

Weighing In on Medical Management of Obesity

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for Children

Disclosures

- ▶ Consultant for Novo Nordisk

Clinical Questions

- ▶ What is the approach to the patient who has difficulty losing weight? Which labs and elements of the history and physical are helpful to management?
- ▶ What are considerations for prescribing medications for weight reduction, and what is the recommended follow up for maximizing success with these patients?
- ▶ When are surgical interventions indicated, and how should patient be prepared for this consultation?

Body Mass Index Calculation

Metric measurements:

$$\frac{\text{Weight (kg)}}{\text{Height (m)}^2}$$

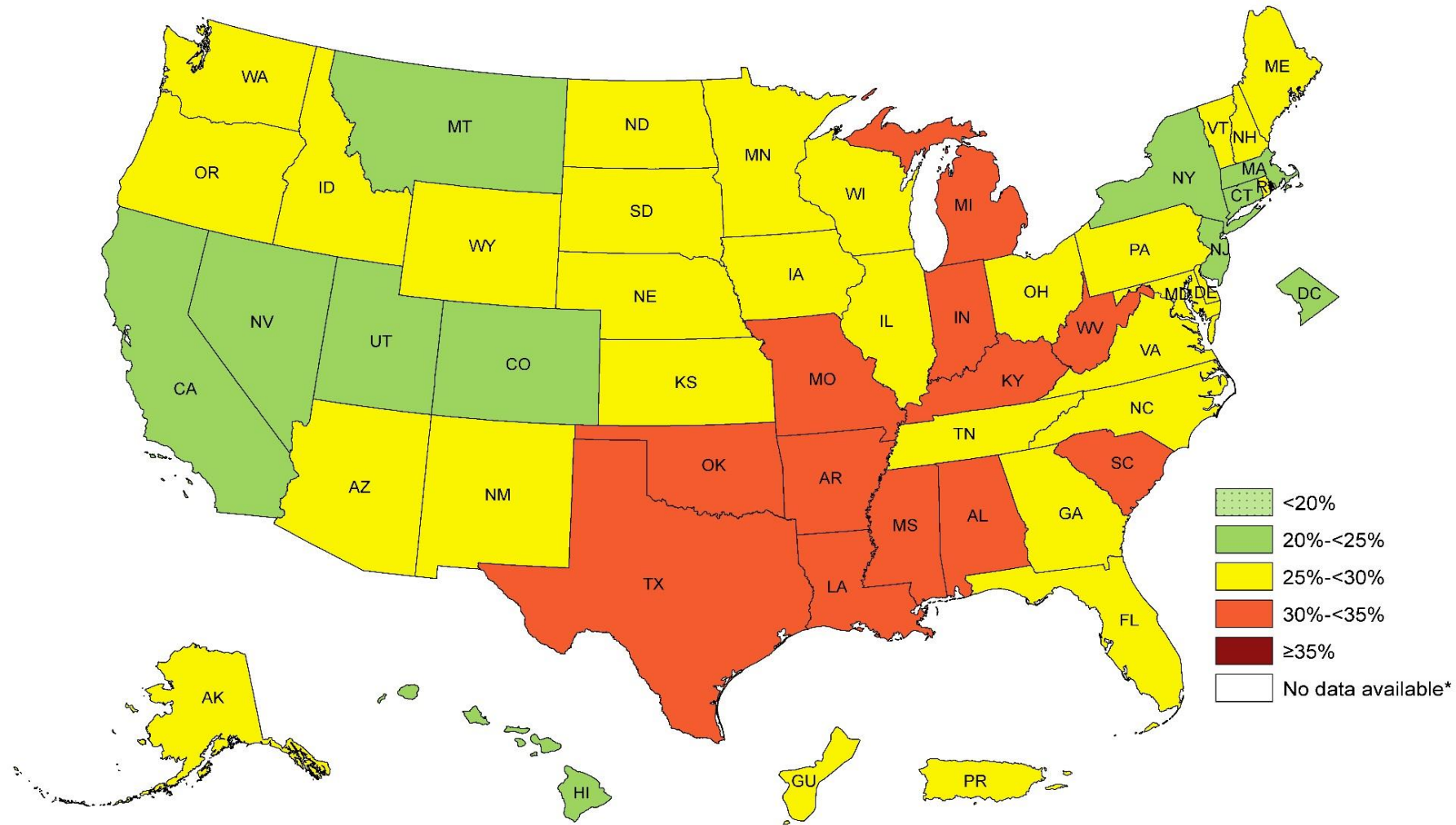
English measurements:

$$\frac{\text{Weight (lb)} \times 703}{\text{Height (in)}^2}$$

How is Obesity defined in Adults?

Weight Status Category	Body Mass Index (BMI)
Underweight	< 18.5
Normal Weight	18.5-24.9
Overweight	25- 29.9
Class I Obesity	30-34.9
Class II Obesity	35-39.9
Class III Obesity	≥40

Prevalence[¶] of Self-Reported Obesity Among U.S. Adults by State and Territory, BRFSS, 2011

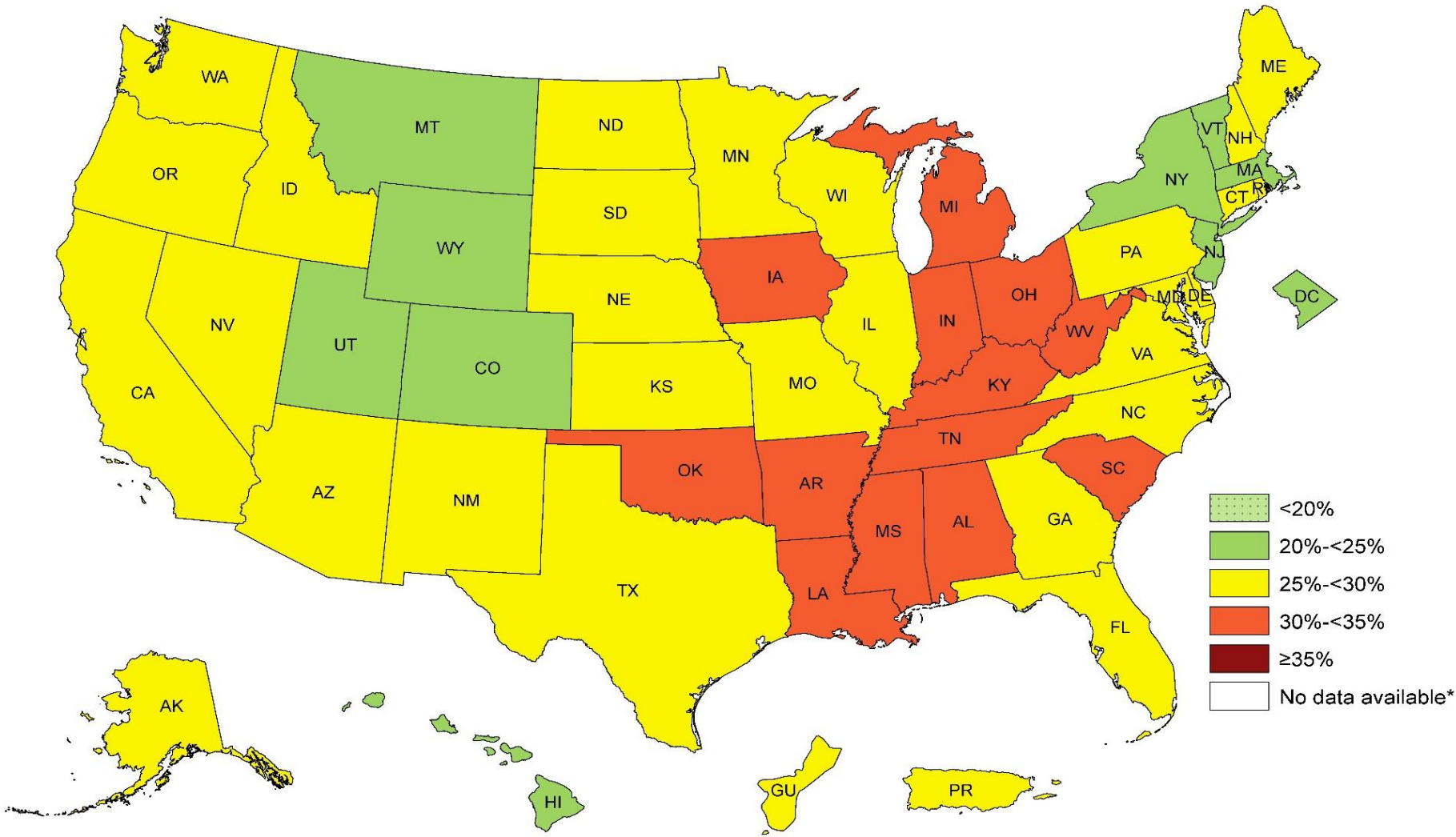


[¶] Prevalence estimates reflect BRFSS methodological changes started in 2011. These estimates should not be compared to prevalence estimates before 2011.

*Sample size <50 or the relative standard error (dividing the standard error by the prevalence) ≥ 30%.



Prevalence¹ of Self-Reported Obesity Among U.S. Adults by State and Territory, BRFSS, 2012

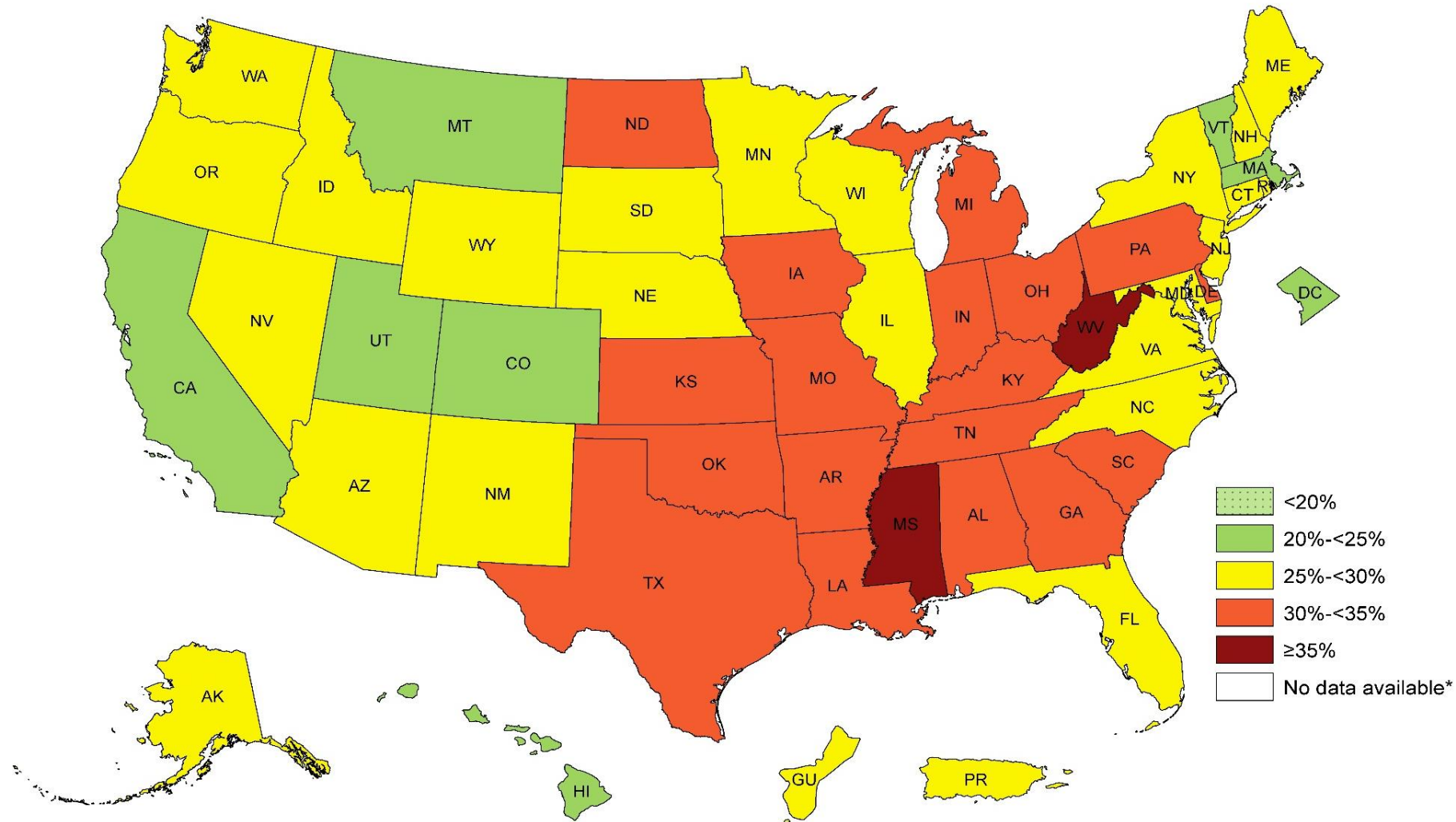


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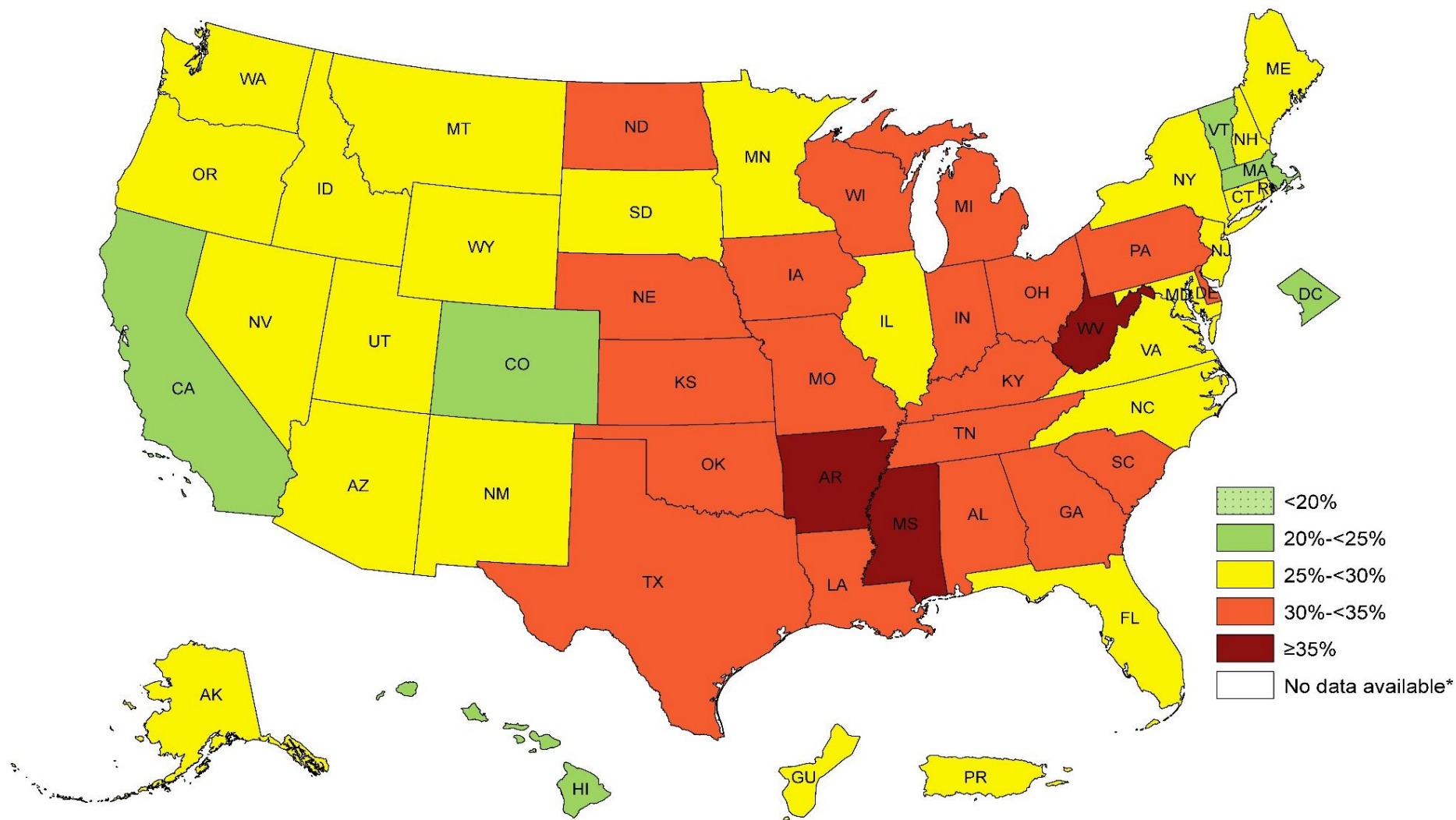


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Prevalence¹ of Self-Reported Obesity Among U.S. Adults by State and Territory, BRFSS, 2014

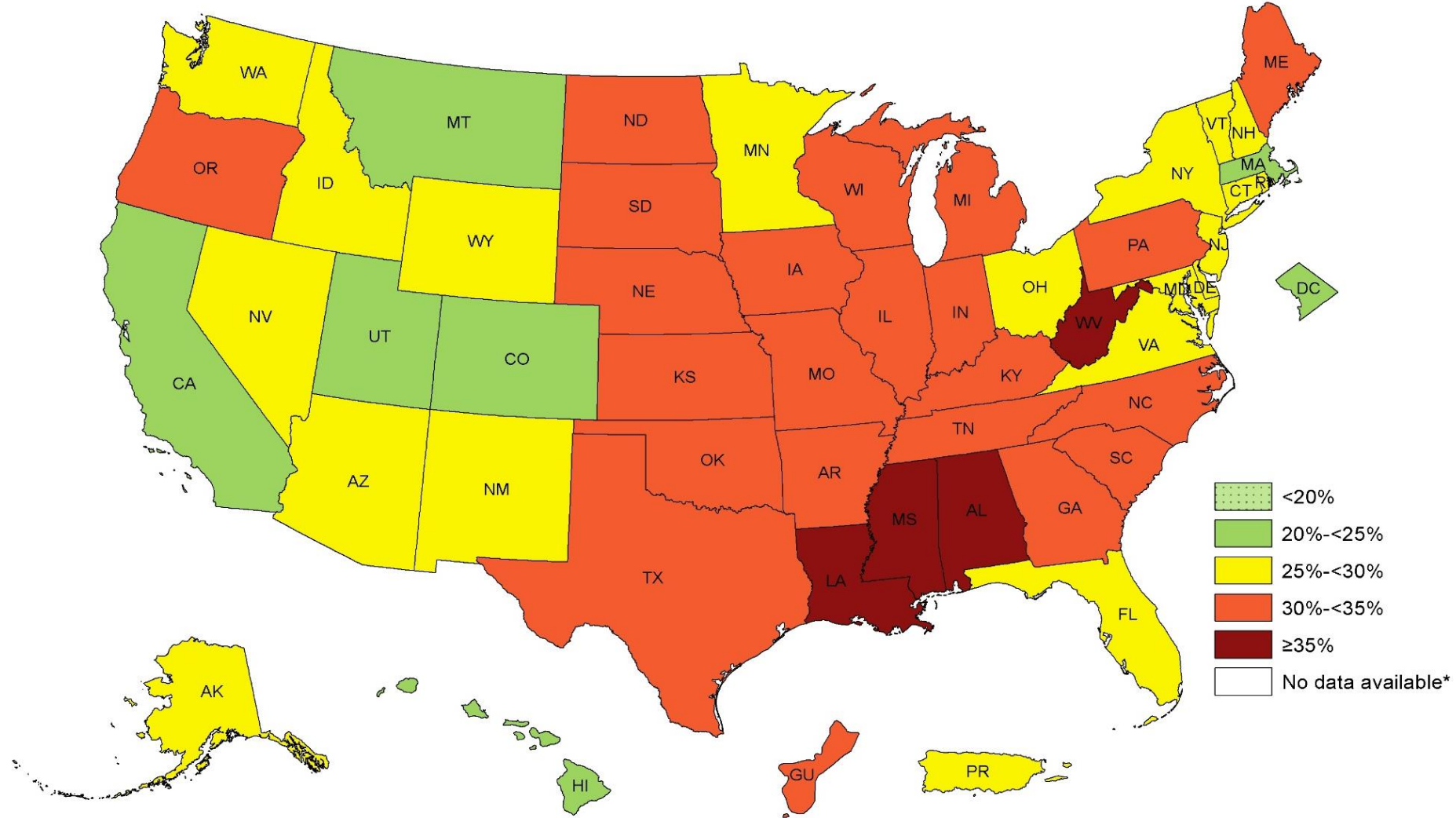


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Prevalence¹ of Self-Reported Obesity Among U.S. Adults by State and Territory, BRFSS, 2015

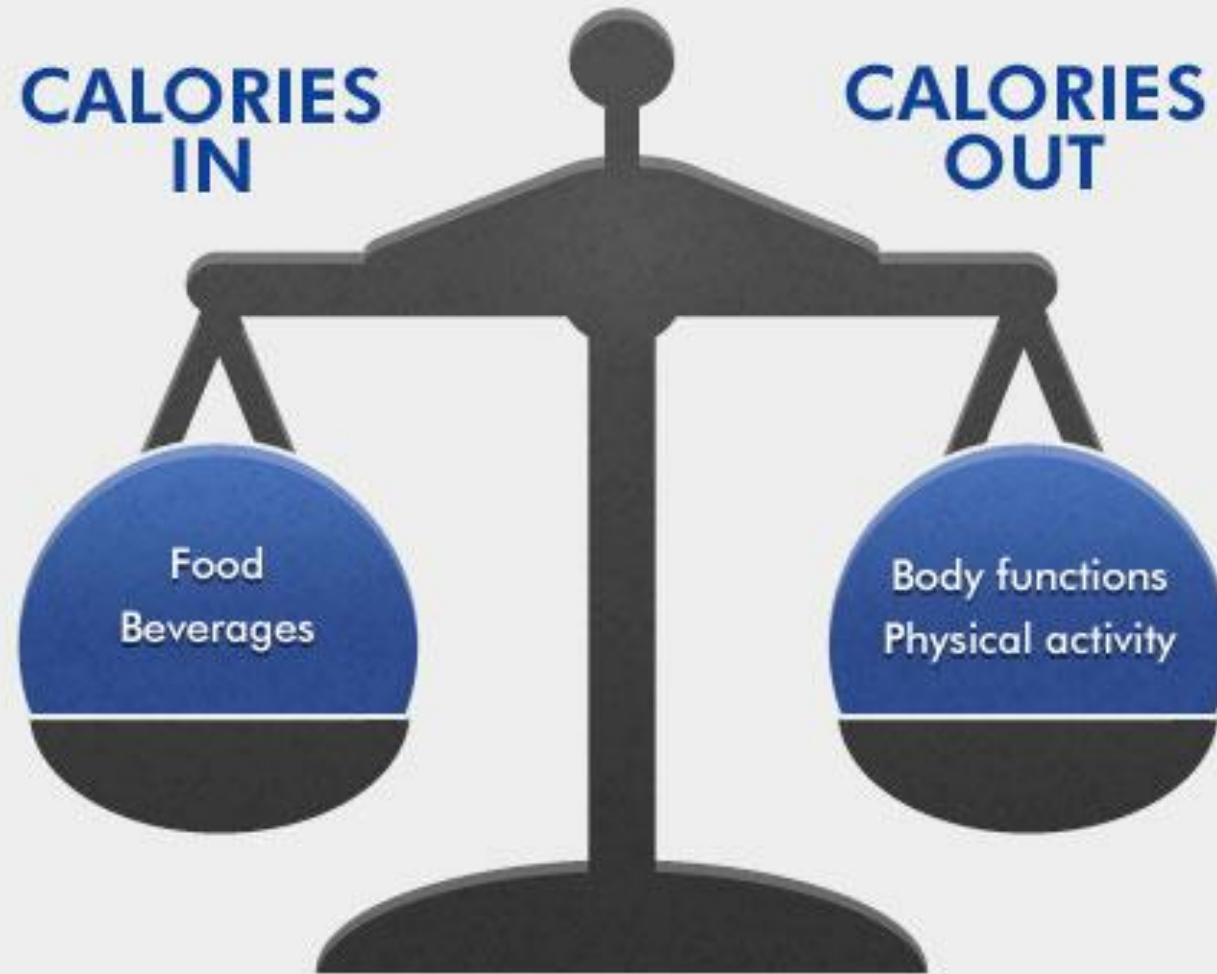


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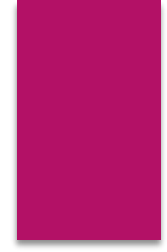
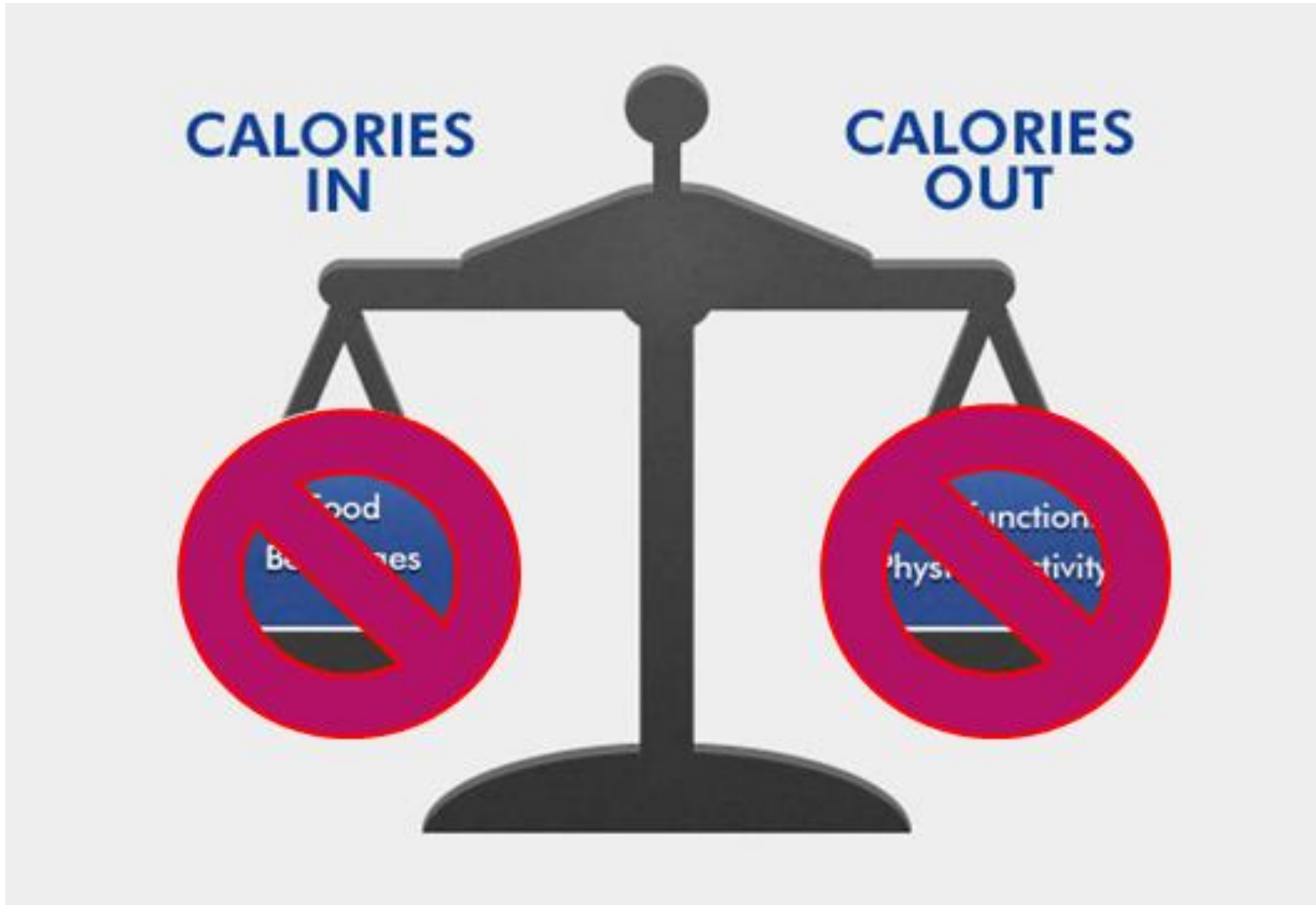
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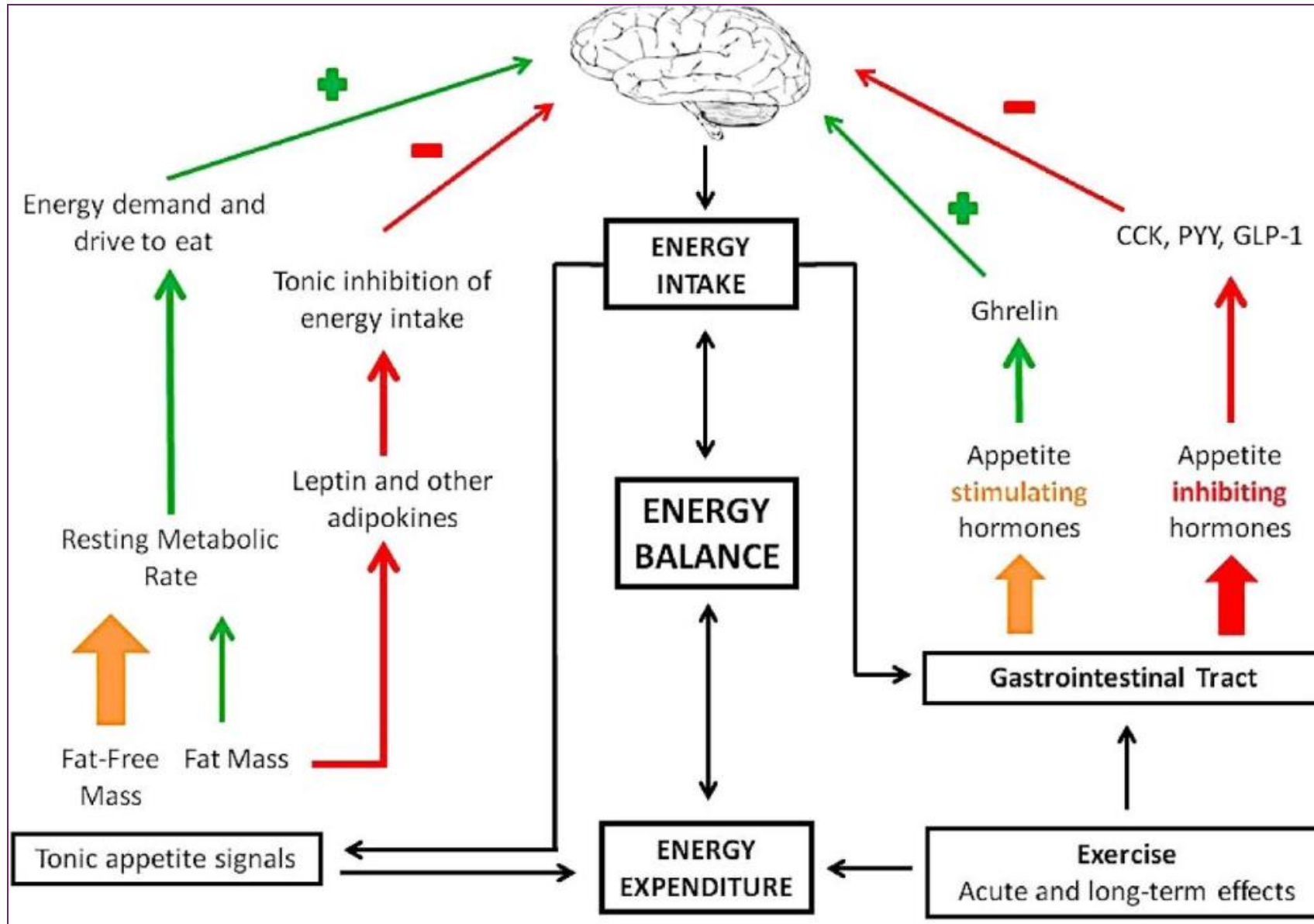
Energy Balance (simple)



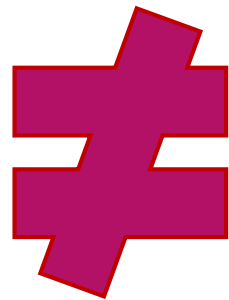
Energy Balance (simple)



Energy Balance (more complex)



All Calories are **NOT** created **EQUAL**



Obesity: A Multi-factorial Disorder



Genetics



Environment



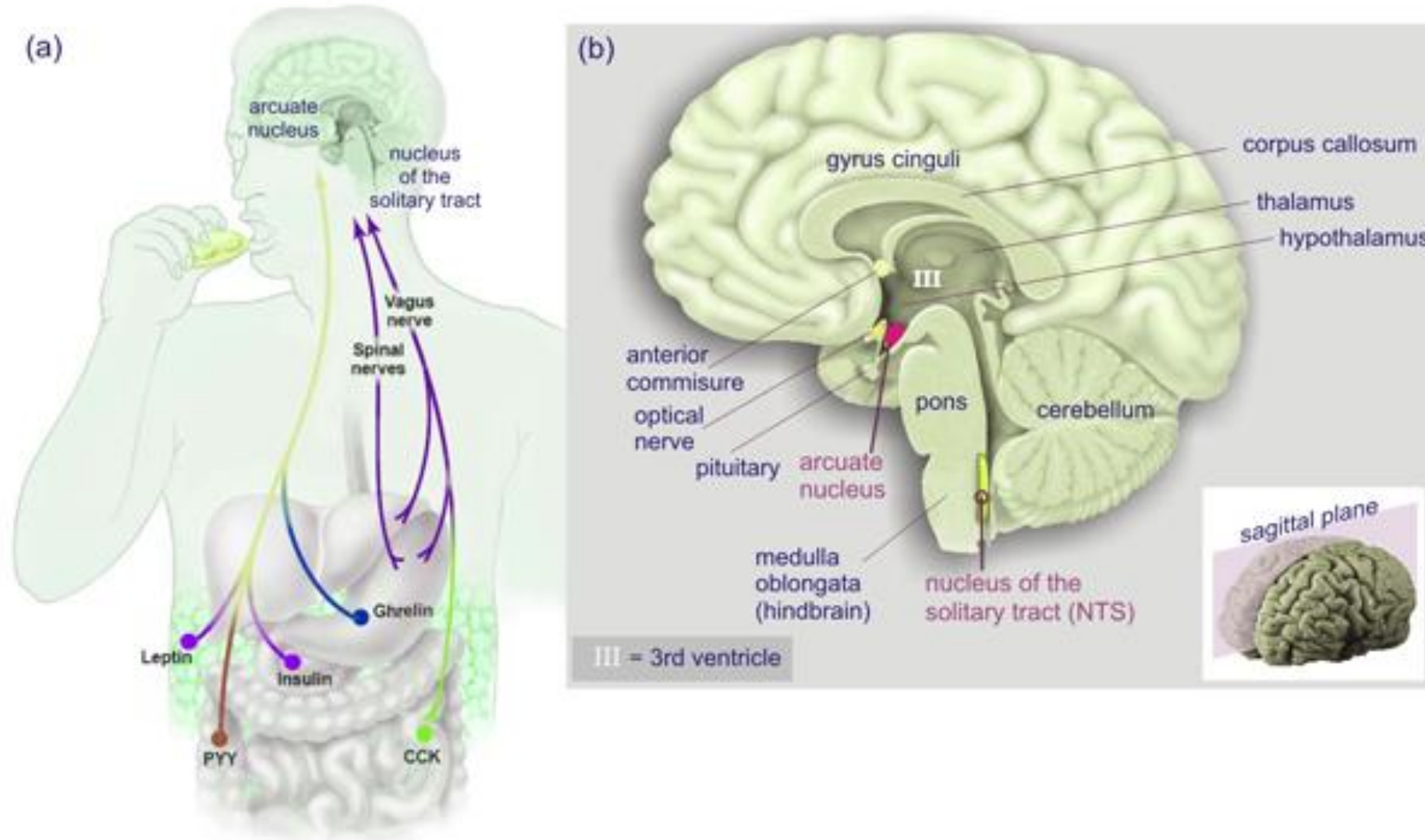
Development



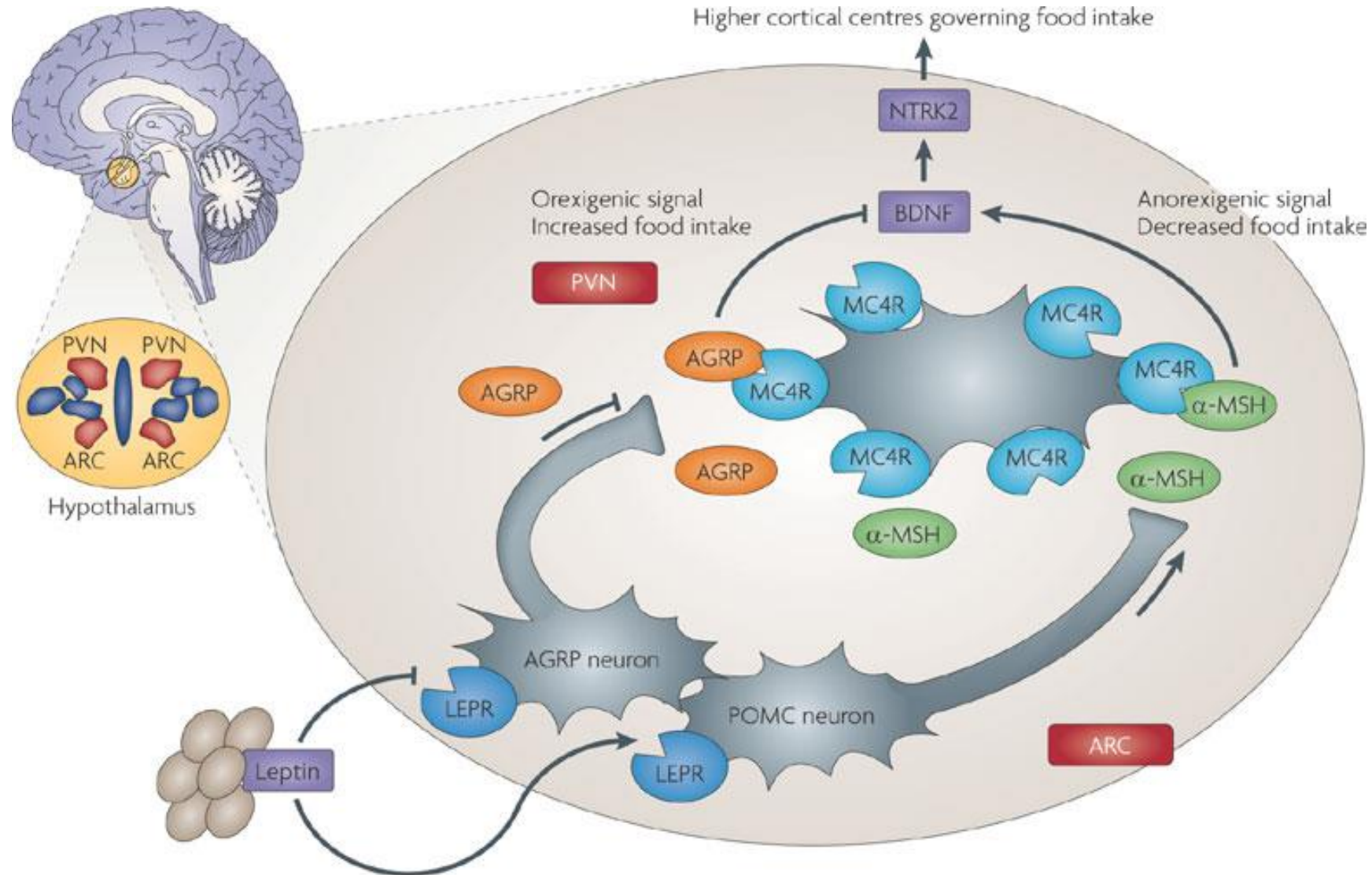
Behavior



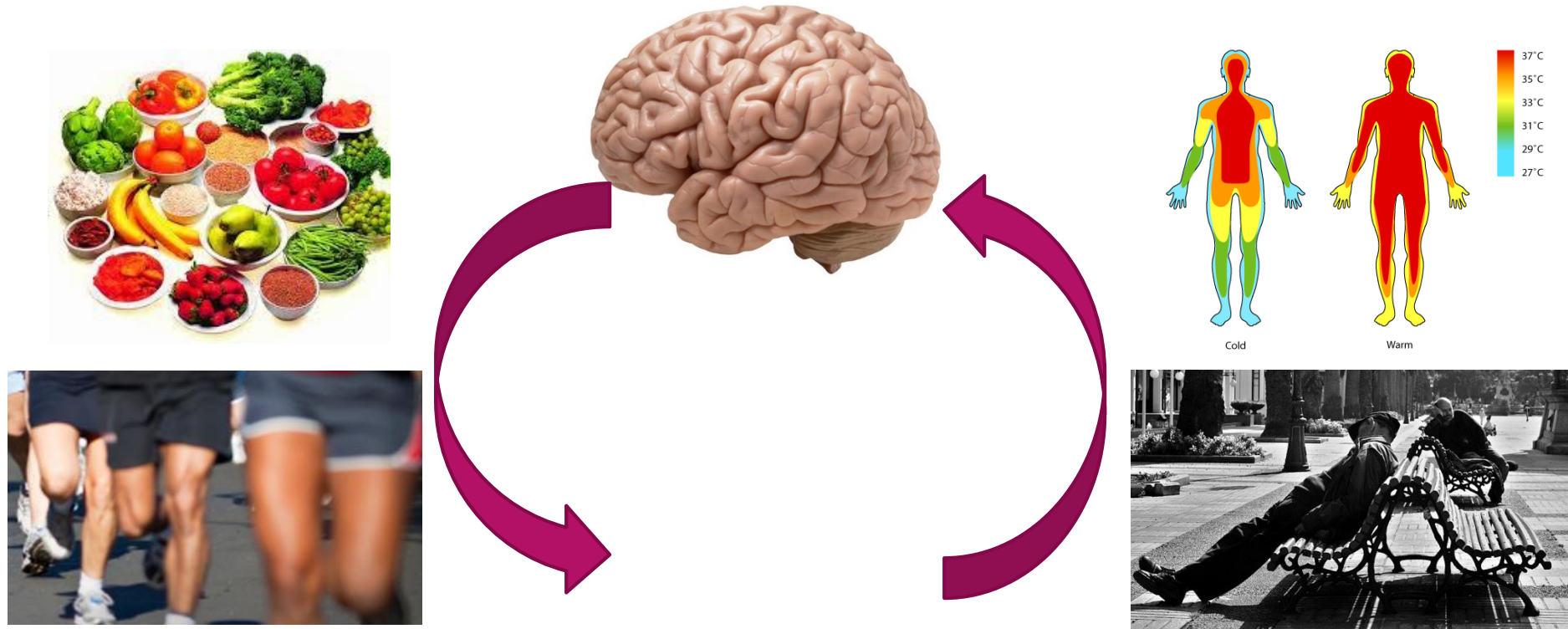
Regulation of Food Intake



Regulation of Food Intake



Central Nervous System regulates weight

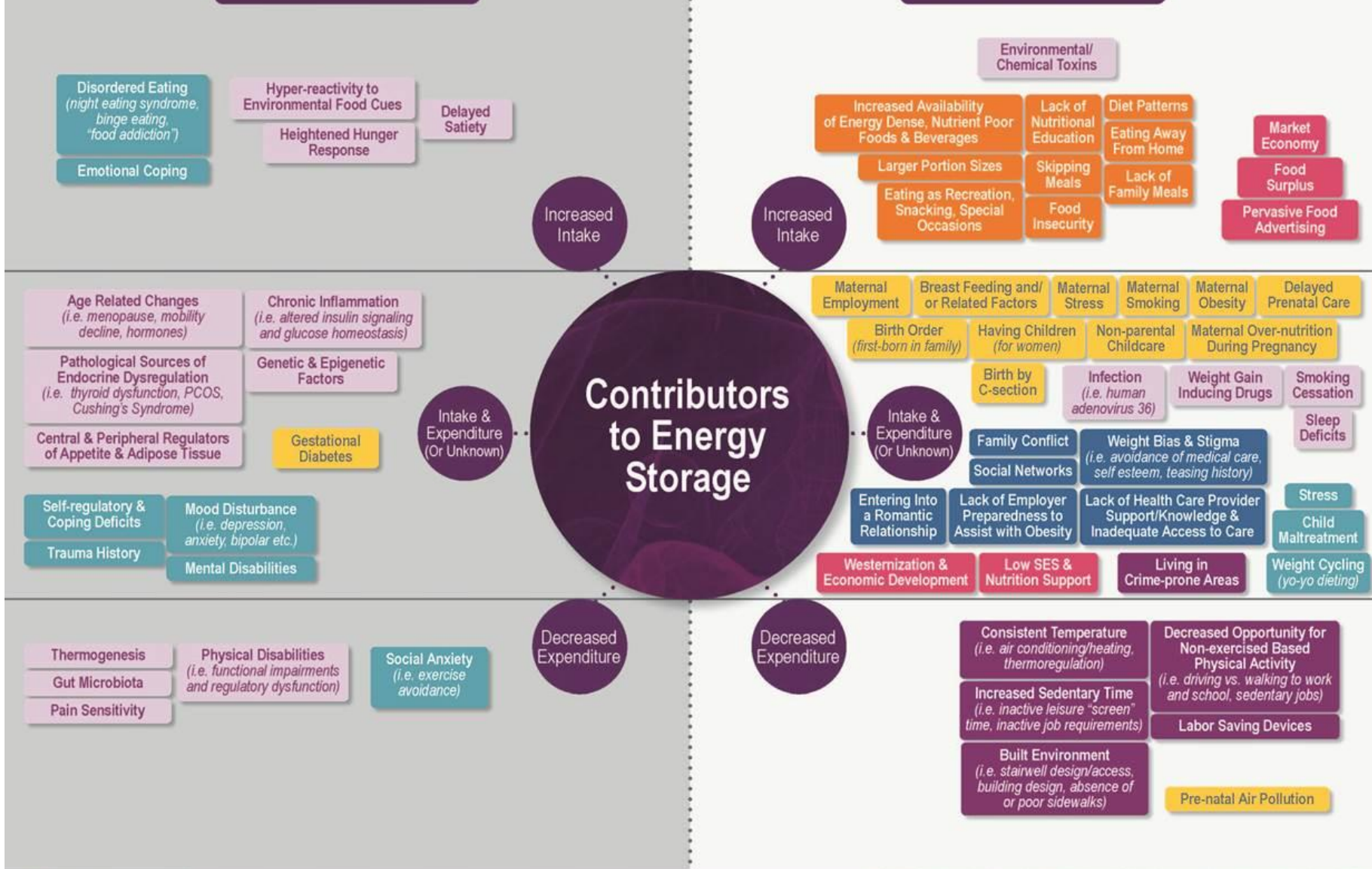


POTENTIAL CONTRIBUTORS TO OBESITY

2015

Inside the Person

Outside the Person



Contributor/Influencer

* Potential contributors indicate anything that has been put forth in the research literature as a question of investigation and is not intended to be a verification of whether or not, or the extent to which, each may or may not contribute.



Contributors/ Influencers to Obesity

Biological/
Medical

Food &
Beverage
Behavior/
Environment

Maternal/
Developmental

Social

Psychological

Economic

Environmental
Pressures on
Physical Activity

Contributors to Obesity- **Inside** the Person

↑ Intake

Hyper-reactivity to
Environmental Food
Cues

Delayed Satiety

Disordered Eating

↓ Expenditure

Gut Microbiota

Thermogenesis

Physical Disabilities

↑ Intake/ ↓ Expenditure

Genetic and
Epigenetic Factors

Age Related Changes

Mood Disturbances

Contributors to Obesity- **Outside** the Person

↑ Intake

Environmental/
Chemical Toxins

Pervasive
Food advertising

Large Portion Sizes

↓ Expenditure

Built Environment

Sedentary Time

Labor Saving
Devices

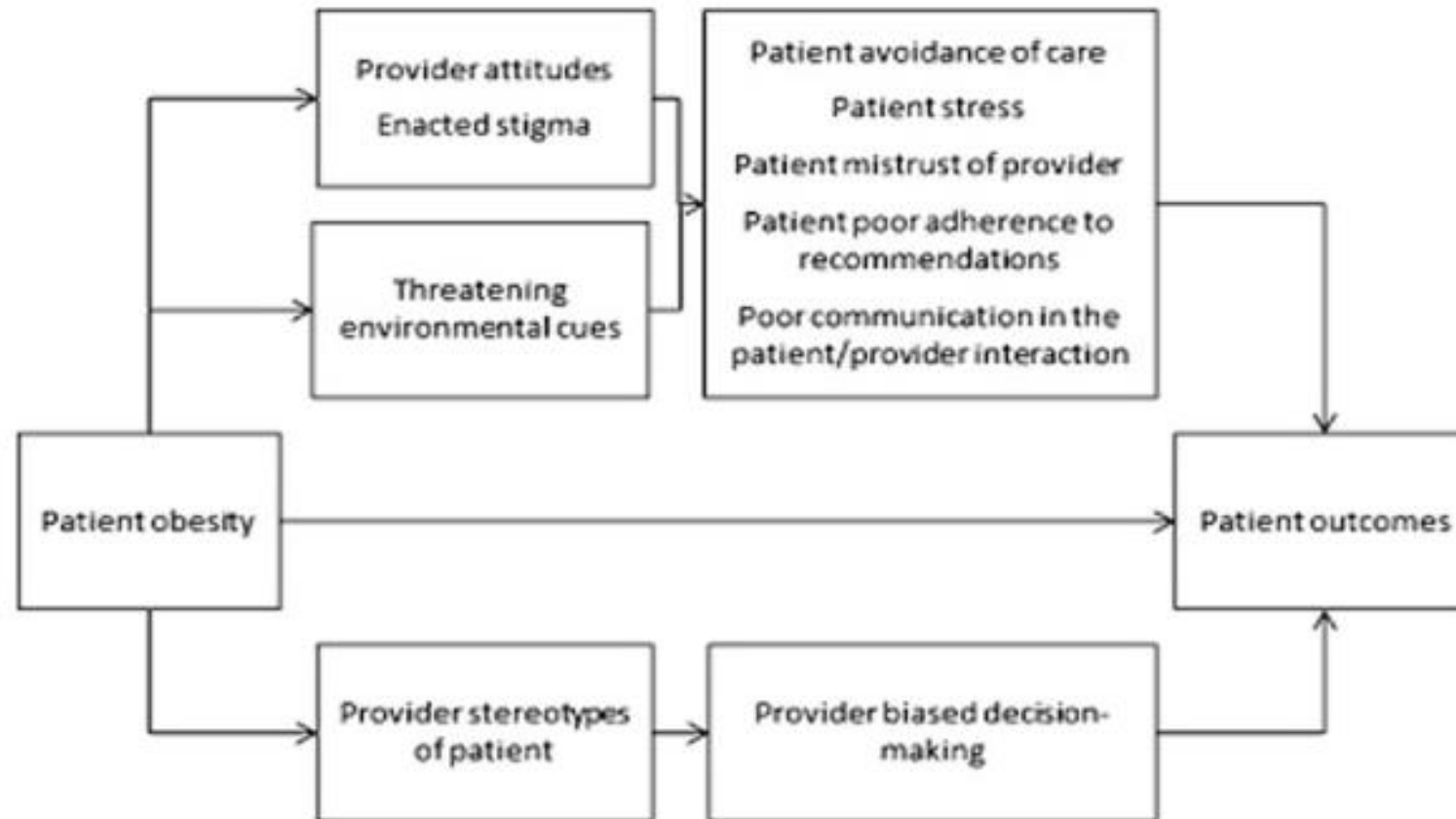
↑ Intake/
↓ Expenditure

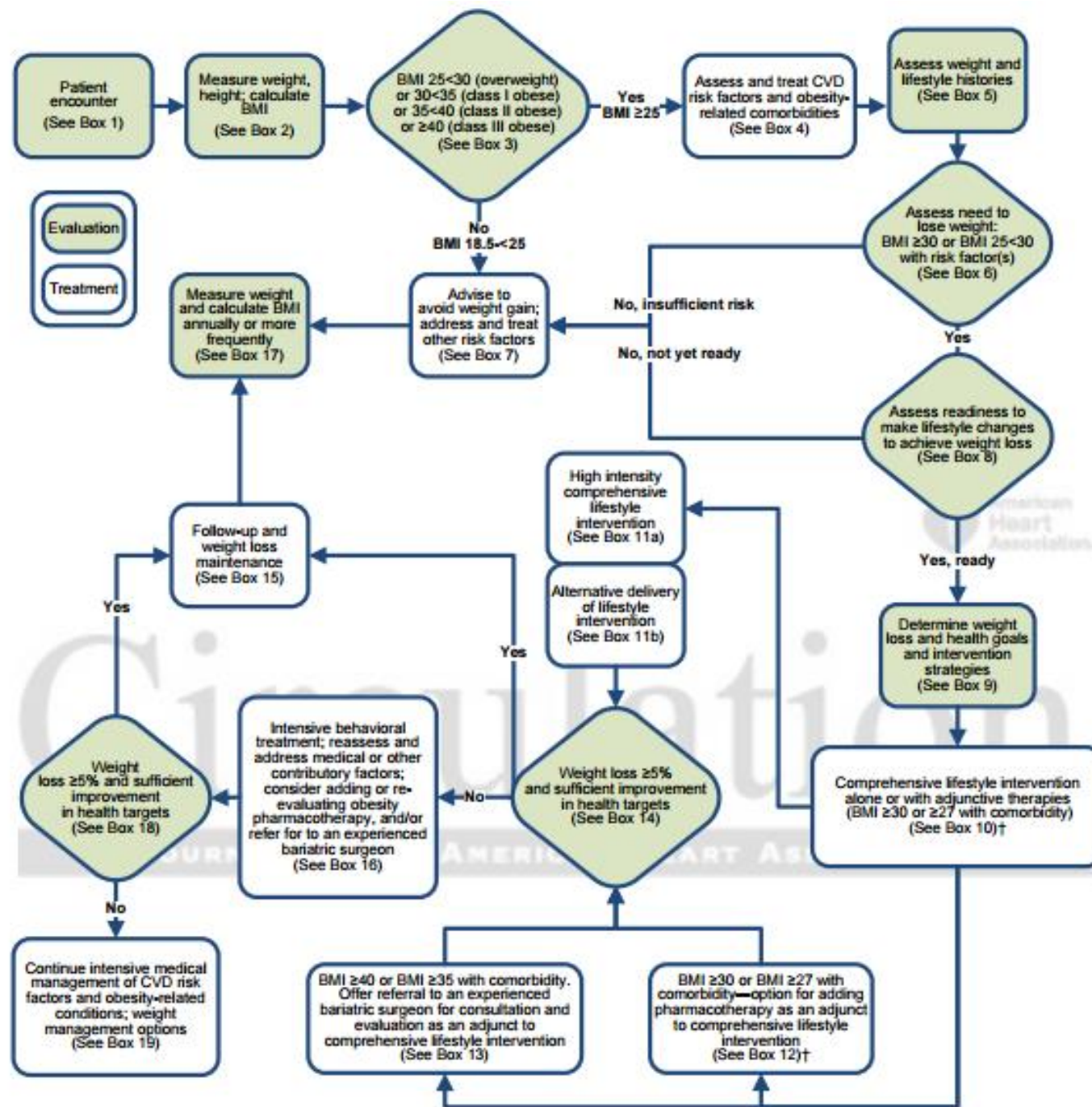
Stress

Weight Cycling

Maternal/Paternal
Obesity

Weight Bias in Healthcare





Initial Steps to Assess Patients with Obesity

(AHA/ACC/TOS guidelines)

Patient Encounter

Measure Height, Weight, and Calculate BMI

Determine Weight Category

Assess and Treat CVD risk factors and obesity related co-morbidities

Assess Weight and Lifestyle Histories

Assess and treat CVD risk factors and obesity related co-morbidities

- ▶ History and physical examination
- ▶ Clinical and laboratory assessments
 - ▶ Blood pressure
 - ▶ Fasting blood glucose
 - ▶ Fasting lipid panel (expert opinion)
 - ▶ Waist circumference measurement (BMI 25- ≤ 35)
 - ▶ (>88 cm or >35 in for women and >102 cm or >40 in for men)
 - ▶ Intensive Management of CVD risk factors (these and host of others):
 - ▶ Hypertension
 - ▶ Dyslipidemia
 - ▶ Prediabetes/ Diabetes
 - ▶ Obstructive Sleep Apnea (OSA)

Assess Weight and Lifestyle Histories

- ▶ Ask questions about history of weight gain and loss over time
- ▶ Details of previous weight loss attempts
- ▶ Dietary habits
- ▶ Physical activity
- ▶ Family history of obesity
- ▶ Other medical conditions or medications that may affect weight

Next Steps to Assess Patients with Obesity

Assess need to lose weight

Advise to avoid weight gain and address other risk factors

Assess readiness to make change and identify barriers to success

Determine weight loss and health goals and intervention strategies

Comprehensive lifestyle therapies alone or in conjunction with adjunctive therapies

Guidelines for Selecting Obesity Treatment

BMI Category

Treatment	25-26.9	27-29.9	30-34.9	35-39.9	≥40
Diet, PA, & Behavioral Therapy	With co-morbidities	With co-morbidities	+	+	+
Pharmacotherapy		With co-morbidities	+	+	+
Weight Loss Surgery			With co-morbidities		

•Prevention of weight gain with lifestyle therapy is indicated in any patient with a **BMI ≥ 25 kg/m²**, even without co-morbidities, while weight loss is not necessarily recommended for those with a BMI of 25–29.9 kg/m² or a high waist circumference, unless they **have two or more co-morbidities**.

•Consider pharmacotherapy only if a patient has not **lost 1 pound per week** after **6 months** of combined lifestyle therapy.

The + represents the use of indicated treatment regardless of co-morbidities.



Common Weight Promoting Medications

▶ **Anti-psychotics**

- ▶ Risperidone
- ▶ Lithium
- ▶ Quetiapine
- ▶ Aripiprazole
- ▶ Olanzapine
- ▶ Valproic Acid

▶ **Anti-depressants**

- ▶ Citalopram
- ▶ Duloxetine
- ▶ Venlafaxine

● **Sleep Agents**

- Zolpidem
- Eszopiclone
- Trazadone
- Zaleplon

● **Neuropathic Agents**

- Gabapentin
- Pregablin

● **β-Blockers**

● **Steroids**

● **Insulin**

● **Hypoglycemic Agents**

Treatment Strategy for Weight Promoting Medications

- ▶ Investigate whether medications are a likely source of weight gain in patients.
- ▶ If a weight promoting drug may be discontinued, discontinue the agent.
- ▶ If discontinuation of a weight promoting medication is not feasible, consider the use of anti-obesity pharmacotherapy for weight loss in conjunction with appropriate lifestyle changes.

Anti-obesity pharmacotherapy agents

- ▶ Most agents may be characterized into **3 primary groups**
 - 1) Centrally acting medications that impair dietary intake
 - 2) Medications that act peripherally to impair dietary absorption
 - 3) Medications that increase energy expenditure

FDA Approved Anti-obesity pharmacotherapy agents

Drug class/name

CNS Stimulants/ Anorexiant:

Phentermine

*Phentermine/topiramate

*Lorcaserin

Diethylpropion

Phendimetrazine

Benzphetamine

Anti-Depressants/ Dopamine Reuptake Inhibitors/ Opioid Antagonists:

*Bupropion/ Naltrexone

Gastrointestinal Agents/Other:

*Orlistat

*GLP-1 agonists (liraglutide)

Other Anti-obesity pharmacotherapy agents

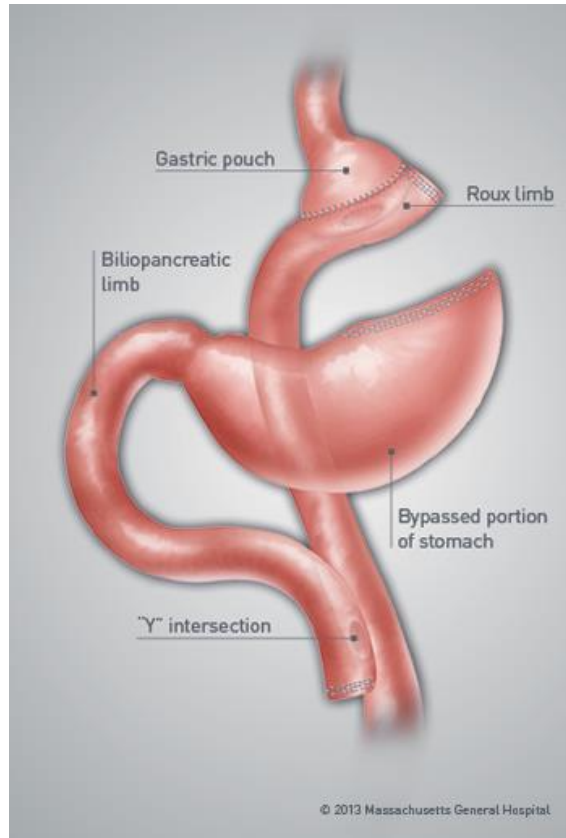
Drug class/name
Topiramate
Zonisamide
Bupropion
Metformin
Amylin agonist (pramlintide)
SGLT2 Inhibitors (canagliflozin, dapagliflozin)

Criteria for Weight Loss Surgery

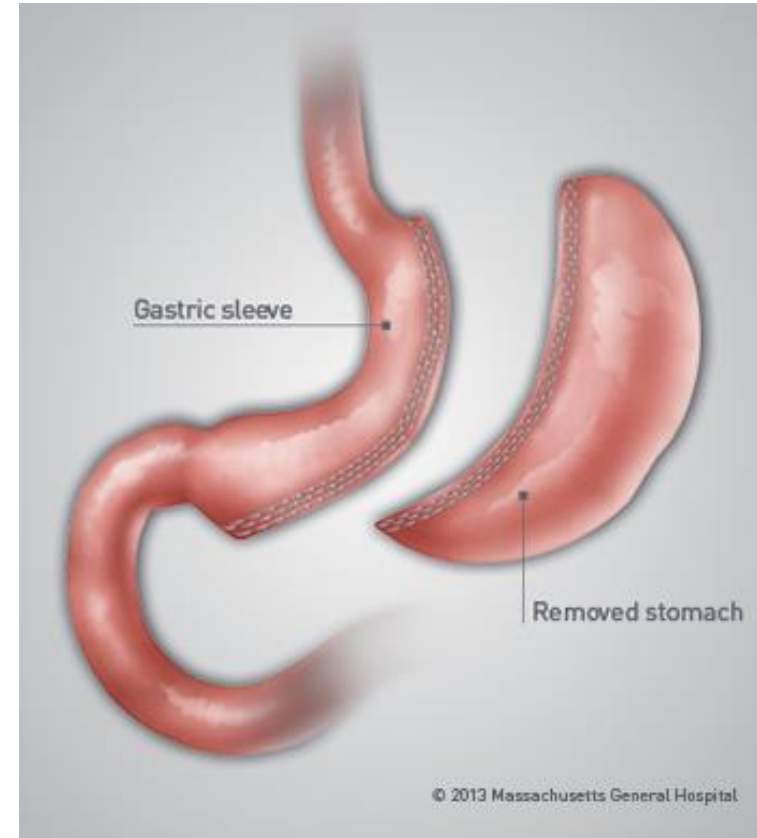
- ▶ Body Mass Index (BMI) ≥ 40 OR
- ▶ BMI of 35-39.9 + 1 serious co-morbidity
 - ▶ Type 2 Diabetes Mellitus
 - ▶ Coronary Artery Disease
 - ▶ Obstructive Sleep Apnea
- ▶ Prior Unsuccessful Weight Loss Attempts
- ▶ Acceptable operative risks
- ▶ Ability to participate in treatment and long term follow-up
- ▶ An understanding of the operation and the lifestyle changes needed to sustain long term weight loss

Most Common Weight Loss Surgeries in the US

Roux-en-Y Gastric Bypass



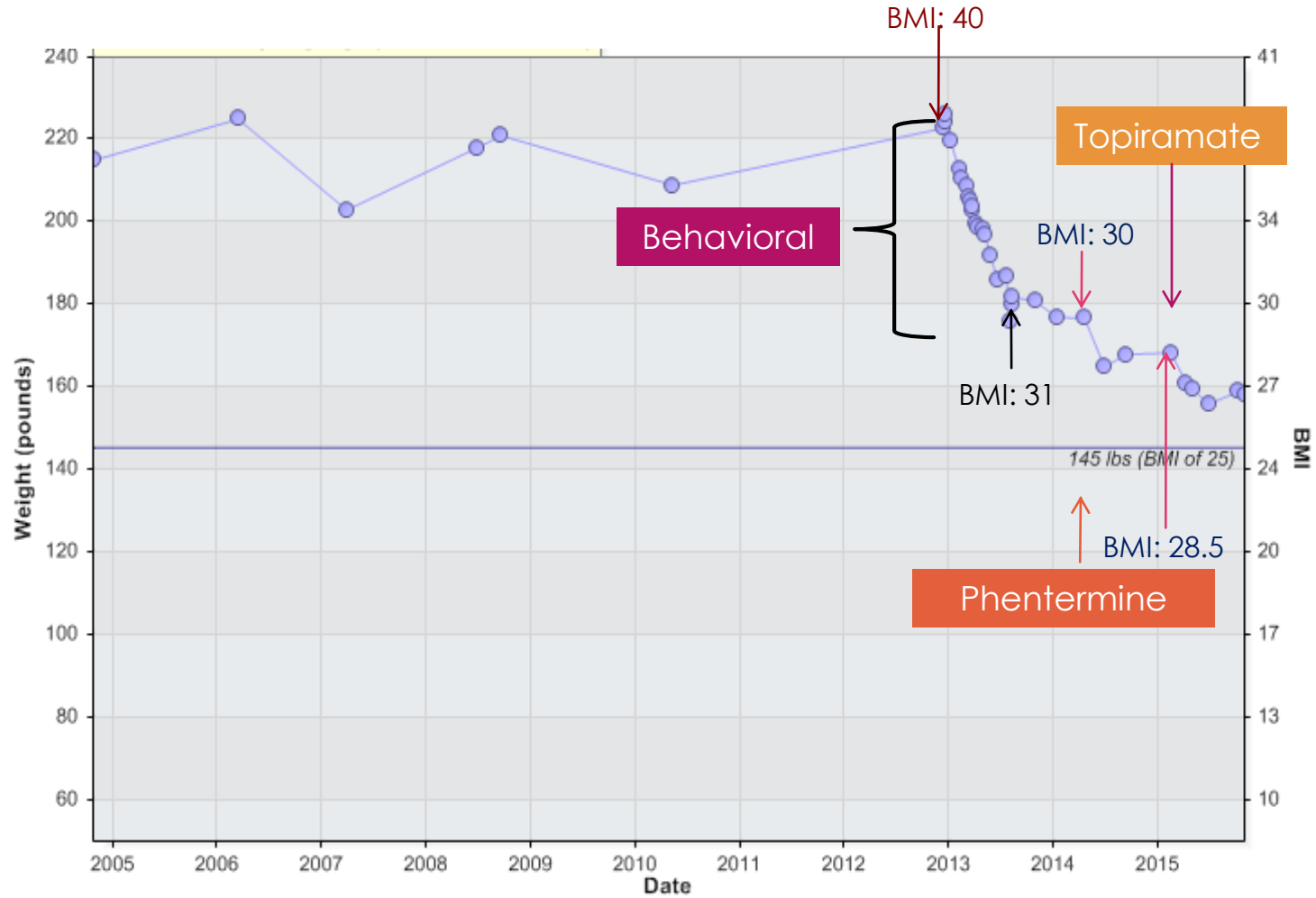
Vertical Sleeve Gastrectomy



Case # 1

- ▶ 54 year old woman
- ▶ Past medical history:
 - ▶ Untreated hypertension
 - ▶ Migraine headaches
 - ▶ GERD
 - ▶ Irritable Bowel Syndrome
 - ▶ Metabolic syndrome
- ▶ Retained 20 lbs with each of her 2 pregnancies
- ▶ Tried many commercial programs which lead to 20 lbs of unsustainable weight loss with each attempt
- ▶ Most significant weight loss with the use of phen-fen in the 1990's (~50 lbs over 6 months)
- ▶ Interested in weight loss medications + behavioral Tx

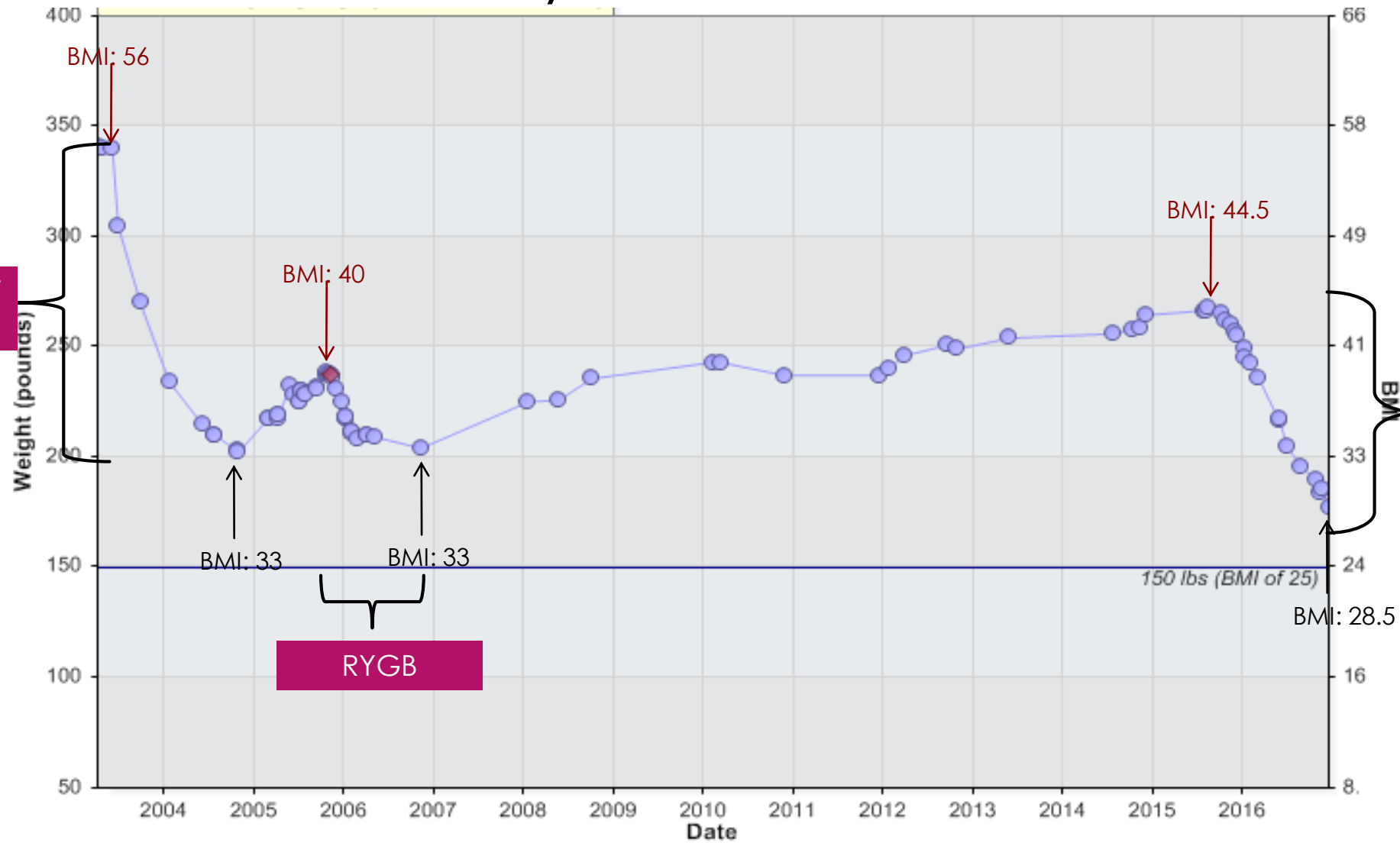
54 year old woman



Case #2

- ▶ 57 year old woman
- ▶ Past medical history:
 - ▶ Dyslipidemia
 - ▶ Breast Cancer
 - ▶ Hypertension
 - ▶ Depression
 - ▶ Pernicious Anemia
- ▶ Diet:
 - ▶ Breakfast: Brown Rice, Cashews, Goat Cheese
 - ▶ Snack: Denies
 - ▶ Lunch: Fish; may be on a sandwich with vegetables
 - ▶ Snack: Cheese and Crackers, Cashew nuts, Protein Bars
 - ▶ Dinner: Salad (Spinach) with cucumbers, tomatoes, goat cheese, peppers, vinaigrette
 - ▶ Snack: Cheese and Crackers, Cashew nuts, Protein Bars
- ▶ Activity: Exercise class (cardio interval circuit- 3 times per week, 1 hour); 2 videos 1/2 hour (low impact cardio); Yoga at night
- ▶ Sleep: 8 hours per night of restful sleep

57 year old woman



Phentermine/
Topiramate

RYGB

Phentermine
+Topiramate



Case #3

Narrative

Ms. Gee is a 29 year-old woman with a weight of 254 (BMI 36.3 kg/m², Class II obesity). She notes that she began to struggle with weight in her early 20's after being in a car accident. She is concerned about her weight due to her strong family history of obesity (both parents have undergone bariatric surgery).

Past Medical History

- ▶ Obesity
- ▶ Allergic rhinitis
- ▶ Eosinophilic esophagitis
- ▶ Migraine headaches
- ▶ Asthma
- ▶ Chronic back pain
- ▶ Plantar fasciitis
- ▶ Polycystic ovaries
- ▶ Dyslipidemia

Case #3 (continued)

Medications

- ▶ **Albuterol Inhaler Hfa** 2 PUFF INH Q4-6H PRN
- ▶ **Albuterol Nebulizer** 2.5 MG (5 MG/ML 20 ML SOLUTION (0.5%) Take 2.5 ML NEB Q4H PRN
- ▶ **Fexofenadine Hcl** 180 MG PO PRN
- ▶ **Fluticasone Propionate** 4 PUFFS INH BID
- ▶ **Ibuprofen** 600 MG PO BID PRN pain
- ▶ **Lidocaine 5% Patch** 1 PATCH TOP as directed, wear 12 hours on, then 12 hours off.
- ▶ **Mirena Intrauterine System** 52 MG PV QMONTH
- ▶ **Budesonide/ Formoterol 160/4.5** 2 PUFF INH BID
- ▶ **Zolmitriptan** 5 MG PO as directed

Case #3 (continued)

Weight History

- ▶ Ms. Gee notes that she gained weight after a car accident in her early 20's. The patient notes that it is difficult to discern whether or not the accident contributed to her weight gain. She notes that all of her family members on both sides of her family have struggled with their weight. Of note, her siblings all began to gain weight in their early 20's.
- ▶ At the age of 22, she tried Weight Watchers on 2 occasions. She lost 10-15 lbs. with each session, but she regained the weight quickly. She also tried Get in Shape for Women at the age of 28 during which she lost 30 lbs., but she regained this weight also after an injury to her foot caused her to be less active. She has been on topiramate for migraine headaches in past with no weight loss noted.

Case #3 (continued)

Diet

Wakes: 5:30am

- ▶ **Breakfast (7:30am):** coffee with 1 Equal and splash of cream, not usually any food OR on weekends: Chex cereal with almond milk
- ▶ **Snack:** occasionally crackers with PB OR whole wheat toast plain
- ▶ **Lunch (2-3pm):** "not that hungry": salad from Whole Foods: mixed greens, cucumbers, broccoli, zucchini, other vegetables, corn, egg, sometimes cheese, with oil and vinegar (small amounts), zero kcal Tazo tea OR Lean Cuisine meal OR occasionally small Italian sub (only eats 1/2), oil and vinegar and cheese (no mayo), 1-2 pieces mini candies
- ▶ - no lunch on weekends, breakfast instead
- ▶ **Dinner (8pm):** broiled steak, steamed mixed veggies, rarely starch (q2wks mashed sweet pot or wild rice) OR chicken/pork, mixed vegetables, water or diet soda
- ▶ **Snack:** occasionally sorbet

Activity

- ▶ She walks for 30 minutes for 5 times per week. She does note limitations on physical activity secondary to pain.

Case #3 (continued)

Sleep History

- ▶ Sleeps 7 hours per night; she will occasionally wake up due to back pain

Review of Systems

- ▶ **Gen:** No fatigue
- ▶ **HEENT:** No glaucoma. Occasional rhinorrhea.
- ▶ **C.V.:** No palpitations. No swelling in legs.
- ▶ **Resp:** No wheezing. Mild symptoms of sleep apnea (daytime somnolence). No insomnia
- ▶ **GI:** No abdominal pain after eating fatty foods. No n/v/d/c. Occasional heartburn (once per week). No h/o liver disease.
- ▶ **GU:** Mild symptoms of polycystic ovary disease. No infertility, History of irregular menstrual cycles, no hirsutism, History of acne. No urinary incontinence. No h/o nephrolithiasis.
- ▶ **Skin:** No hair loss. No skin fold infections. No h/o lipomas
- ▶ **MSS:** Severe joint pain (back)
- ▶ **Neuro:** History of migraine headaches (once per month). H/o head trauma (concussion with car accident in 2012)
- ▶ **Heme/Lymph:** No h/o clotting disorders
- ▶ **Endocrine:** No episodes of low blood glucose. No symptoms of hypothyroidism. (heat or cold intolerance, hair loss, dryness of skin) . No symptoms of Cushing's syndrome

Case #3 (continued)

Physical Exam

- ▶ **BP 130/80, HR 60**
- ▶ **General:** NAD. Central and gluteal adiposity. Waist circumference (in)-46
- ▶ **Skin:** No acanthosis nigricans. No skin tags. No intertrigo. No lipomas
- ▶ **HEENT:** No cushingoid facial habitus. PERRL. Anicteric. Tongue moist. No OP crowding.
- ▶ **Neck:** No thyromegaly. No supraclavicular adiposity. No dorsal adiposity
- ▶ **Heart:** RRR no m/r/g
- ▶ **Lungs:** CTAB
- ▶ **Abdomen:** Soft. NT/ND. No striae or hernias. NABS.
- ▶ **Extremities:** No edema. No venous stasis changes.
- ▶ **Neurologic:** Nonfocal. DTR 2+ bilaterally

Weight Graph at Presentation

(BMI: 36.2 (Class II obesity), Weight: 254 lbs.)



Case #3 (continued)

► Question 1

Based upon her weight current weight status, strong family history of obesity, BMI 36.2, which of the following is the most appropriate next step?

- a. Start with behavioral therapy for weight loss in a group setting.
- b. Start metformin 500 mg PO BID for PCOS
- c. Start topiramate 25 mg daily for patient's monthly headaches and schedule a follow up visit in 1 month.
- d. Start phentermine 15 mg and schedule a follow up visit in 1 month.

Case #3 (continued)

Narrative (continued)

- ▶ The patient was started on phentermine 15 mg. She returns for a 1 month follow up visit with 10 lbs. of weight loss noted. She has been tolerating phentermine without any issues. In her first 2 weeks of use, she noted nausea which has resolved at this time. Otherwise, she denies any palpitations, difficulty sleeping, or other issues associated with the use of phentermine.
- ▶ She does have significant life stressors which have been of some concern, but she notes that this is improving at this time. As a hospital employee, she has returned on a daily basis for weighing. She has noted weight stabilization over the last 2.5 weeks.

Case #3 (continued)

Diet:

- ▶ Breakfast: Eats 2 times per week, Protein Smoothie
 - ▶ Lunch: Skips Lunch Regularly
 - ▶ Dinner: Varies; Chicken with Vegetables, OR Steak with Vegetables, OR Pizza (Cheese), Skips Dinner 1 time per week
- Fluid Intake: 1.5 gallons of water daily

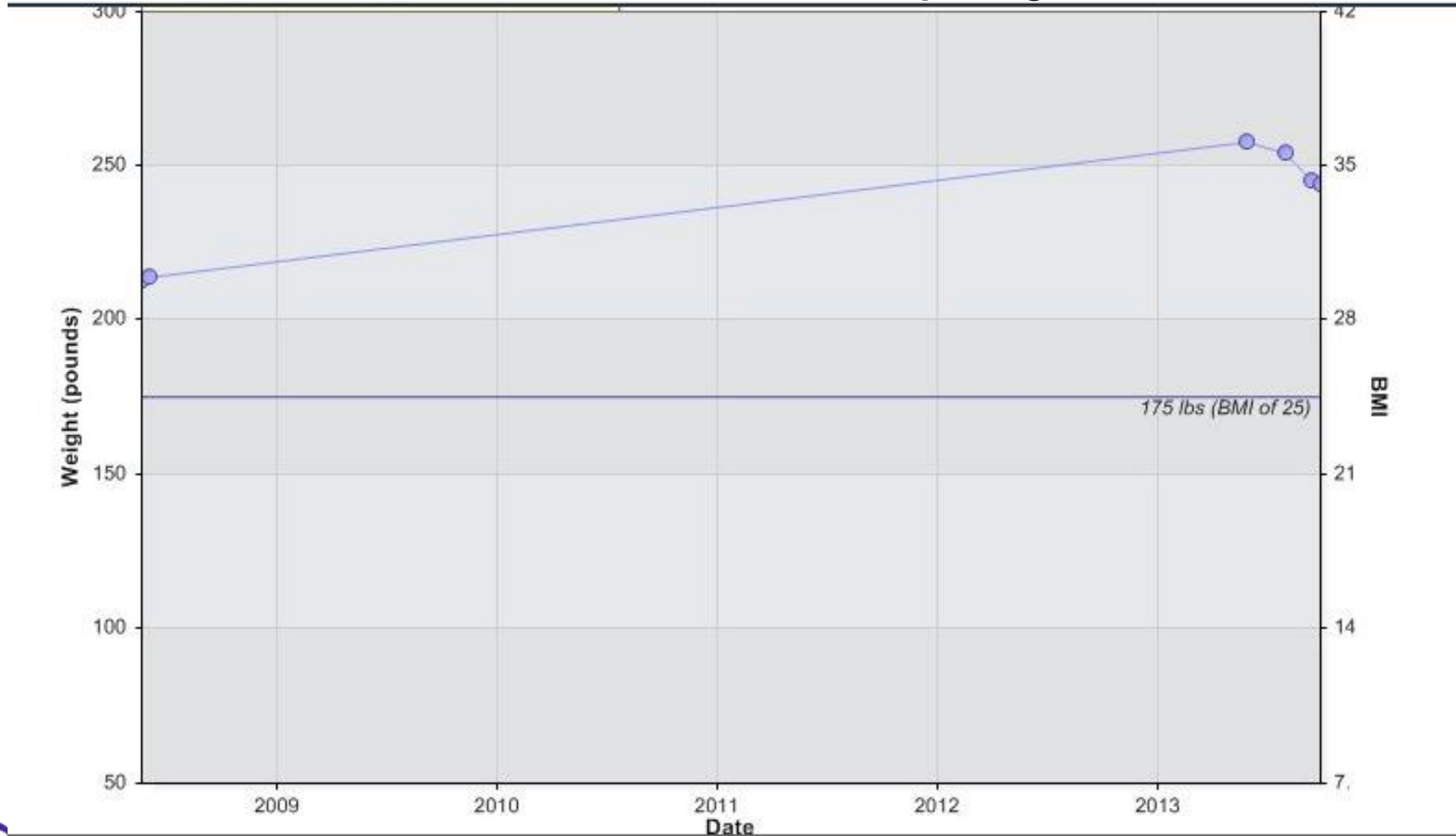
Exercise:

- ▶ Walk to/from train station; Walking around city; Pedometer: 10,000-14,000 steps daily; No strength training

Sleep: 3-4 hours per night --> will aim to increase sleep as stress level improves

- ▶ **Hunger:** No hunger on phentermine
- ▶ **Satiety:** Fills quickly on phentermine
- ▶ Blood Pressure: 130/84; Pulse: 84, Waist circumference: 41.5 (lost 5.5 inches off of waist in 1.5 months)

Her BMI is now 34.8 kg/m²; Lost 12.7% of her excess body weight and 3.9% of her total body weight



Case #3 (continued)

Question 2

Which of the following is the best next step?

- a. Continue phentermine 15 mg PO QAM with a follow up visit in 1-2 months.
- b. Increase phentermine to 30 mg PO QAM with a follow up visit in 1-2 months.
- c. Keep phentermine at 15 mg PO QAM and add topiramate 25 mg PO QHS with a follow up visit in 1-2 months.
- d. Discontinue phentermine 15 mg PO QAM with a follow up visit in 1-2 months.

Case #3 (continued)

Narrative (continued)

You increased Ms. Gee's phentermine dose to 30 mg. She returns to clinic 2 months later (she has continued her daily weights at the Weight Center in the interim). While she has lost a considerable amount of weight, she does note some recent frustration with weight stabilization on her current regimen. Otherwise, she denies any palpitations, difficulty sleeping, or other issues associated with the use of phentermine.

Diet:

- ▶ Breakfast: Eats 4 times per week, Protein Smoothie, or Toast (wheat) with peanut butter
 - ▶ Lunch: California Roll (Sushi), Salad (Mixed Greens) with Cucumbers, Broccoli, Carrots, Corn, Egg with Oil and Vinegar (or Lemon Juice)
 - ▶ Dinner: Varies; Chicken with Vegetables, OR Steak with Vegetables, Skips Dinner 1 time per week
- Fluid Intake: 1.5 gallons of water daily

Case #3 (continued)

Exercise:

- ▶ Walk to/from Train Station; Walking around city; No strength training--> will pursue
- ▶ 2-3 miles daily of walking
- ▶ Hiking on Weekend (3 miles uphill--> mountain)

Sleep: 4-5 hours per night --> will aim to increase sleep as stress level improves

Hunger: Improved on phentermine (not as pronounced as was noted with start of medication)

Satiety: Fills quickly (less pronounced as was noted with start of medication)

Case #3 (continued)

Her BMI is now 32.5 kg/m²; Lost 36% of her excess body weight and 11.6% of her total body weight



Case #3(continued)

Question 3

How would you proceed regarding this patient's weight management at this time?

- a. Continue phentermine 30 mg and return to clinic for follow up in 2-3 months.
- b. Reduce phentermine to 15 mg and return to clinic for follow up in 2-3 months.
- c. Continue phentermine at 30 mg PO QAM and add topiramate 25 mg PO QHS with a follow up visit in 2-3 months.
- d. Discontinue medications and follow up with good behavioral practices that the patient has instituted in 2-3 months.

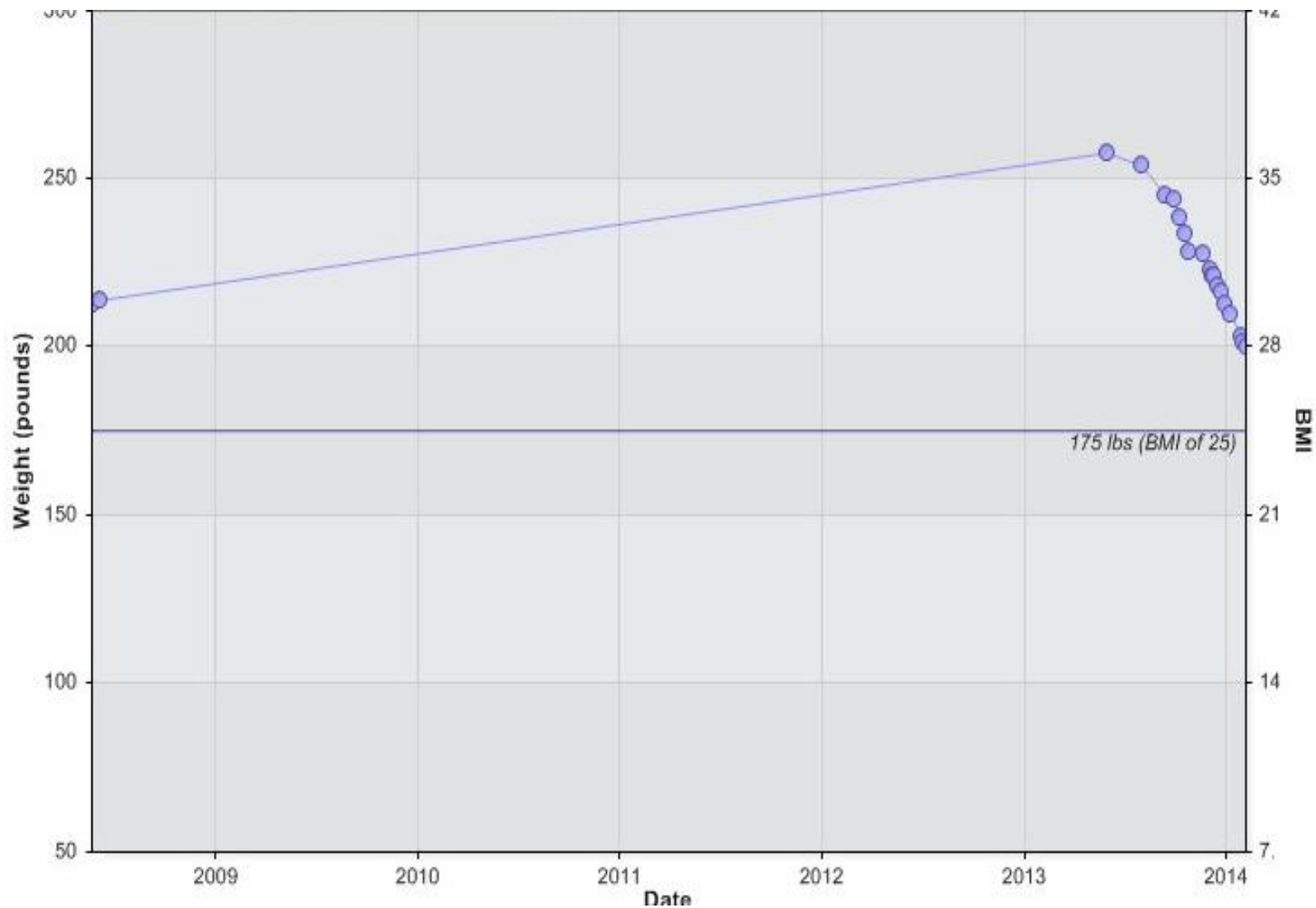
Case #3 (continued)

Narrative (continued)

- ▶ The patient is maintained on phentermine 30 mg PO QAM and the patient was started on topiramate 25 mg at bedtime to augment her weight loss response and help with her increased hunger and decreased satiety she noted on phentermine monotherapy. The patient returns and is very encouraged with her weight loss response. She has done well on the combination of phentermine and topiramate. She denies any side effects from either medication.
- ▶ She has several life stressors as she has recently relocated to a neighboring state, but she continues her work at the hospital as a surgery scheduler. Her commute time is now 2-3 hours each direction (to/from work). Also, she has had a recent cholecystectomy secondary to gallstones. Despite her life stressors, she continues to lose weight.

Case #3 (continued)

Her BMI is now 28.6 kg/m²; Lost 69.9% of her excess body weight and 22.5% of her total body weight



Case #3 (continued)

Narrative (continued)

- ▶ Ms. Gee is continued on her regimen of phentermine 30 mg PO QAM and topiramate 25 mg PO QHS. She continues to lose weight and incorporate healthy life habits into her daily regimen. Due to occasional breakthrough headaches 3 months later, the patient's topiramate dose was increased to 50 mg.
- ▶ At this time, almost 3 years after her initial start on the medications, she remains on phentermine and topiramate in combination with complete normalization of her weight into a healthy weight range.

Case #3 (continued)

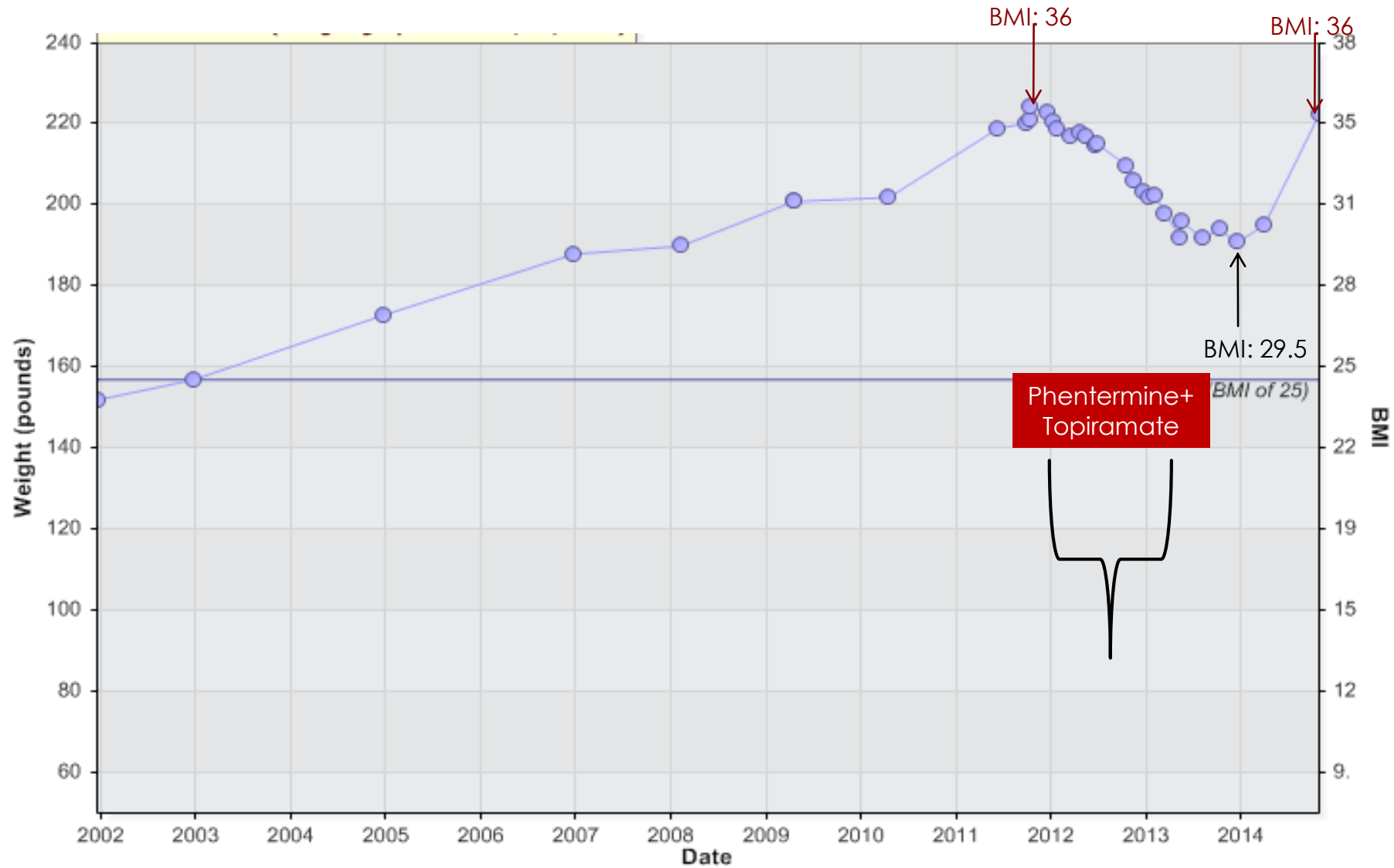
Her BMI is now 24.7 kg/m²; Lost 102% of her excess body weight and 33% of her total body weight



Case #4

- ▶ 36 year old woman
- ▶ Past medical history:
 - ▶ Hypothyroidism
 - ▶ Dysthymia
 - ▶ Allergic Rhinitis
 - ▶ Chronic Back Pain
 - ▶ Migraine Headaches
- ▶ Diet:
 - ▶ Breakfast: Oatmeal and Egg Whites
 - ▶ Lunch: Salad with Chicken
 - ▶ Snack: Fruit (Less Recently)
 - ▶ Dinner: Fruit, Chicken, Rice, Broccoli, Increase in Plant Based Protein
- ▶ Activity: Cardio at gym- 5 days per week (elliptical)-1 hour; Walks at lunch time (45 minutes); strength training with 3 times per week- 1 hour
- ▶ Sleep: 6-7 hours per night of restful sleep

36 year old woman



Take Home Points

- ▶ Track weight loss progress in terms of excess body weight and total body weight at each visit.
- ▶ Listen to patient cues about hunger, satiety, and side effects to drive weight management.
- ▶ Continue to encourage healthy lifestyle behaviors as weight loss medications should serve an adjunct to these.
- ▶ If a patient has a superior response to medication (5-10% of total body weight loss), continue medications indefinitely.
- ▶ Advise women of childbearing age about discontinuing medication prior to conception.