

# Pharmacotherapy for Treatment of Pediatric Obesity

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Claudia K. Fox, MD, MPH, ABOM  
Associate Professor of Pediatrics  
Co-Director, Center for Pediatric Obesity Medicine  
University of Minnesota

# Disclosures

- I serve as a site PI for clinical trials sponsored by Novo Nordisk and Eli Lilly

# Objectives

- Understand rationale for using obesity medications.
- Know indications for using obesity medications in the pediatric population.
- Know mechanisms of action and outcomes of newly FDA approved obesity medications.

what  
how  
when



where  
why  
who

# CAUSES OF OBESITY



**excess eating and limited activity** —————> **obesity**



**excess eating and limited activity** ← **obesity**

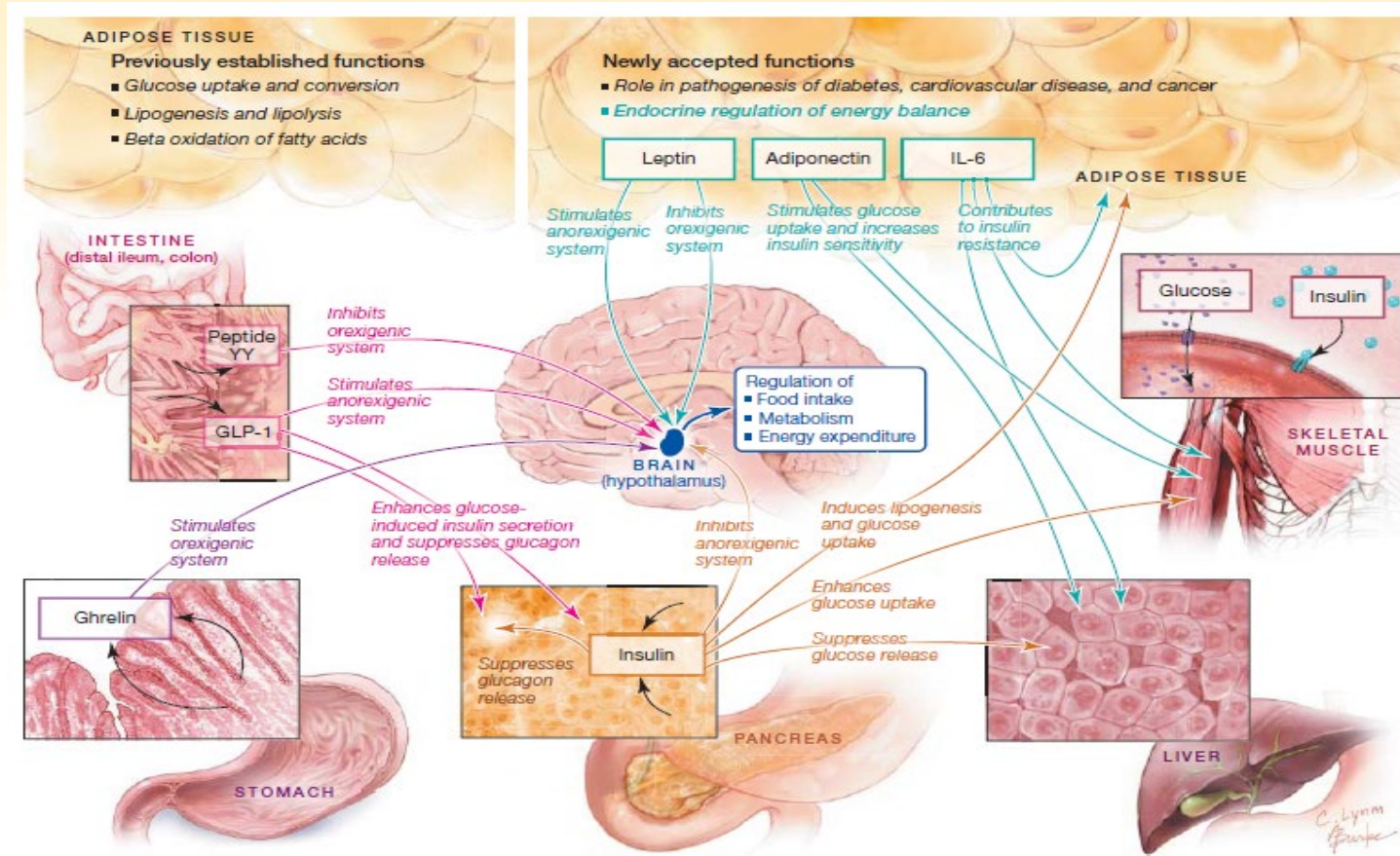
# Physiology of Body Weight Regulation

- Human body is designed to self regulate all physiological processes through sensing internal and external environment and then adjusting through feedback loops
  - Respirations
  - Body temperature
  - Red blood cell mass
  - Fluid status
  - Adipose tissue mass
- Involuntary





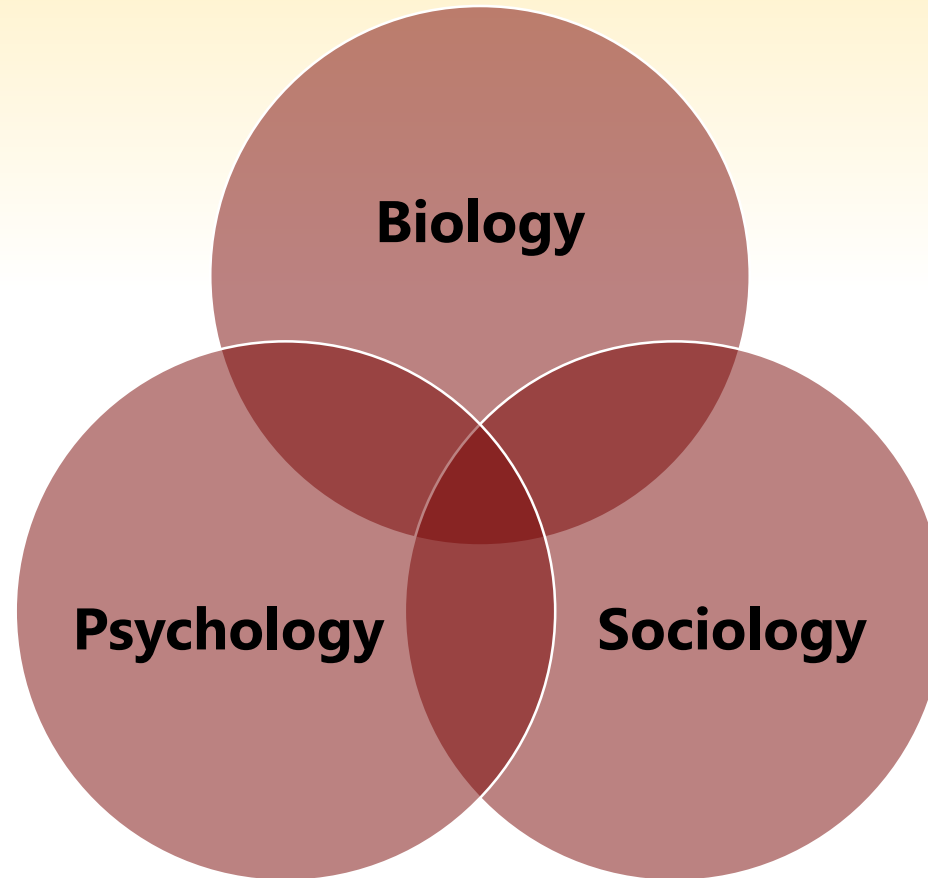
# Biology of Energy Regulation



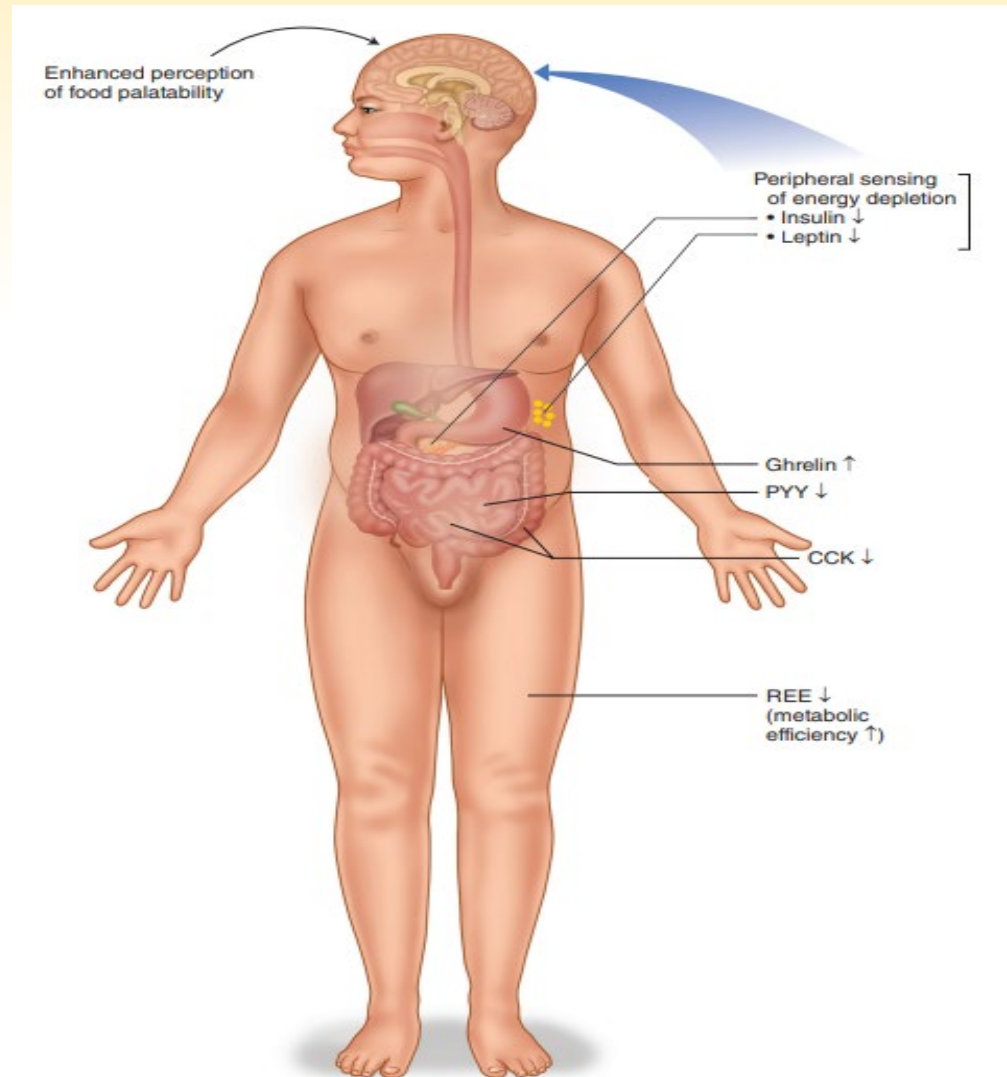
**Neuroendocrine and Endocrine Pathways of Obesity.** Once a cell thought to be a simple, passive storehouse for lipids, the adipocyte is now known to be marvelously complex. It senses the body's energy state and sends signals to many organs, coordinating their function. The solution for the obesity epidemic might lie in better understanding adipocyte biology.



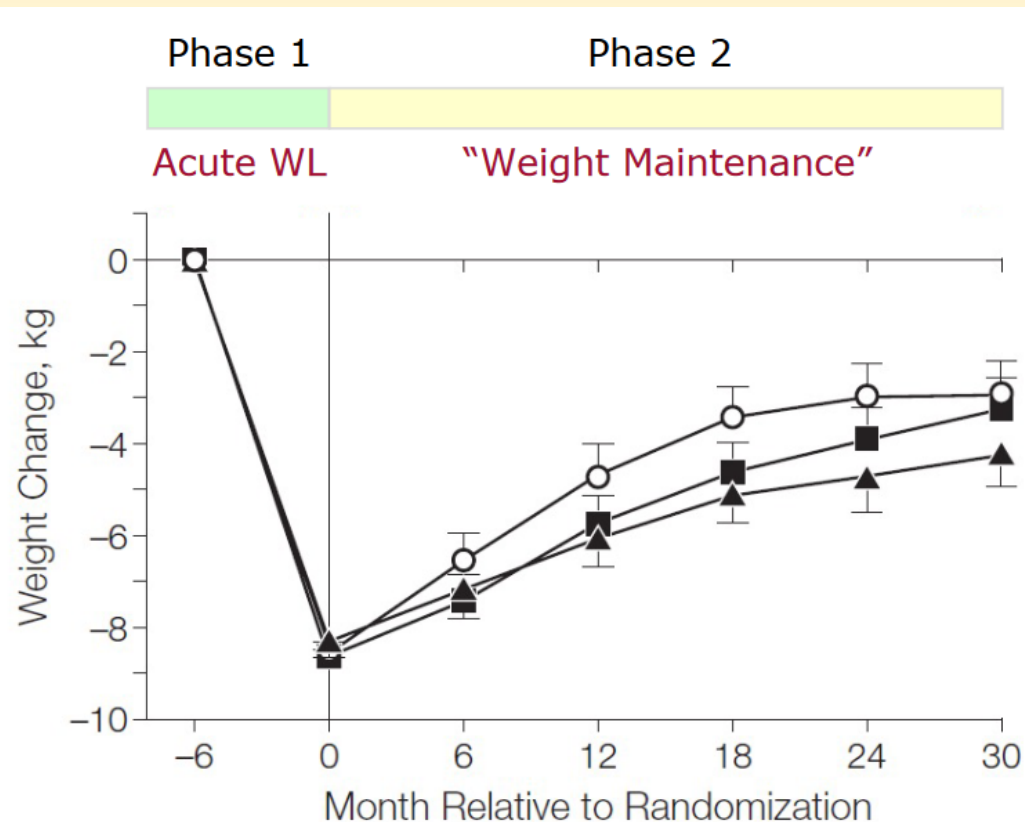
# Obesity is an Error in Fat Mass Regulation



# Body Fights the Weight Reduced State



# Weight Regain is Biologically Driven



- Obesity medications and bariatric surgery combat counter-regulatory mechanisms that promote weight gain/regain.
- Lifestyle therapy does not address obesity pathophysiology.

# AAP Clinical Practice Guidelines

TREATMENT	P&PHCPs <i>should</i> treat overweight/obesity & comorbidities concurrently (KAS 4) following the principles of the <b>medical home</b> and the <b>chronic care model</b> , using a <b>family-centered</b> and <b>non-stigmatizing</b> approach that acknowledges obesity's <b>biologic, social, and structural drivers</b> .(KAS 9)	Overweight			Obesity					
		Components of Comprehensive Treatment			<6y	6 to <12y	≥12y	<6y	6 to <12y	≥12y
		Motivational Interviewing <sup>f</sup> (KAS 10)	✓	✓	✓	✓	✓	✓	✓	✓
Intensive Health Behavior and Lifestyle Treatment <sup>e</sup> (KAS 11)	⚖️	✓	✓	⚖️	✓	✓	✓	✓		
<b>Weight Loss Pharmacotherapy<sup>h</sup> (KAS 12)</b>								✓		
Offer referral to Comprehensive Pediatric Metabolic & Bariatric Surgery programs <sup>i</sup> (KAS 13)								✓ <sup>i</sup>		

KAS12. Pediatricians and other PHCPs **should offer** adolescents 12 y and older with obesity weight loss pharmacotherapy, according to medication indications, risks, and benefits, as an adjunct to health behavior and lifestyle treatment. Grade B

what  
how  
when



where  
why  
who

**Should I be using OM for  
ALL of my patients  
with BMI  $\geq$  95<sup>th</sup> percentile  
who are  $\geq$  12 years old?**

Risks of OM:

- short term side effects
- unknown long-term risks or benefits

Risks of Not Treating:

- progressive BMI increase
- development of comorbidities
- worsening of comorbidities
- reduced life expectancy





# Who Should be Treated with OM?

- People for whom
  - Benefits of OM are greater than risks of OM
  - Risks of treating are less than risks of not treating
- Risk:Benefit depends on
  - Severity of obesity
  - Age
  - Co-morbidities
  - Safety/efficacy of OM
- Other factors:
  - BMI trajectory
  - Patient/family preferences
  - Response to LST
  - Pre- or post MBS



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# Timing

- AAP CPG recommends starting obesity treatment upon diagnosis; no more watchful waiting
- Not clear when in course of treatment OM should be started
  - Upon diagnosis?
  - After trial of LST?

# Timing

- Early treatment response predicts long-term treatment response
  - 3% BMI reduction at 1 mos predicts 5% BMI reduction at 12 mos
- Very few (<10%) with severe obesity achieve clinically significant BMI reduction with LST alone

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# FDA-Approved Medications for Pediatric Obesity

- Phentermine (> 16 yr, short term)
- Orlistat ( $\geq 12$  yr)
- Liraglutide 3mg ( $\geq 12$  yr)
- Phentermine/topiramate ER ( $\geq 12$  yr)
- Semaglutide 2.4mg ( $\geq 12$  yr)
- Setmelanotide ( $\geq 6$  yr)

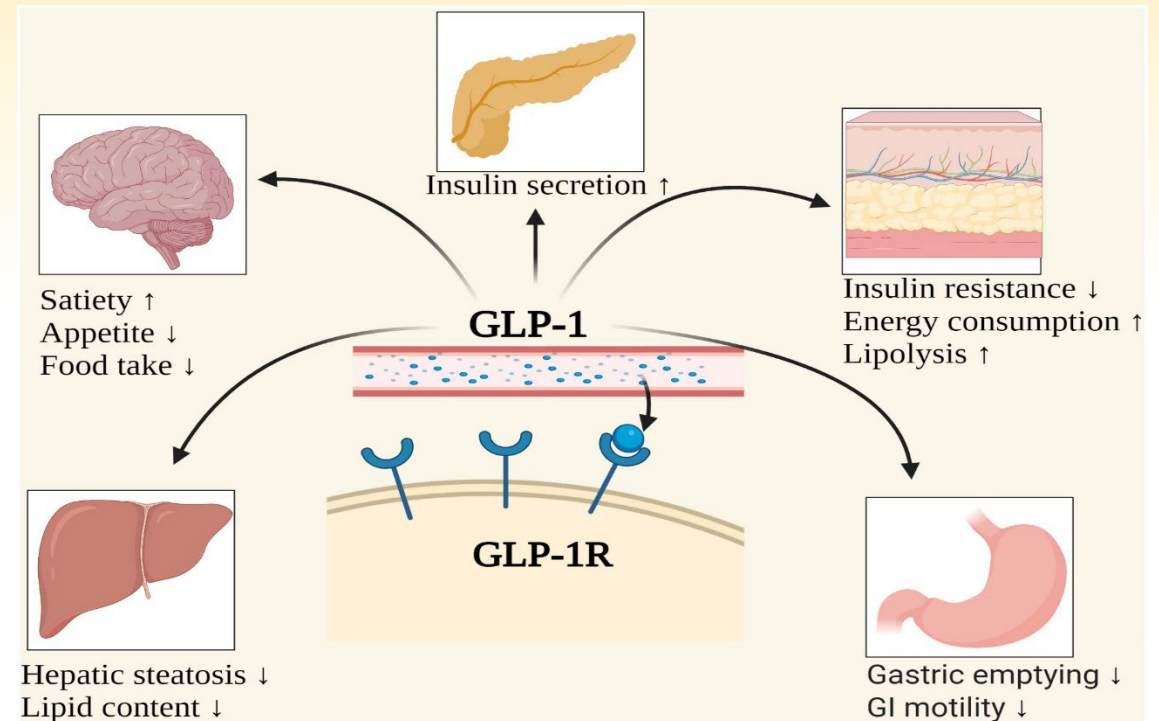
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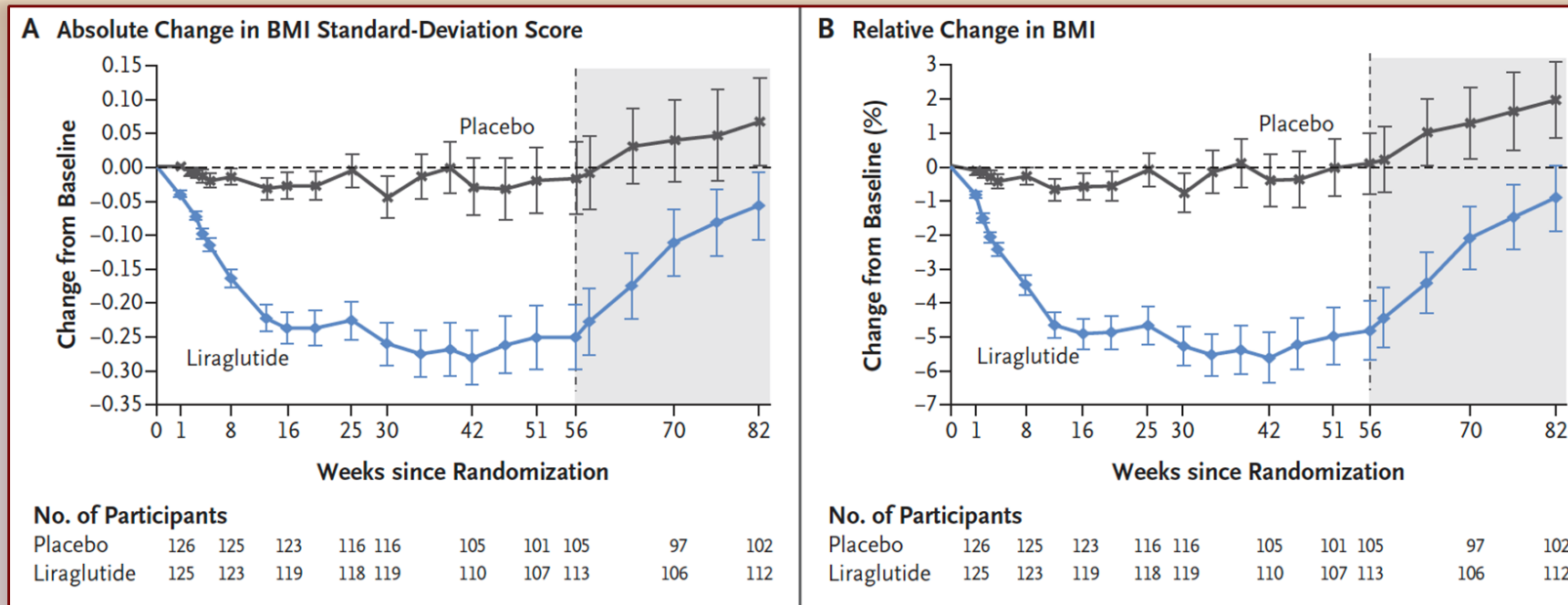
# Liraglutide 3 mg (Saxenda™)

- GLP-1 RA
  - Reduces appetite, increases satiety, reduces food reward
- SC daily injection (5 wk titration schedule to max 3mg)
- Contraindications:
  - Medullary thyroid CA, MEN II
- Side effects: nausea, vomiting, diarrhea



Wang JY et al. Front Endo; 2023.

# Liraglutide 3 mg (Saxenda™)

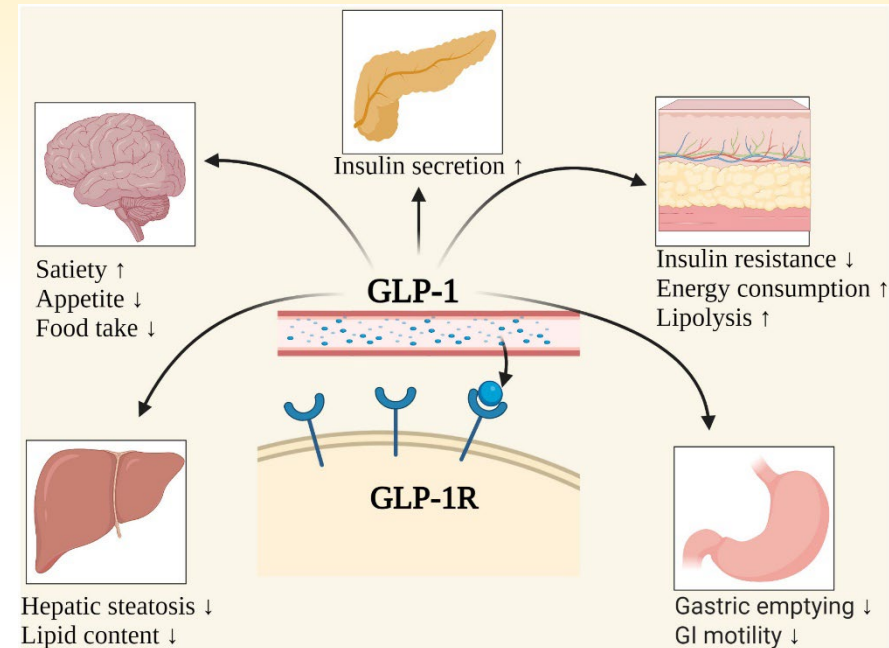


4.5% ↓

Kelly AS et al. NEJM; 2020

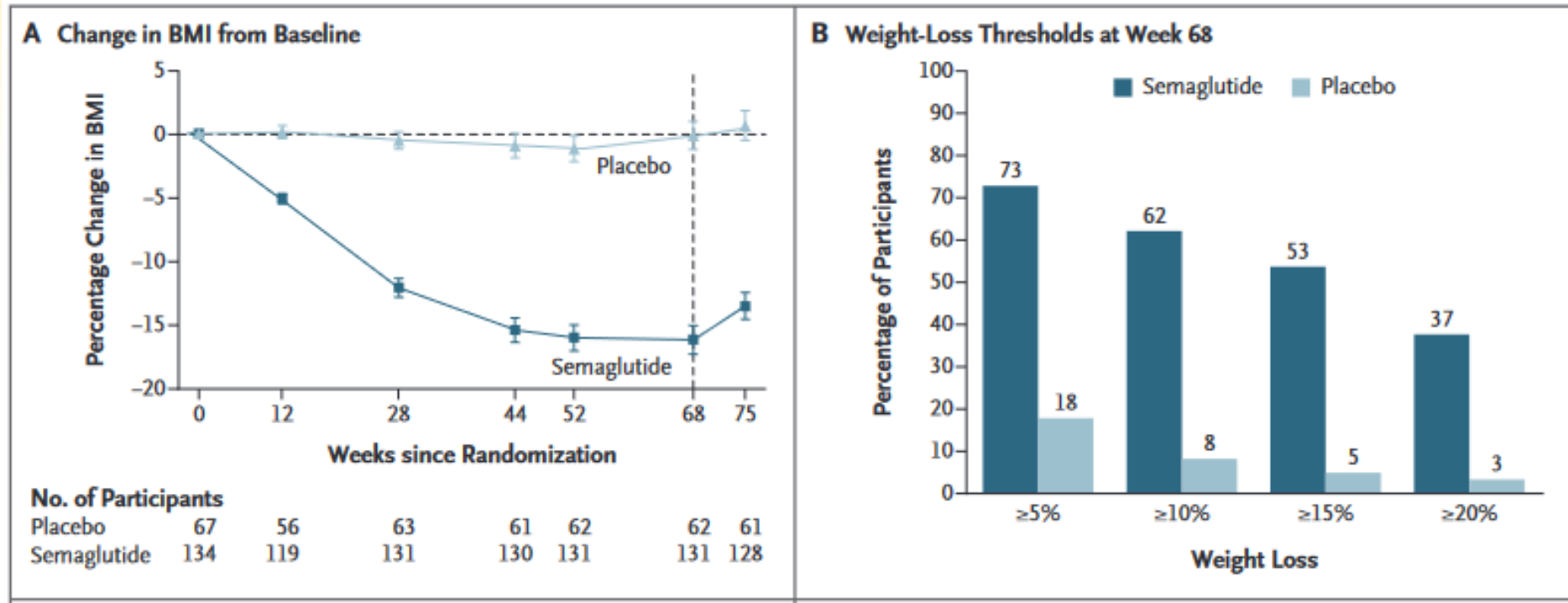
# Semaglutide 2.4 mg (Wegovy™)

- GLP-1 RA
  - Reduces appetite, increases satiety, reduces food reward
- SC weekly injection (5 mos titration schedule to max 2.4mg)
- Contraindications:
  - Medullary thyroid CA, MEN II
- Side effects: nausea, vomiting, diarrhea



Wang JY et al. Front Endo; 2023.

# Semaglutide 2.4mg (Wegovy™)

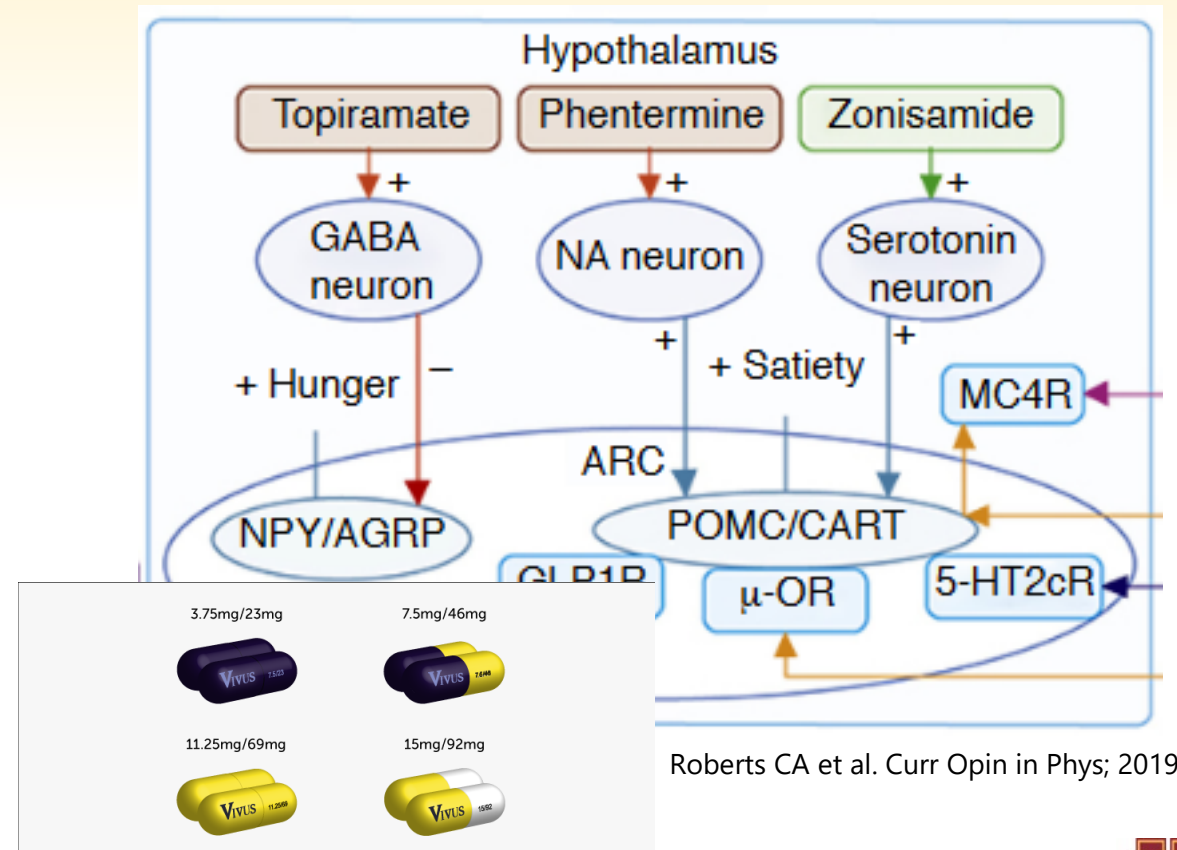


17%↓

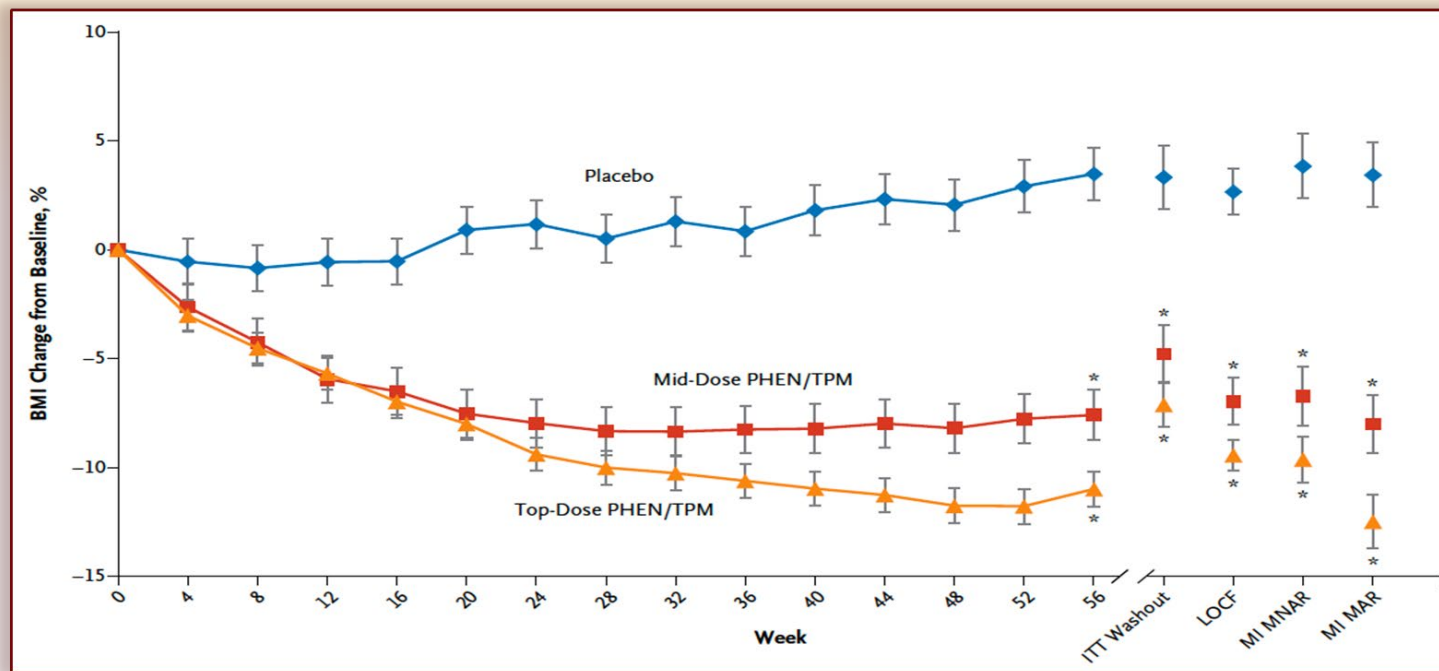
Weghuber D et al. NEJM; 2022.

# Phentermine/Topiramate XR (Qsymia™)

- Phentermine: reduces appetite via noradrenergic pathways
- Topiramate: reduces food reward via unclear pathways
- Daily pill; 2 mos dose titration to max 15/92 mg
- Contraindications:
  - Substance abuse, pregnancy, CVD, hyperthyroidism, glaucoma, MAOI use
- Side effects: paresthesia, dizziness, insomnia, constipation



# Phentermine/Topiramate XR (Qsymia™)



10% ↓

Kelly et al. NEJM Evidence; 2022.

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# Medication Selection

- Mechanism of action
- Side effect profile
- Effects on other diagnoses
- Patient phenotype
- Patient/family preferences
- Insurance coverage and access
- Provider comfort



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**Insurance  
coverage and  
access**

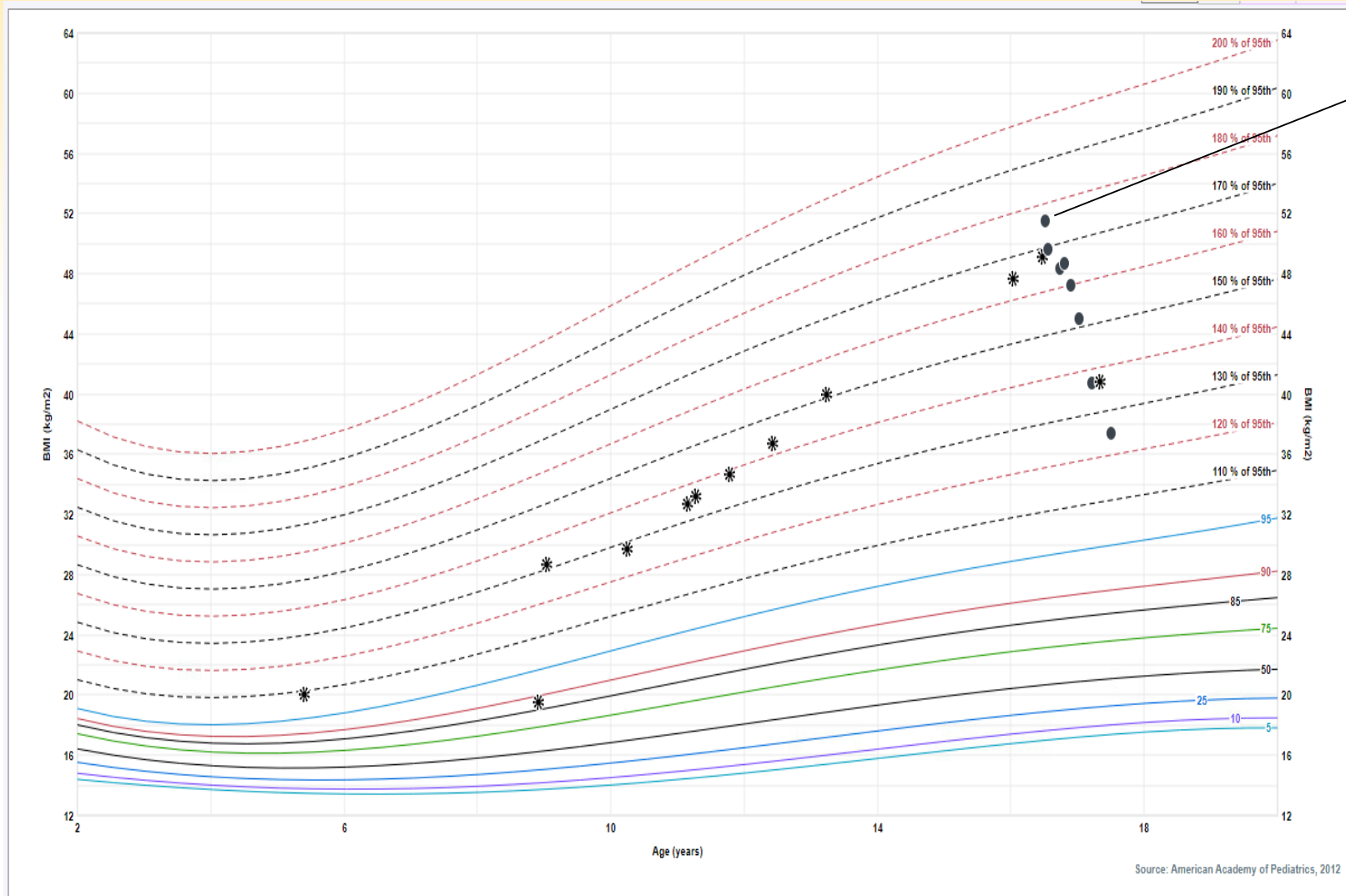
# 16 yo girl BMI 51 kg/m<sup>2</sup>

- HPI
  - Started to gain wt in middle school
  - No prior weight loss attempts
- PMH: anxiety, treated with weekly therapy and sertraline 100mg
- FH: mother is living with obesity
- SH:
  - Lives with mom, dad and 7 sibs (2 yo -18yo)
  - Works PT at daycare
  - 11th grade and gets mediocre grades

# 16 yo girl BMI 51 kg/m<sup>2</sup>

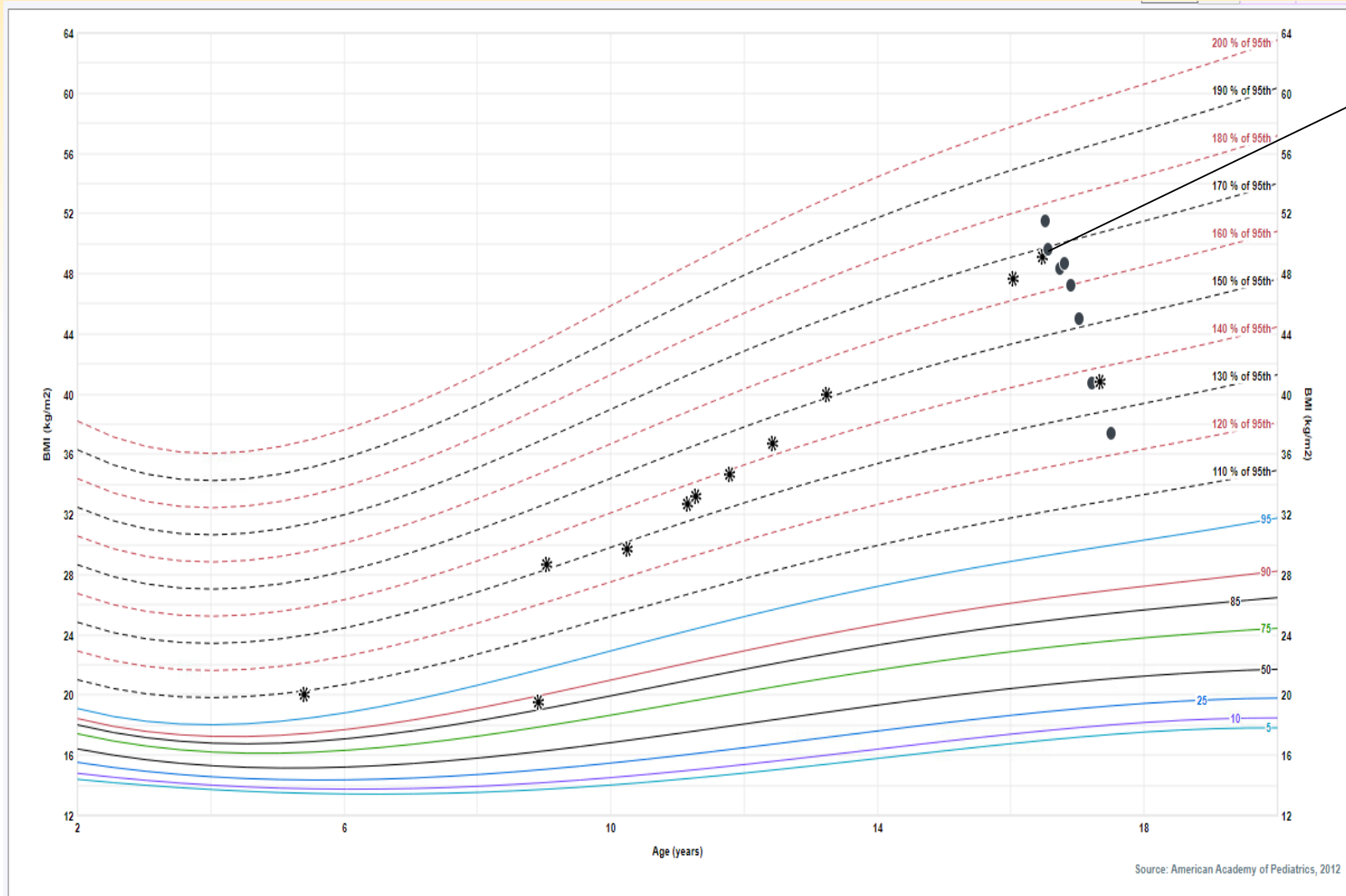
- PE:
  - Weight: 298 lbs, Height 5'3.8", BMI 51.5 kg/m<sup>2</sup> (1.76x95<sup>th</sup> percentile)
  - BP 127/72, P 77
  - Normal exam otherwise
- Labs
  - HbA1c 4.8%, glucose 82
  - AST 19, ALT 25
  - Lipids normal except TG 169

# 16 yo girl BMI 51 kg/m<sup>2</sup>



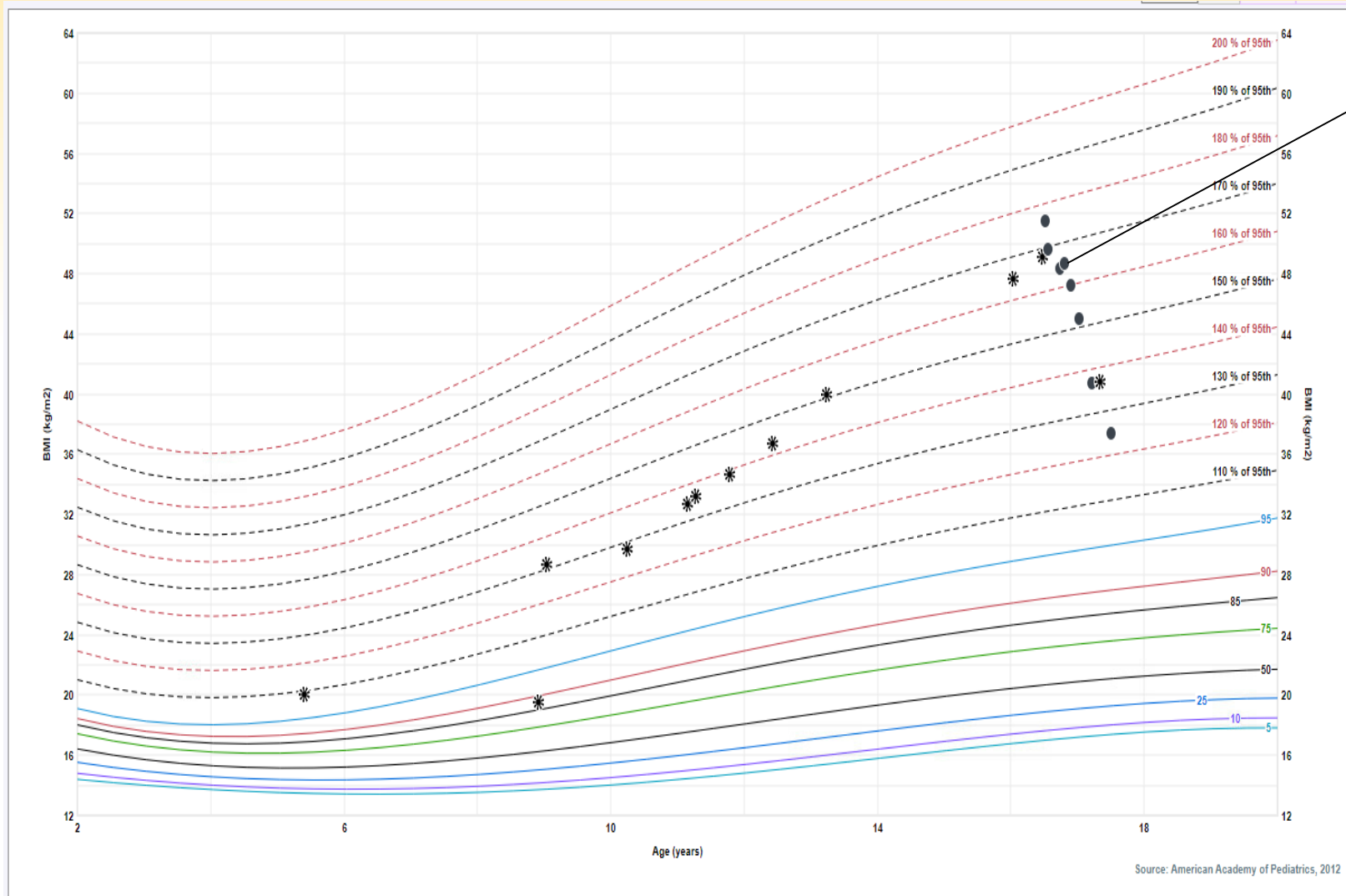
- Discuss MBS
- Start phentermine 15 and topiramate 75 mg
- Meet with RD

# 16 yo girl BMI 51 kg/m<sup>2</sup>



-Wt down 21 lbs in 6 wks  
-Wants to pursue MBS

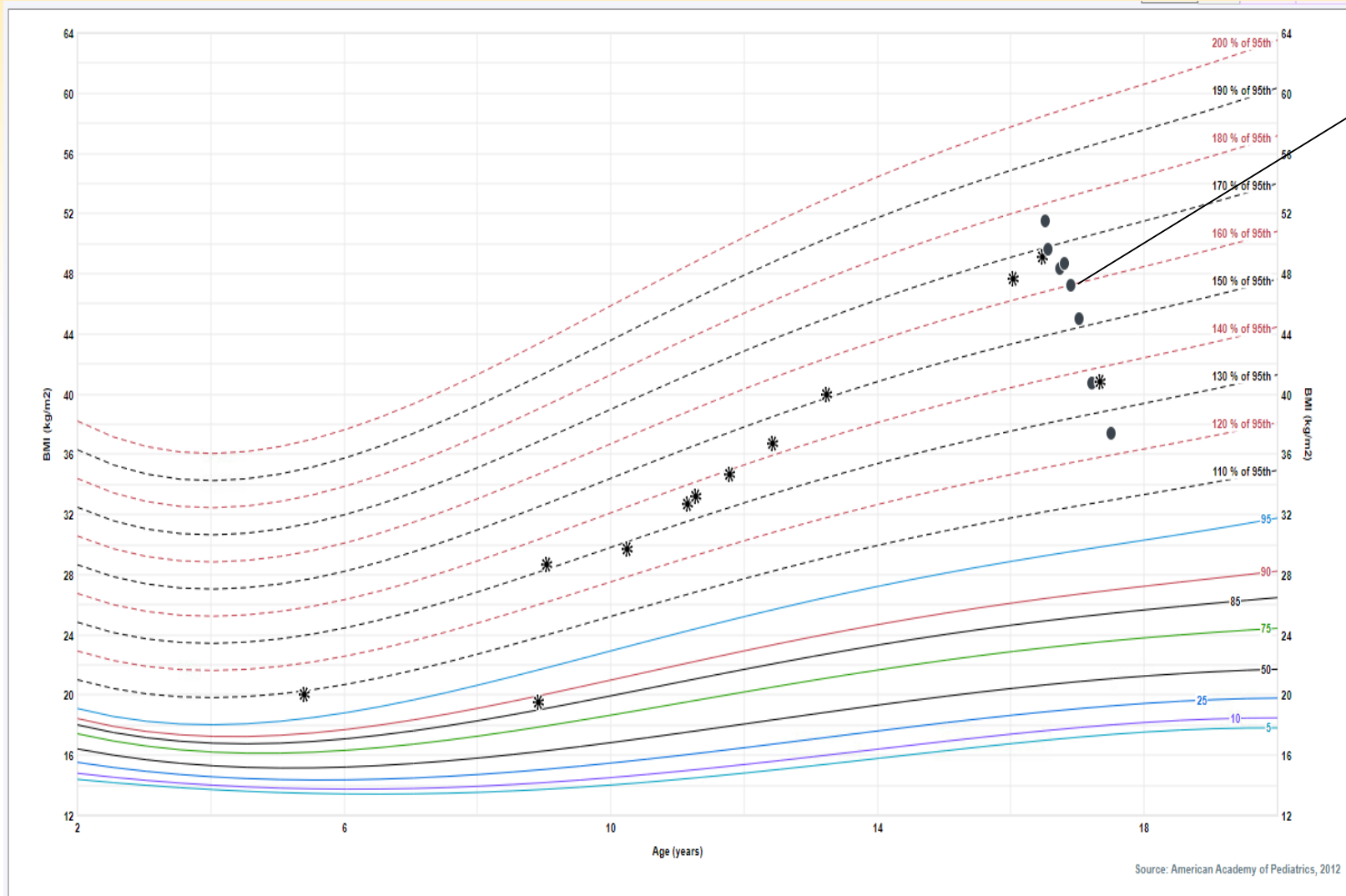
# 16 yo girl BMI 51 kg/m<sup>2</sup>



- Wt is up a few lbs over the holiday
- PCP wondered about MBS given results of semaglutide 2.4mg
- Pt still wants to pursue MBS and wants to try semaglutide

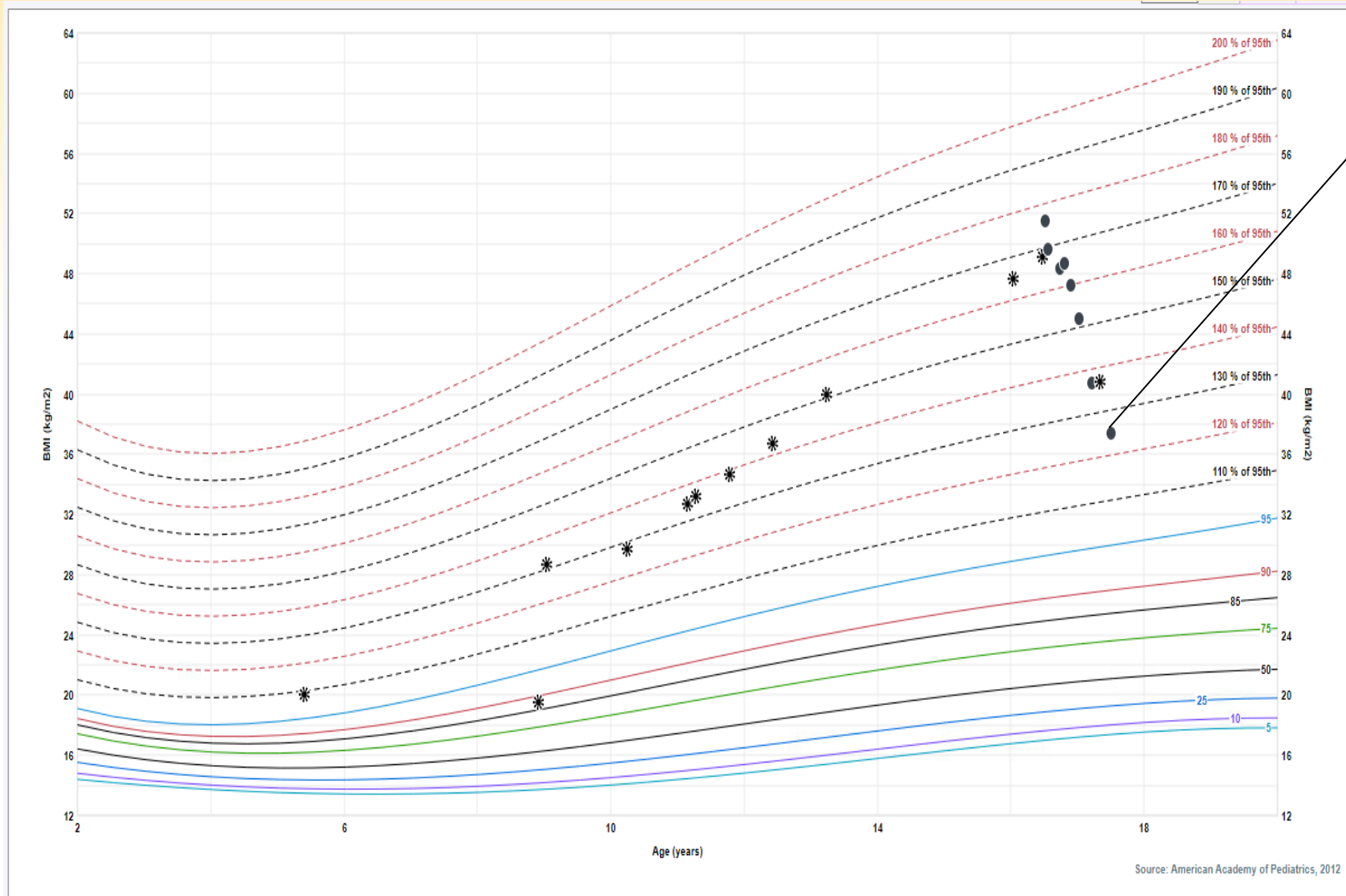


# 16 yo girl BMI 51 kg/m<sup>2</sup>



-Wt down 14 lbs (5%) in 1 mos with semaglutide 0.25mg + phentermine 15mg + topiramate 75mg  
-MBS is not a covered benefit

# 16 yo girl BMI 51 kg/m<sup>2</sup>



-27% BMI reduction in 1 year with semaglutide 2.4mg, phentermine 15mg, and topiramate 75 mg

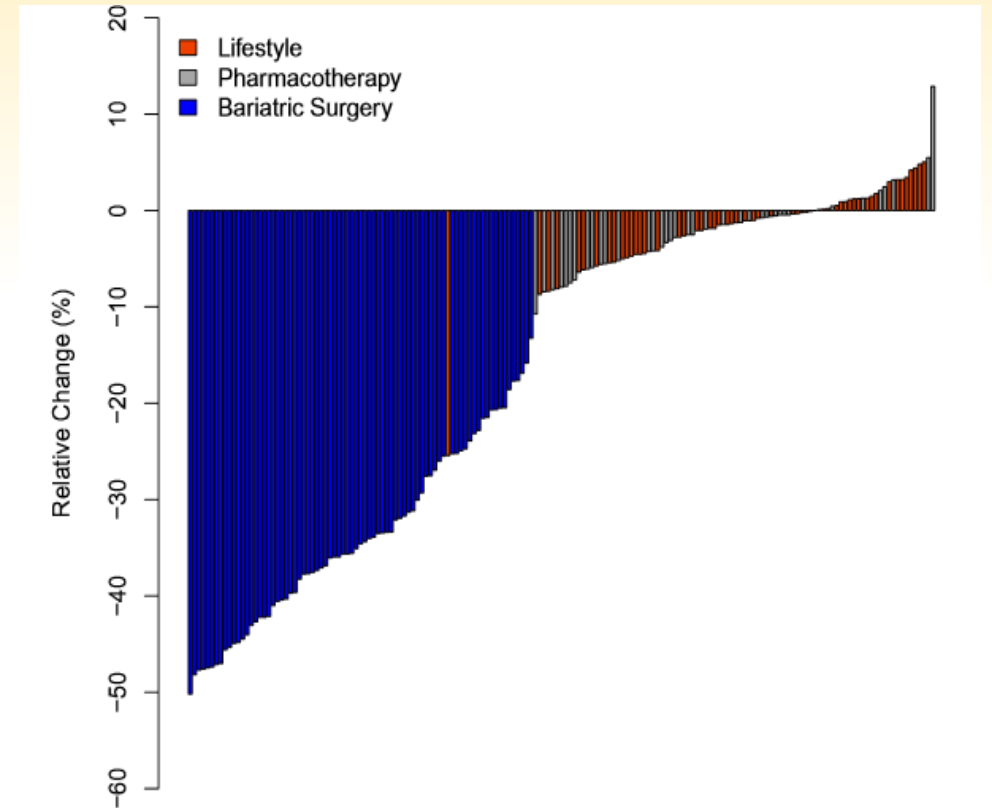
# New Frontier....

- What is effect of dramatic weight loss on
  - Body composition
    - Bone health
    - Muscle mass and function
  - Puberty
  - Social development
- What is the role of traditional lifestyle therapy vis a vis potent OM
  - What is the additive benefit of LST?



# Caveats

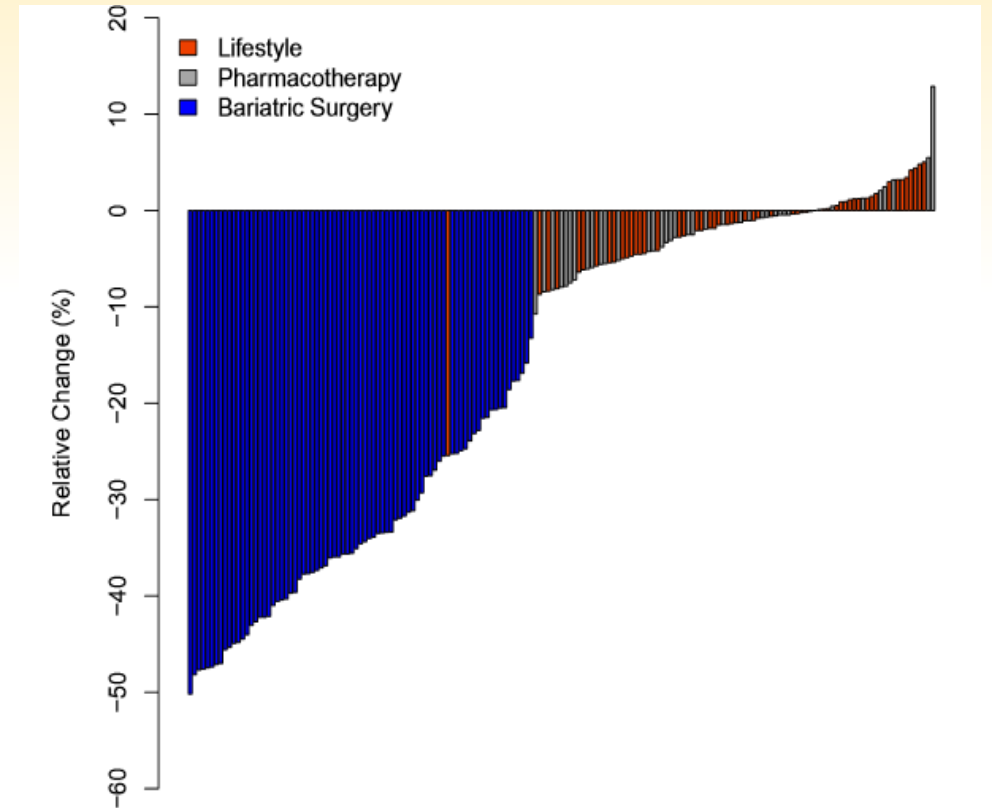
- Variability of intervention outcomes is significant



Ryder JR et al. Obesity; 2019

# Caveats

- Variability of intervention outcomes is significant
- Long-term results are missing



Ryder JR et al. Obesity; 2019

# Take Home Points

- OMs target underlying pathophysiology of obesity
- Obesity treatment is chronic
- One size does not fit all

# Want to Learn More?

# University of Minnesota Pediatric Obesity Medicine Fellowship



[Our team is nationally & internationally recognized in pediatric obesity clinical care, education, and research](#)

## **At our program you will:**

- gain expertise in managing the most common chronic disease of children/adolescents
- learn how to use advanced dietary strategies, behavioral techniques, pharmacotherapy, and bariatric surgery
- work in a [multidisciplinary team](#)
- become proficient in diagnosing and treating common obesity-related comorbidities
- be eligible to sit for the American Board of Obesity Medicine exam at the end of training
- become uniquely positioned to work in pediatric obesity advocacy and policy

## **[Choose to train with us!](#)**

- Our Weight Management Program is world renowned for its leadership in cutting edge treatment strategies
- The Center for Pediatric Obesity Medicine ([CPOM](#)) provides a strong infrastructure, mentorship & resources for clinical research

Candidates must be board eligible or certified in Pediatrics & be a current US citizen or permanent resident. Submit a [universal application](#), CV, personal statement, USMLE/COMLEX scores, and 3 Letters of Recommendation to Valerie Cole ([cole0430@umn.edu](mailto:cole0430@umn.edu)).



University of Minnesota Center for Pediatric Obesity Medicine

**SAVE THE DATE**

# ATPO 2025

Advanced Therapies for Pediatric Obesity



**March 5<sup>th</sup>-7<sup>th</sup>**



**CPOM**

**Thank You!**  
**lusc0001@umn.edu**