcomes at Baseline and During Follow-Up Period for Metabolic Bariatric Surgery (MBS) and Glucagon-Like Peptide-1 Receptor Agonists (GLP-1 RAs)



Barrett TS, Hafermann JO, Richards S, LeJeune K, Eid GM. Obesity Treatment With Bariatric Surgery vs GLP-1 Receptor Agonists. *JAMA Surg.* Published online September 17, 2025.

Summary: Bariatric Surgery vs GLP-1RA Effectiveness

Outcome	Bariatric Surgery	GLP-1 Agonists	References
All-cause mortality	38–62% reduction vs GLP-1; ~50% vs usual care	9–12% reduction vs usual care; less than surgery	[18, 24, 25]
Coronary artery disease	46–54% reduction	Moderate reduction	[18, 26, 27]
Diabetes	~61% reduction, possible remission	7-fold reduction in incidence, improved control	[18, 27, 28]
Hypertension	~64% reduction	23% reduction, improved BP	[12, 18, 27, 28]
Dyslipidemia	~67% reduction	Improved lipid profile, less than surgery	[12, 18, 27]
Cancer	Reduced incidence and mortality	Possible reduction, less robust data	[27, 29]
Weight loss	25–30% (durable)	15–20% (requires ongoing therapy), less in real word data	[28, 30-32]

GLP-1 RA vs MBS: Cost effectiveness

Table 2 Time needed for GLP-1 s to break even with bariatric surgery

From: A cost comparison of GLP-1 receptor agonists and bariatric surgery: what is the break even point?

Drug	Sleeve gastrectomy	RYGB
Wegovy	8.93 months	10.72 months
Saxenda	8.96 months	10.75 months
Victoza	10.72 months	12.86 months
Mounjaro	12.27 months	14.72 months
Ozempic	13.20 months	15.84 months
Trulicity	13.59 months	16.31 months
Byetta	15.23 months	18.28 months

Docimo, S., Shah, J., Warren, G. *et al.* A cost comparison of GLP-1 receptor agonists and bariatric surgery: what is the break even point?. *Surg Endosc* **38**, 6560–6565 (2024).

GLP-1 RA vs MBS: Cost effectiveness

- $63,483 after 2 years for GLP-1 RA vs. $51,794 for MBS

Barrett TS, Hafermann JO, Richards S, LeJeune K, Eid GM. Obesity Treatment With Bariatric Surgery vs GLP-1 Receptor Agonists. *JAMA Surg*. Published online September 17, 2025.

Table 1. Propensity Score-Weighted Costs per Month for GLP-1 RA and MBS Groups

Table 1. Propensity Score-Weighted Costs per Month for GLP-1 RA and MBS Groups

Outcome	Cost, mean (SE), $ GLP-1 RAs (n = 16 357)	MBS (n = 14 101)	Difference, $	*P* value
Total costs per month				
Baseline	1601.32 (97.27)	1673.29 (102.59)	−72.06	.61
0-1 y	2841.83 (130.29)[a]	3161.49 (143.63)[a]	−319.66	.10
1-2 y	2448.42 (27.46)[a]	1154.68 (85.82)[a]	1293.74	<.001
Pharmacy costs per month				
Baseline	664.90 (63.36)	198.95 (35.96)	465.95	<.001
0-1 y	1861.15 (106.00)[a]	132.58 (29.35)[b]	1728.57	<.001
1-2 y	1551.03 (99.26)[a]	114.57 (27.66)[b]	1436.46	<.001
Medical costs per month				
Baseline	934.58 (73.48)	1427.97 (93.75)	−493.39	<.001
0-1 y	1018.67 (76.78)[b]	2914.44 (138.11)[a]	−1895.77	<.001
1-2 y	984.61 (77.40)[b]	1005.76 (79.02)[a]	−21.15	.85
Costs over 2-y follow-up period				
Total costs	63 483.00 (946.50)	51 794.04 (1376.70)	11 688.96	<.001
Pharmacy costs,	40 946.16 (1231.56)	2965.80 (342.06)	37 980.36	<.001
Medical costs	24 039.36 (925.08)	47 042.40 (1302.78)	−23 003.04	<.001

Trends in Utilization 2022-2023: US Non-Diabetic Population

- ↑ GLP1-RA use 132.6%
- ↓ Bariatric Surgery 25%
- GLP1-Agonists > 25 times more common than MBS (in insured adult population without diabetes)
- MBS patients medically more complex

Table. Characteristics of Patients Without Diabetes Prescribed GLP-1 RA, Undergoing Metabolic Bariatric Surgery, or Neither in 2023

Characteristic	Patients, No. (%) (N = 13 448 870)[a]			P value
	Metabolic bariatric surgery (n = 4662)	GLP-1 RA prescription (n = 58 193)	Neither treatment (n = 13 386 015)[b]	
Age, y				
18-35	863 (17.9)	6976 (12.0)	3 718 580 (27.8)	<.001
36-50	1624 (33.6)	16 683 (28.6)	2 928 520 (21.9)	
51-65	1151 (23.8)	17 323 (29.7)	2 637 300 (19.7)	
≥66	1024 (21.2)	17 211 (29.5)	4 101 620 (30.6)	
Sex[c]				
Female	3681 (76.2)	44 858 (76.9)	6 939 920 (51.8)	<.001
Male	977 (20.2)	13 294 (22.8)	6 435 320 (48.1)	
Unknown	4 (0.1)	41 (0.1)	10 780 (0.1)	
Comorbidities, No.				
0	482 (10.0)	17 397 (29.8)	7 867 380 (58.8)	<.001
1	1171 (24.2)	19 333 (33.1)	2 932 120 (21.9)	
2-3	2146 (44.4)	17 420 (29.8)	1 952 940 (14.6)	
≥4	863 (17.9)	4043 (6.9)	633 580 (4.7)	

Lin K, Mehrotra A, Tsai TC. Metabolic Bariatric Surgery in the Era of GLP-1 Receptor Agonists for Obesity Management. *JAMA Netw Open.* 2024;7(10):e2441380. doi:10.1001/jamanetworkopen.2024.41380

Conclusion

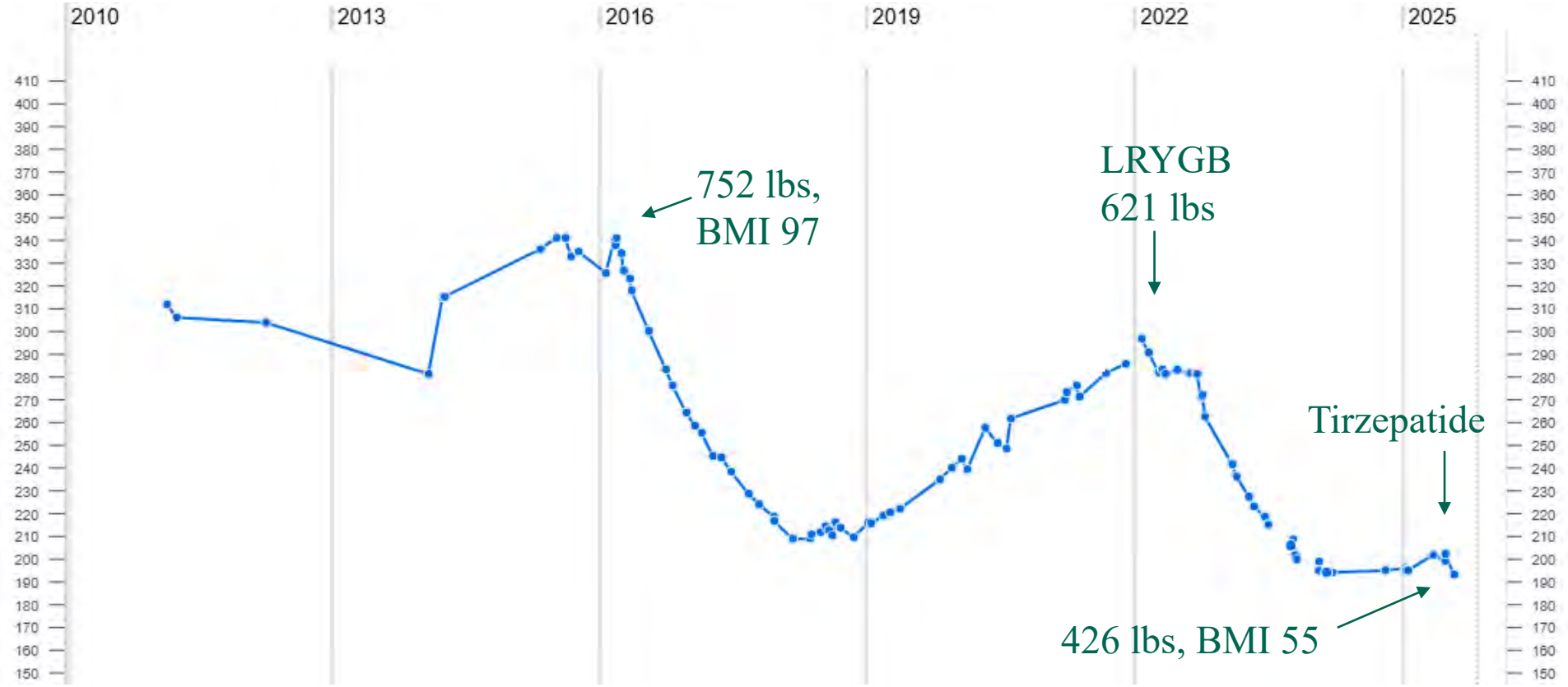
- Bariatric surgery **superior** to GLP1-RA in all examined outcomes
- EXCEPT in patient and referring clinician preferences?

Case Presentation

RH

Case Presentation

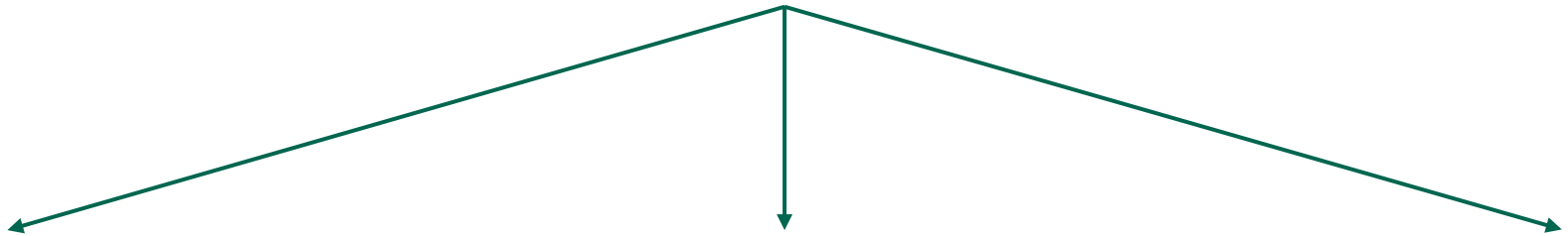
- RH – 43 yo M with obesity, MASH, preDM, OSA AHI 149, hypertension, depression



Case Presentation

- >200 lbs at age 13
- Respiratory failure in 2009
- Interest in Bariatric surgery 2014
- Worked with the Weight Center since 2016
  - Dietary and lifestyle changes
  - AOM HX: buproprion, naltrexone, topiramate, phentermine, GLP1 RA, metformin
    - Ozempic -> diarrhea
- LRYGB in 2022. Good response, persistent severe obesity
    - Denied: Mounjaro, Trulicity
    - Started Zepbound

Persistent Severe Obesity after MBS



Initial suboptimal response

Good response. Persistent obesity due to high baseline BMI

Initial good response, then weight regain

Multimodal therapy – Surgery + Meds

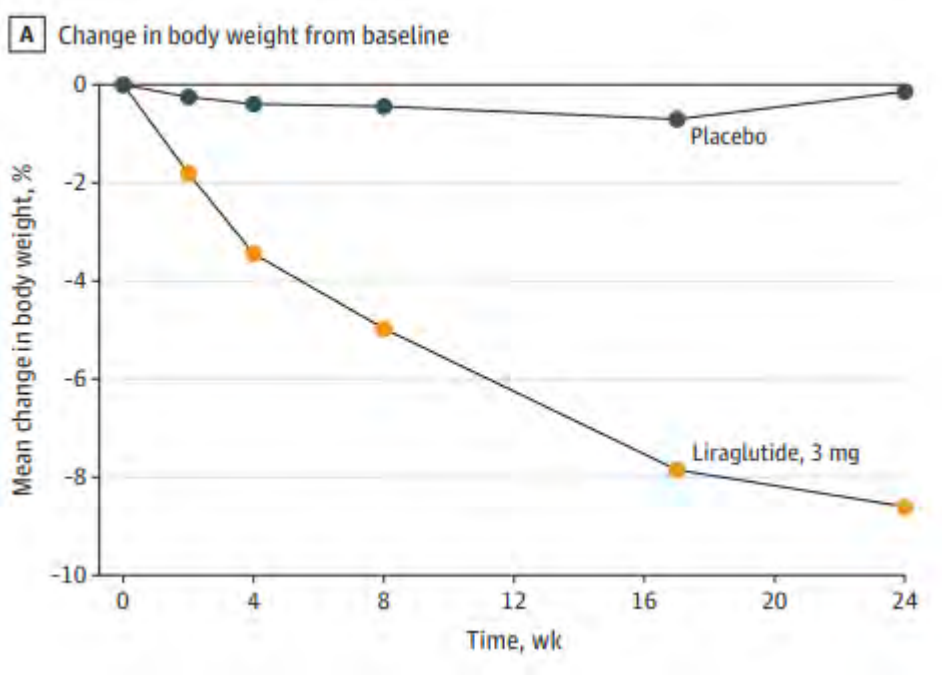
- Persistent severe obesity after bariatric surgery
  - Fasting and post-prandial GLP1 levels lower in obesity (pre surgery)
  - Postoperative GLP1, PYY increased after RYGB/LSG surgery, ghrelin decreased
  - Higher GLP1 levels associated with more robust weight loss
  - Hormonal changes less robust/durable with LSG

Basaran. International J of Obesity 2024

But so many unanswered questions…

Are GLP-1 RA effective for weight regain/inadequate weight loss after MBS?

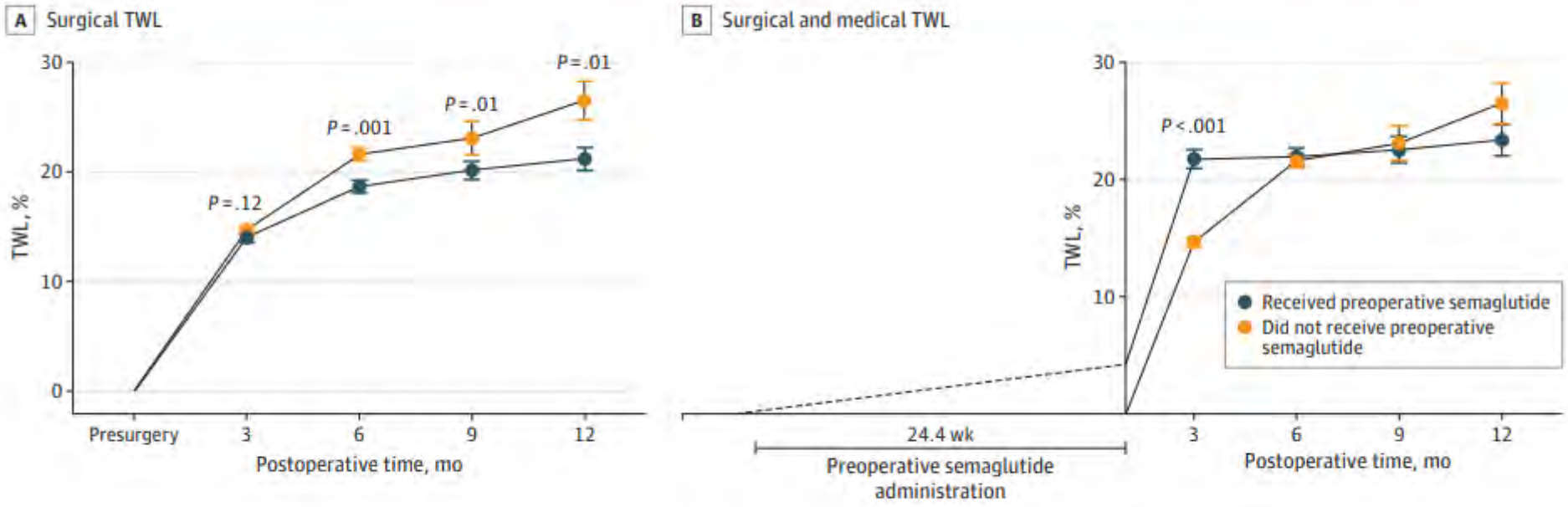
- BARI-OPTIMISE RCT
- 1 year postop – Mostly LSG patients with <20% WL, low post prandial GLP-1 levels
- 8.8 vs 0.5% weight loss at 24 weeks



Mok, Jama Surgery, 2023

How does preoperative semaglutide impact weight loss after surgery?

Figure. Surgical and Multimodality Total Weight Loss (TWL) in Patients Who Received vs Did Not Receive Preoperative Semaglutide



A, Surgical TWL was calculated using weight immediately prior to surgery as the baseline. B, In patients who received preoperative semaglutide, multimodality TWL was calculated using weight at the time of semaglutide initiation as the baseline.

- Retrospective, 364 patients, mostly LSG
- Surgical weight loss lower after neoadjuvant semaglutide

Mathur, Jama Surgery, March 2025

Current ClinicalTrials.gov

- Preoperative GLP-1 RA undergoing MBS → stop vs. continue GLP-1 RA
- MBS vs. semaglutide vs. tirzepatide
- MBS with inadequate weight loss → semaglutide vs. placebo (Multiple trials)
- Teens undergoing LSG with inadequate weight loss → semaglutide vs. placebo

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WELCOME to the *Obesity Care in All Ages ECHO*

Session 10 - Improving Equitable Access to Obesity Care - November 18th

This ECHO is supported by the Walter and Carole Young Center for Digestive Health

Improving Equitable Access to Obesity Care

Elaine S Banerjee, MD, MPH

Disclosures

I have no relevant conflicts of interest to disclose

Objectives

- By the end of this presentation, participants should be able to:
  - Describe challenges to equitable care for obesity
  - Identify opportunities to improve access to obesity treatment in the clinical setting
  - Identify opportunities to improve access to obesity treatment at the population level

Stigma

Bias and Stigma

- “Bias is described as having negative beliefs and attitudes toward people living with overweight and obesity. It is theoretically understood as originating from false and negative attributions around the causality and controllability of weight.”
- “Weight stigma is…manifested through actions that can be exclusionary and discriminatory resulting in the devaluation and marginalization of people living with obesity.”

Ryan L, et al. Weight stigma experienced by patients with obesity in healthcare settings: A qualitative evidence synthesis. Obesity Reviews. 2023;24:e13606.

Weight Stigma in Healthcare

- Disrespectful dialog and facial expressions
- Physicians being unwilling to perform a physical exam
- Dismissal of concerns
- Refusal of care
- Receiving unsolicited advice
- Receiving outdated or unhelpful advice
- Equipment that does not accommodate patients

Ryan L, et al. Weight stigma experienced by patients with obesity in healthcare settings: A qualitative evidence synthesis. Obesity Reviews. 2023;24:e13606.
Crompvoets PI, et al. Perceived weight stigma in healthcare settings among adults living with obesity: A cross-sectional investigation of the relationship with patient characteristics and person-centered care. Health Expectations. 2024;27:e13954.

Weight Stigma in Healthcare

- Weight stigma is associated with worse physical and psychological outcomes
- Weight stigma increases morbidity and mortality independent of BMI

Ryan L, et al. Weight stigma experienced by patients with obesity in healthcare settings: A qualitative evidence synthesis. Obesity Reviews. 2023;24:e13606.
Murillo AZ, Rodriguez JS. The role of artificial intelligence in reducing obesity stigma in healthcare. Medicina Clinica. 2025;165:107157.

When patients experience Stigma in Healthcare:

- High stress levels
- Avoidance of health care
- May not recall advice or instructions
- Poorer adherence to treatments
- LESS likely to achieve successful weight loss

Remmert JE, et al. Stigmatizing weight experiences in health care: Associations with BMI and eating behaviors. Obes Sci Pract. 2019;5:555-563.

Strategies to Reduce Weight Stigma in Healthcare

- Education
  - Cause and controllability
  - Cultural norms
- Empathy
- Person first language
- Focusing on the patient's concern
- Welcoming clinic environment
- Separating healthy behaviors from weight outcomes
- Motivational interviewing
  - Encouraging feasible behaviors

Murillo AZ, Rodriguez JS. The role of artificial intelligence in reducing obesity stigma in healthcare. Medicina Clinica. 2025;165:107157.
Phelan SM, et al. Impact of weight bias and stigma on quality of care and outcomes for patients with obesity. Obesity Reviews. 2015;16:319-326.
Talumaa B, et al. Effective strategies in ending weight stigma in healthcare. Obesity Reviews. 2022;23:e13494.

Social Determinants of Health

SDOH

- Economic stability
- Neighborhood and physical environment
- Food insecurity
- Education
- Health care system

Javed Z, et al. Social determinants of health and obesity: Findings from a national study of US adults. Obesity. 2022;30:491-502.

SDOH and Obesity

- Patients in the lowest SDOH quartile were more likely to have obesity than those in the highest quartile, and were 70% more likely to have class 3 obesity

Javed Z, et al. Social determinants of health and obesity: Findings from a national study of US adults. Obesity. 2022;30:491-502.

Access to Care

Access to Any Care

- Insurance coverage
- Rural health
- TH access

Treatment of Obesity in Primary Care

- You are part of the solution right now!
- More education in training
- Referrals
- E-consults

Dartmouth Health

Project ECHO

Advocacy

•Commercial insurance and CMS

- Access to care
- Medication coverage
- Coverage for endoscopic procedures
- Surgery coverage, access, and requirements

Medication access

Non-GLP-1 Medication Access

- Co-prescribing generic medications off-label when combinations are not covered
- Coverage for other conditions:
  - Topiramate for migraine and seizure disorders
  - Bupropion for depression and smoking
  - Naltrexone for alcohol use disorder
  - Metformin for prediabetes or impaired glucose tolerance

GLP-1 Access – Coverage for non-weight-related conditions

- Moderate and severe OSA
- MASLD with F2-3 fibrosis
- CAD

GLP-1 Access – Self-pay options

- Novocares for wegovy $499/month
- Lilly Direct for zepbound via vial and syringe $499/month ($350 for 2.5mg dose)
- Costco pharmacy has similar pricing

- Not equitable!

GLP-1 Access “Most-favored-nation pricing ”

- According to the white house, through TrumpRx:
  - Ozempic and wegovy will be $350/month
  - Zepbound and Orforglipron will be $346/month
  - Other oral medications in the future will be $150/month
  - Medicare and Medicaid programs will be able to purchase Ozempic, wegovy, mounjaro, and zepbound for $245/month
    - Medicare beneficiaries will pay of copay of $50/month
- Expected by January for out-of-pocket and mid-2026 for Medicare & Medicaid

https://www.whitehouse.gov/fact-sheets/2025/11/fact-sheet-president-donald-j-trump-announces-major-developments-in-bringing-most-favored-nation-pricing-to-american-patients/

GLP-1 Access –Company sponsored programs

- Novocares program for Ozempic
  - Patients with Medicare, no Medicaid coverage, and no part D
  - <200% of the poverty level

GLP-1 coverage – International picture

- Of 13 high income countries reviewed, only 4 countries have a national plan that includes coverage for GLP-1 receptor agonists for obesity
- France:
  - BMI >35 kg/m^2
  - Only patients younger than 65 years old
- Iceland
  - BMI >45 kg/m^2 or BMI >35 kg/m^2 and severe comorbidity
  - 5% weight loss at 6 months, 10% weight loss at 12 months, 15% weight loss at 18 months
- UK:
  - Requires diet and exercise counseling for any anti-obesity medication
  - GLP-1 RAs can only be prescribed by obesity specialists at obesity medicine practices

Dellgren JL, Persad G, Emanuel EJ. International coverage of GLP-1 receptor agonists: a review and ethical analysis of discordant approaches. Lancet. 2024;404:902-906.

GLP-1 coverage – Recommendations

- “Use up-to-date cost-effectiveness analysis
- Lower prices while preserving long-term innovation incentives
- Set priorities rather than issuing blanket denials
- Treat high-cost obesity drugs in the same way as high-cost drugs for other conditions”

  “Perhaps latent bias against people with obesity is motivating the scarce coverage. People who consider obesity a consequence of personal choices might be unwilling to use public funds to reimburse a costly medication, even if costly medications are covered for other conditions that result from personal choices, including some cancers and cardiovascular conditions”

These recommendations are quoted directly from: Dellgren JL, Persad G, Emanuel EJ. International coverage of GLP-1 receptor agonists: a review and ethical analysis of discordant approaches. Lancet. 2024;404:902-906.

Case 1

- 35 year old with history of roux en y gastric bypass 8/6/2019 presents in follow up with low blood sugar and concerns about her weight. History of Class III, stage III obesity with complications including MASLD, PCOS, GERD with pre-surgery weight 357 lbs, BMI 54.44, current weight 146 lbs BMI 21.9 (57% total body weight loss". Wants to lose '5 more pounds' to be more satisfied for her weight. No hunger cues, 'forgets to eat'. Eliminates carbohydrates due to history of PCOS and did fasting behavior presurvey. Does some food avoidance and restricting due to 'dumping syndrome'
- Assessment: Concern for restrictive eating behavior.
- Plan: Referral to program psychologist and nutritionist

Health Psychologist

- Assessment:
  - Severe restrictive eating. Negative relationship with body and food at young age. Current active restriction and purging several times a week with self induced vomiting and using milk of magnesium. Weighing several times a day. Severe fear of weight gain and overvaluation of weight and shape with self-esteem.
  - Regrets meeting with physician for hypoglycemia, as wants to keep these behaviors 'secret' from team.
  - Discloses this restrictive behavior was present pre-surgery, but didn't report extent of problems
  - Recommend inpatient treatment which was refused due to previous bad experience and lack of other treatment choices
  - Patient lost to follow up

Return to clinic

- Lost to follow up until May of 2024 s/p birth of two children and wanting to get into space of ‘more health eating patterns. Fear of being judged and been seen as failure as weight has increased.
- Worked with program psychologist for disordered eating and nutritionist and restrictive behaviors in remission. Has stopped purging, increased frequent of eating episodes and decrease fear of gaining weight and body checking.
- Started on GLP1 agonist for past year without relapsing of restrictive eating behaviors and is successfully in remission from obesity.

Up Next

- Thank You!
- Please take our post-course survey: https://redcap.hitchcock.org/redcap/surveys/?s=PFYR9N9WH9LC7YN7
- Recordings will be posted on the D-H ECHO website https://www.dartmouth-hitchcock.org/project-echo/enduring-echo-materials