

Obesity

Bariatric and General Surgery
Corinne Chomiczewski, PA-C

Objectives:

Define Obesity

Incidence, prevalence and impact of Obesity

Describe the disease of obesity (*not a disease of will-power*)

Discuss weight loss surgery

What is
obesity?

A life-long

Life-threatening

Progressive

Disease of excess fat storage

Costly to individual and society

How to we
measure the
extent of
obesity?

BODY MASS INDEX (BMI)

= Weight in kg/(Height in meters)²

EXCESS BODY WEIGHT

= Actual Weight- Ideal Weight



IDEAL WEIGHT

Height	Women	Men	
5'	110	120	
5'3"	125	135	
5'5"	135	145	
5'7"	145	155	
5'9"	155	165	
6'	170	185	

CLASSIFICATION OF OBESITY (Adults)

IDEAL BODY WEIGHT	100% IBW	BMI 20-25
MILD OBESITY (Class I)	130% IBW	BMI \geq 30-34.99
MODERATE OBESITY (Class II)	200% IBW	BMI \geq 35-39.99
SEVERE OBESITY (Class III)	220% IBW	BMI \geq 40

CLASSIFICATION OF OBESITY (Children and Adolescents)

Underweight	Less than 5th percentile
Normal or healthy weight	5th percentile to less than 85th percentile
Overweight	85th to less than 95th percentile
Obesity	95th percentile or greater
Severe obesity	120% of the 95th percentile

BMI Calculator for Child and Teen:

<https://www.cdc.gov/healthyweight/bmi/calculator.html>

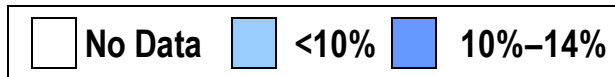
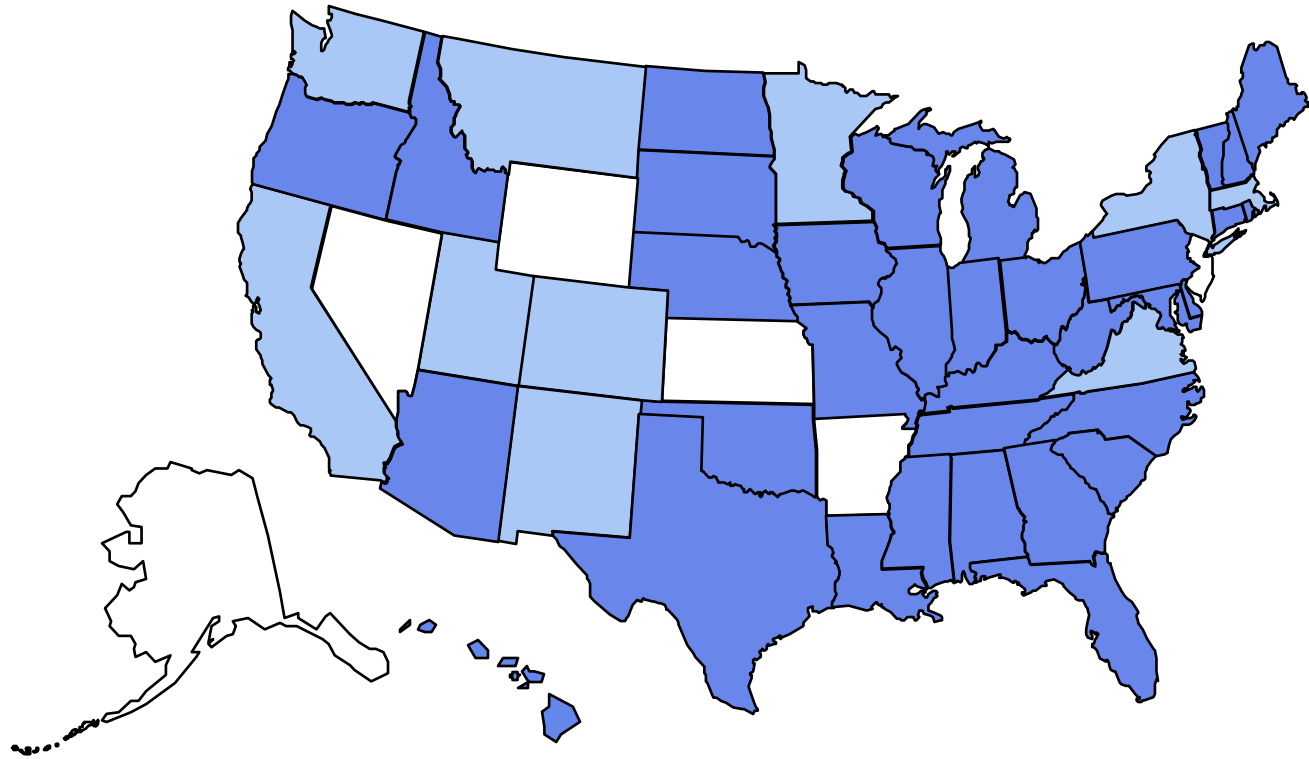
Obesity is an Important Medical Problem!

- Major public health problem affects 25% of industrialized world
- 73.6% Americans are overweight
- 41.9% Americans have obesity
- 19.7% American children (ages 2-19) are overweight or obese (*~ 14.7 million children*)

400,000 deaths annually

Obesity Trends* Among U.S. Adults

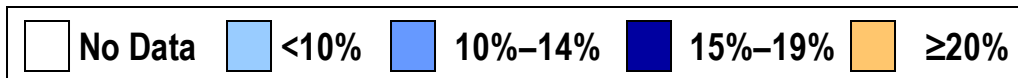
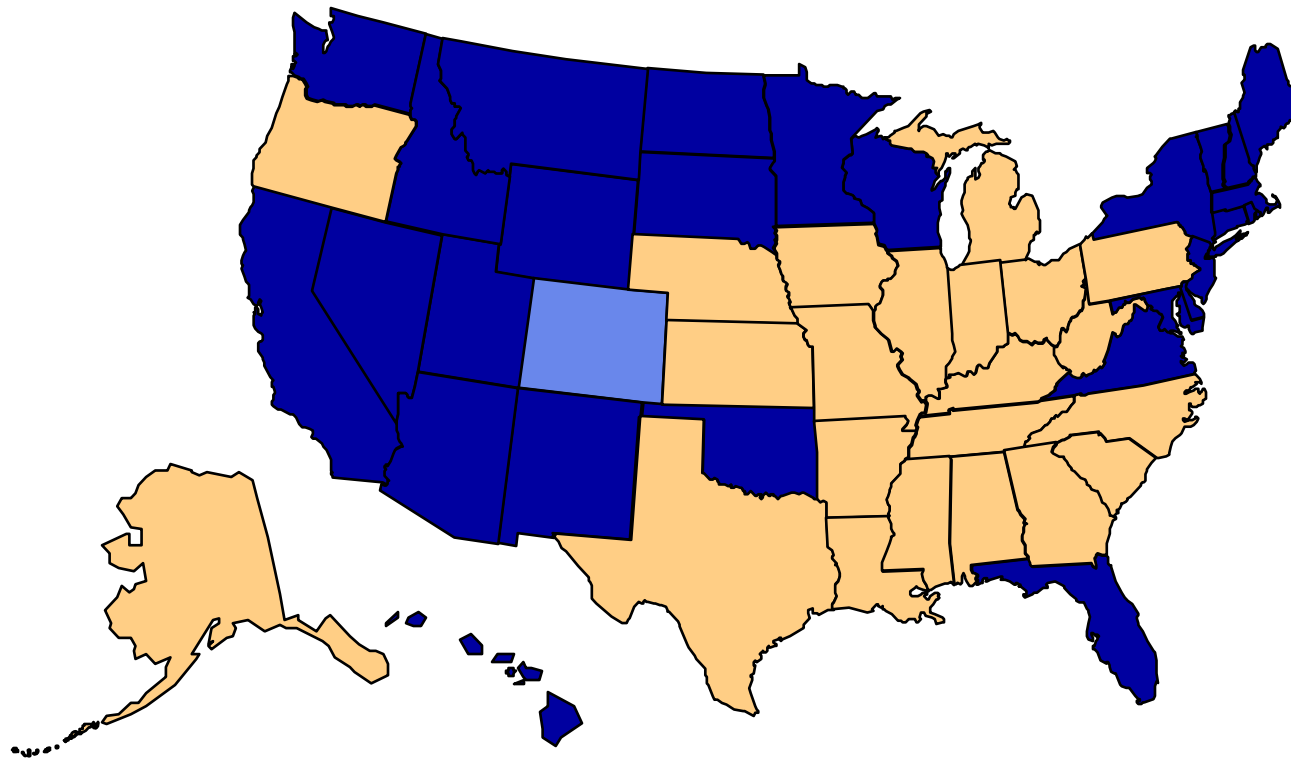
(*BMI ≥ 30 , or ~ 30 lbs. overweight for 5' 4" person)



BRESS, 1990

Obesity Trends* Among U.S. Adults

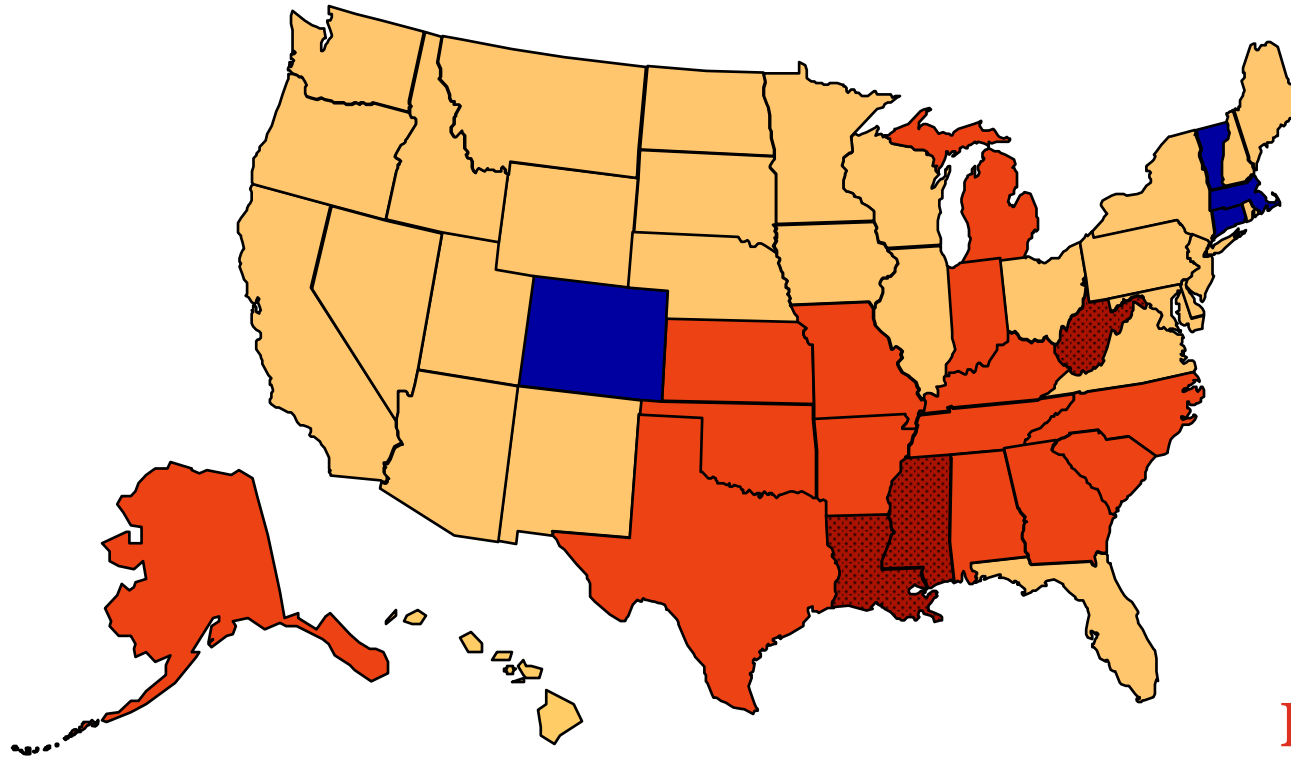
(*BMI ≥ 30 , or ~ 30 lbs. overweight for 5' 4" person)



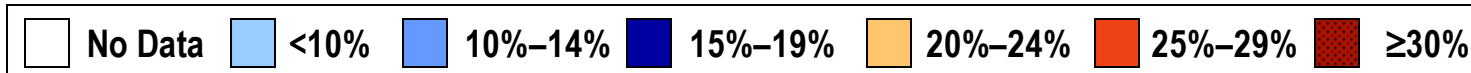
BRESS, 2000

Obesity Trends* Among U.S. Adults

(*BMI ≥ 30 , or ~ 30 lbs. overweight for 5' 4" person)

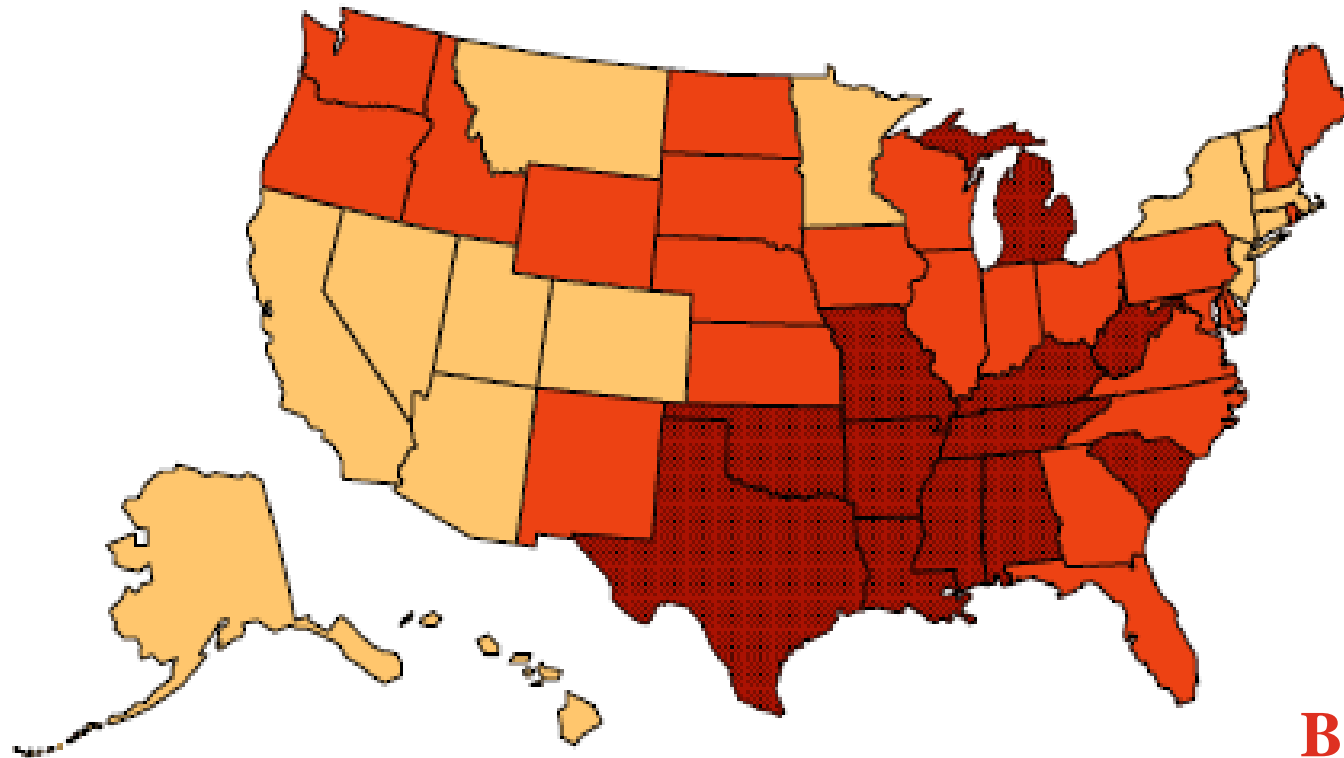


BRESS, 2005



Obesity Trends* Among U.S. Adults

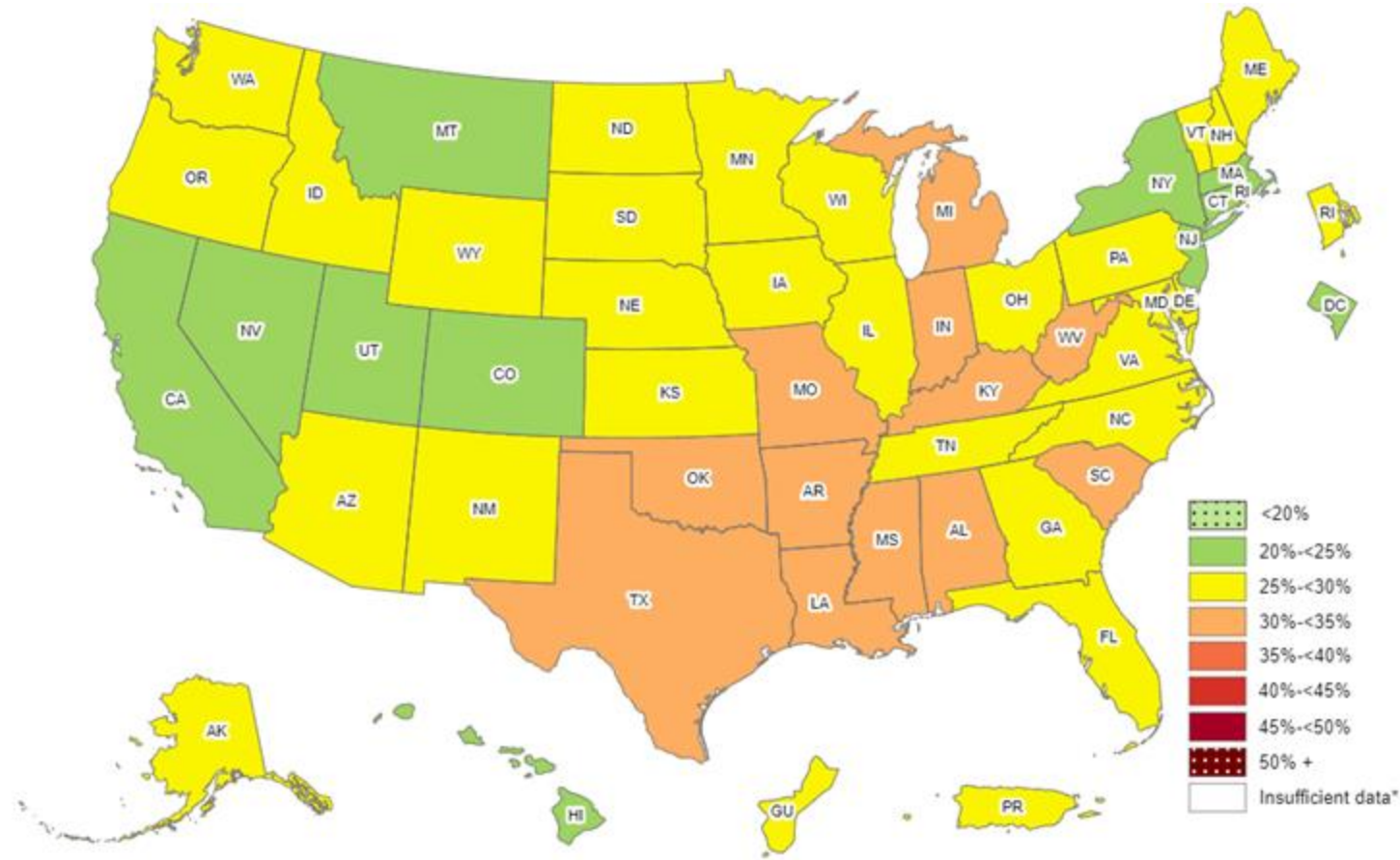
(*BMI ≥ 30 , or ~ 30 lbs. overweight for 5' 4" person)



BREFFS, 2010

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.

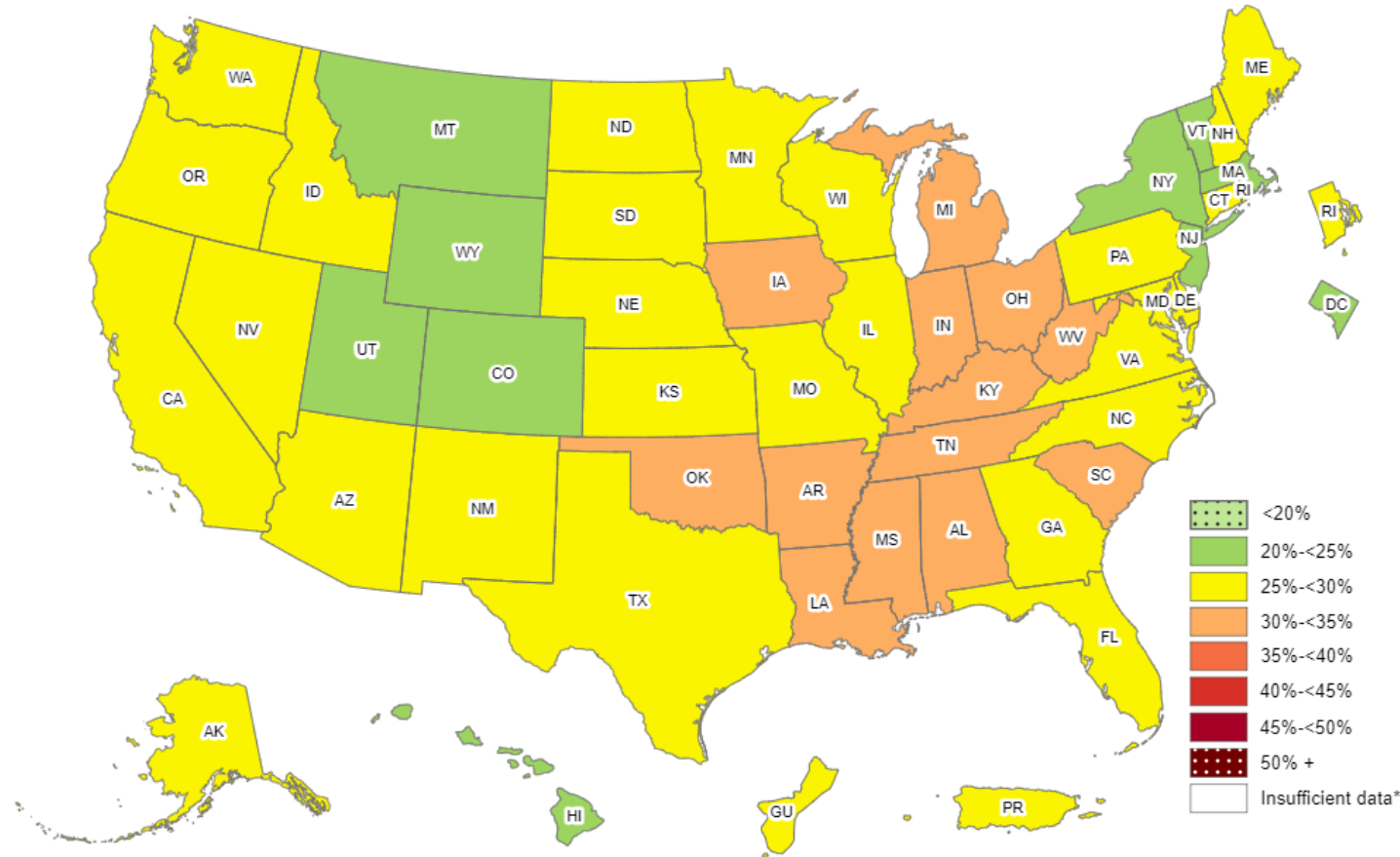


*Sample size <50, the relative standard error (dividing the standard error by the prevalence) $\geq 30\%$, or no data in a specific year.



Prevalence[†] of Self-Reported Obesity Among U.S. Adults by State and Territory, BRFSS, 2012

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

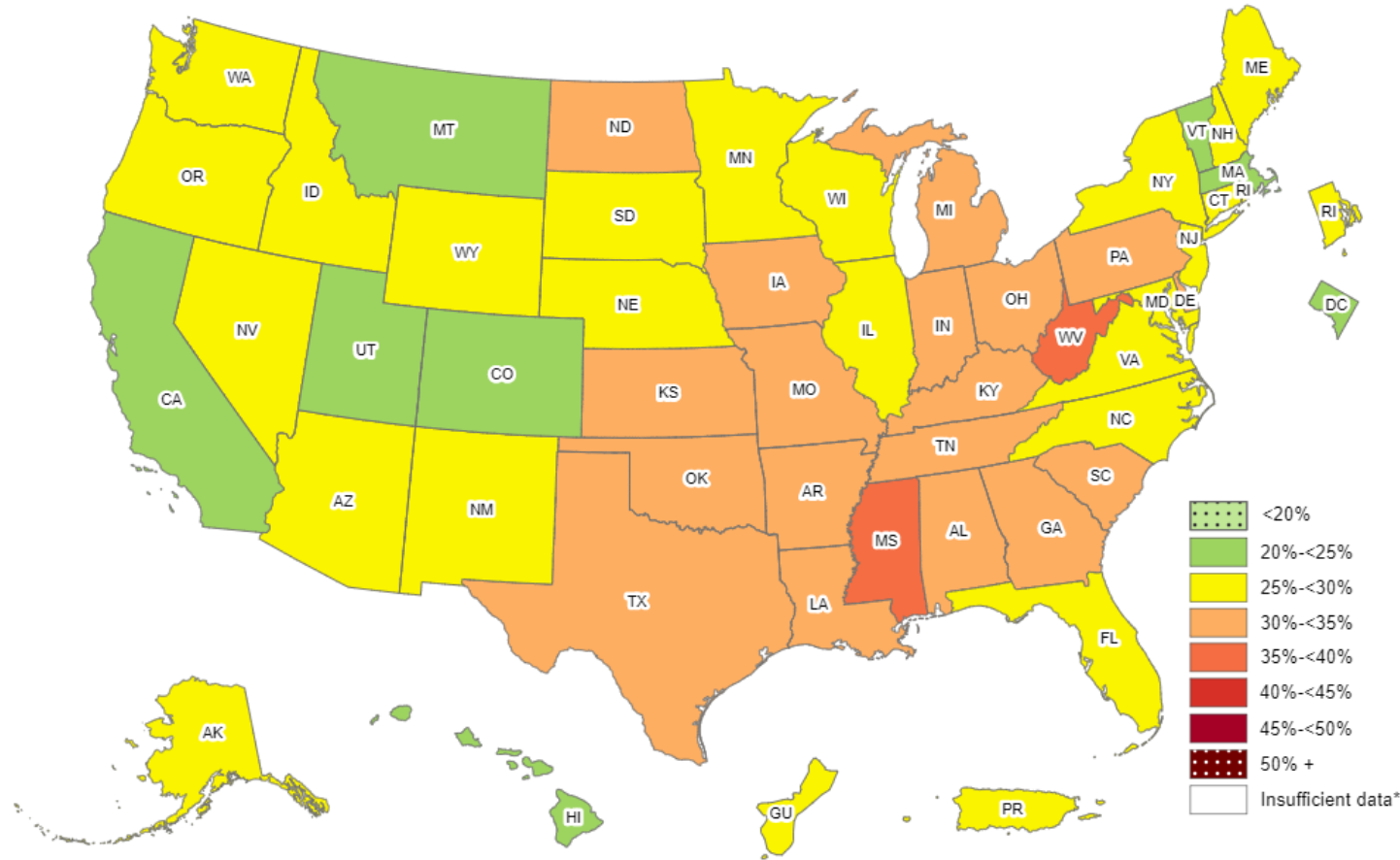


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Prevalence[†] of Self-Reported Obesity Among U.S. Adults by State and Territory, BRFSS, 2013

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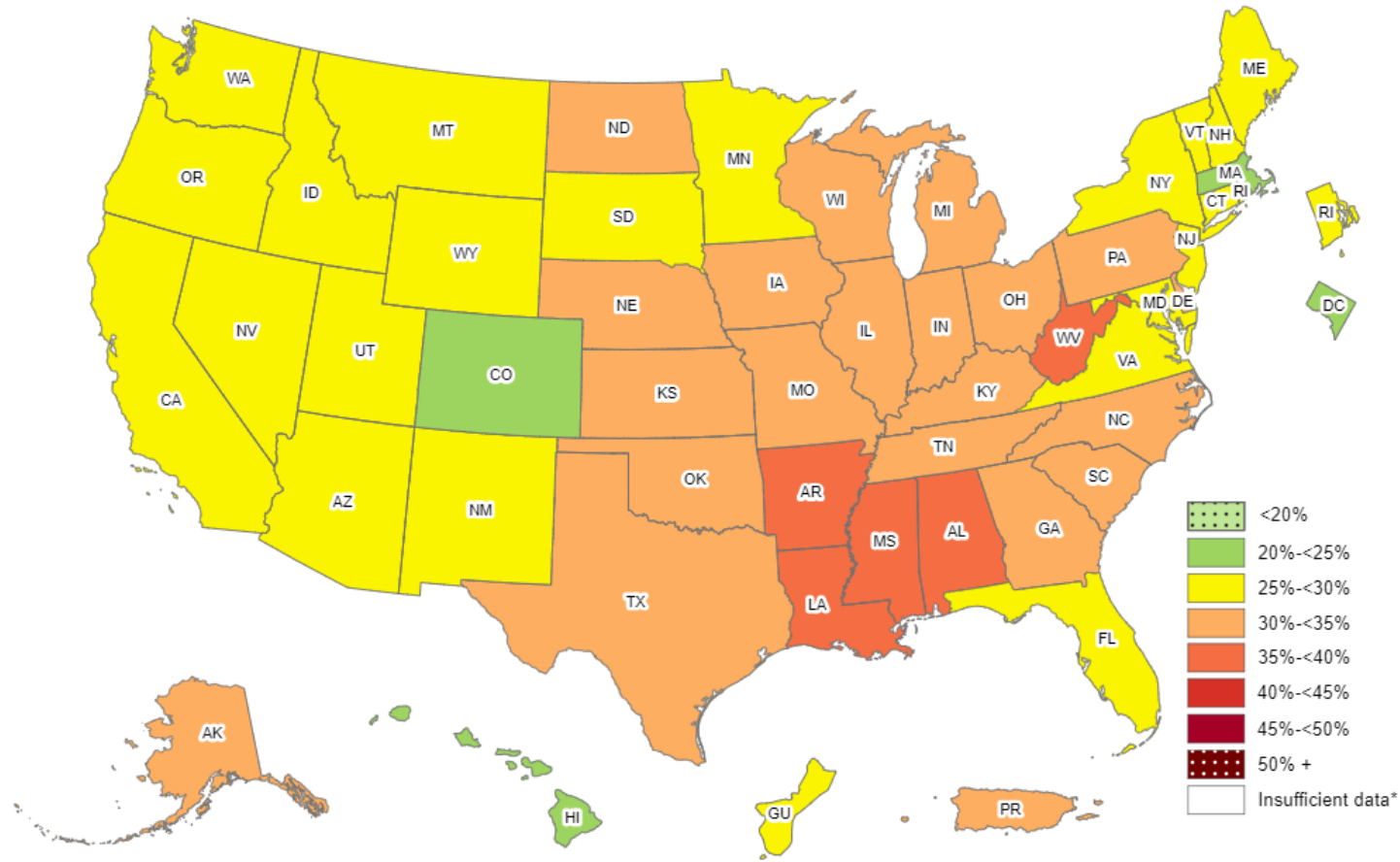


*Sample size <50, the relative standard error (dividing the standard error by the prevalence) ≥30%, or no data in a specific year.



Prevalence¹ of Self-Reported Obesity Among U.S. Adults by State and Territory, BRFSS, 2016

¹ Prevalence estimates reflect BRFSS methodological changes started in 2011. These estimates should not be compared to prevalence estimates before 2011.

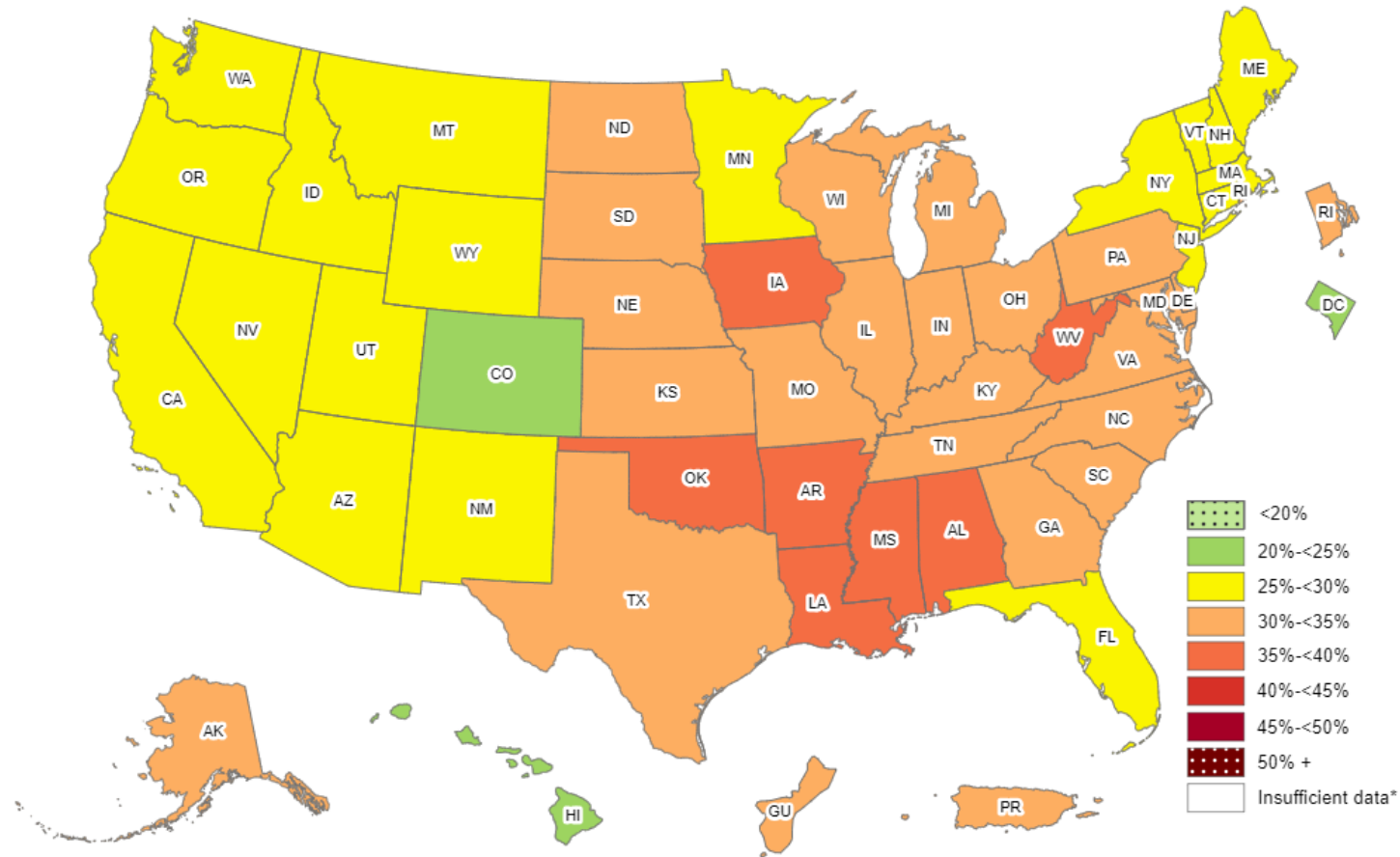


*Sample size <50, the relative standard error (dividing the standard error by the prevalence) $\geq 30\%$, or no data in a specific year.



Prevalence[†] of Self-Reported Obesity Among U.S. Adults by State and Territory, BRFSS, 2017

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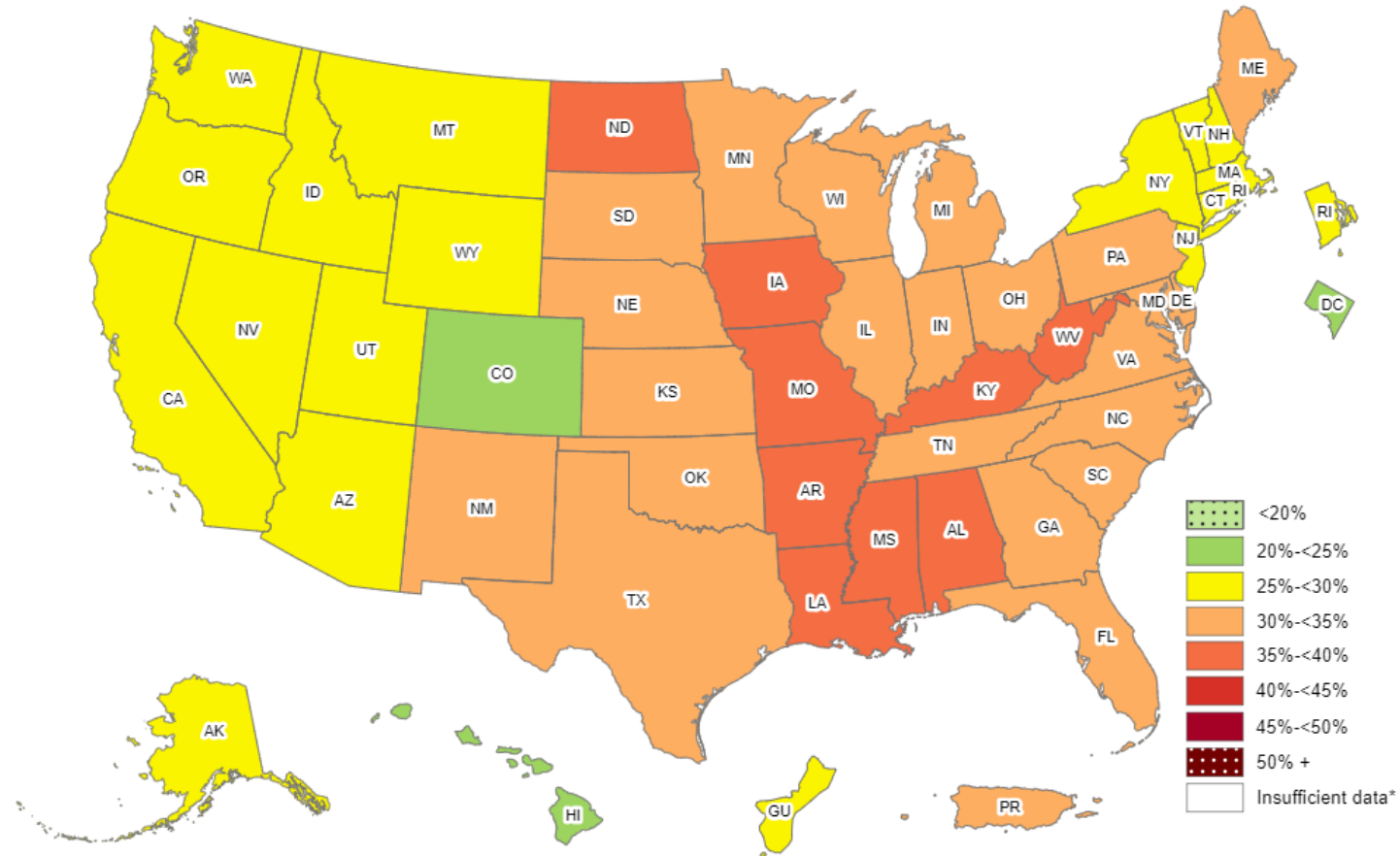


*Sample size <50, the relative standard error (dividing the standard error by the prevalence) $\geq 30\%$, or no data in a specific year.



Prevalence¹ of Self-Reported Obesity Among U.S. Adults by State and Territory, BRFSS, 2018

¹ Prevalence estimates reflect BRFSS methodological changes started in 2011. These estimates should not be compared to prevalence estimates before 2011.

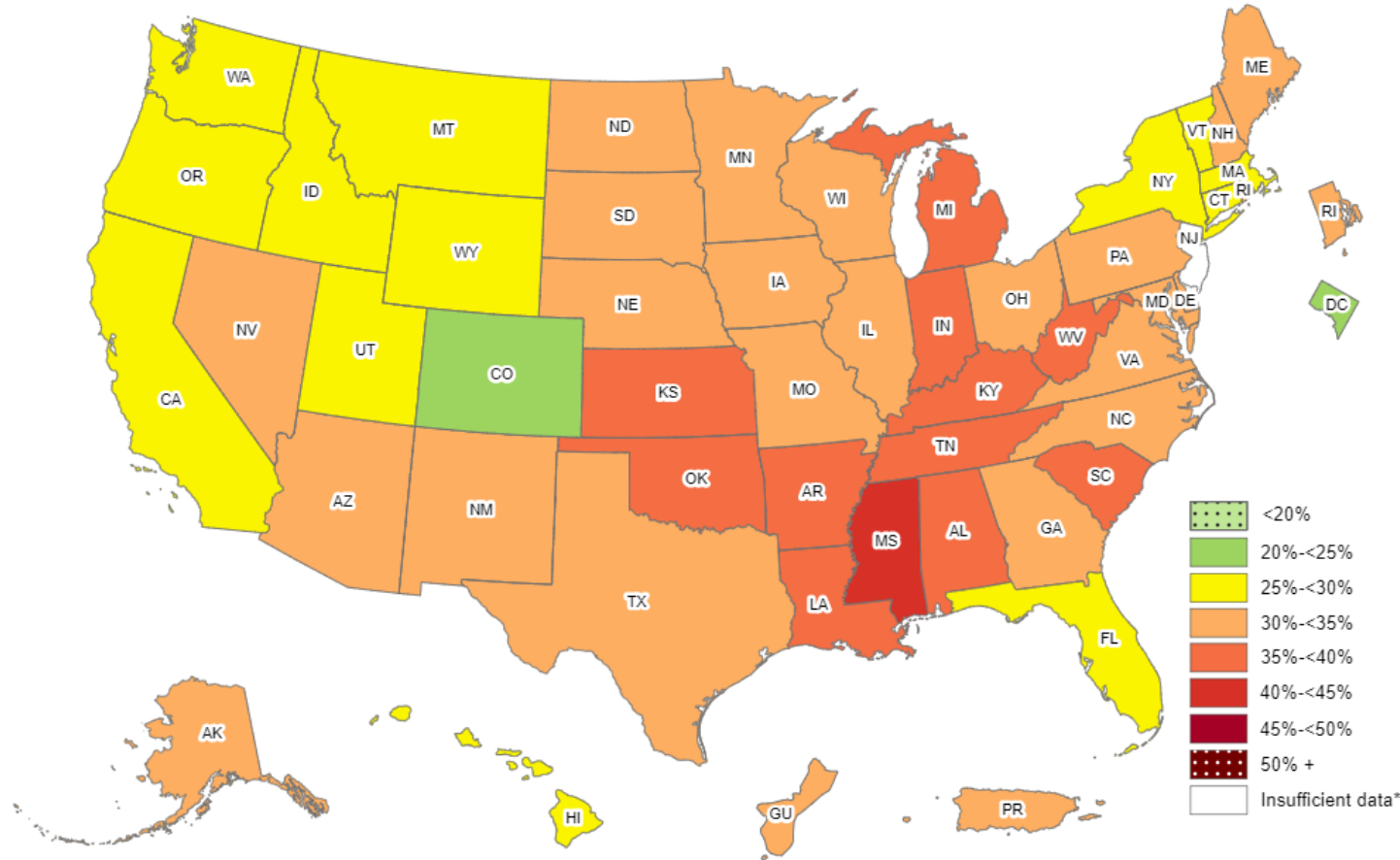


*Sample size <50, the relative standard error (dividing the standard error by the prevalence) $\geq 30\%$, or no data in a specific year.



Prevalence¹ of Self-Reported Obesity Among U.S. Adults by State and Territory, BRFSS, 2019

¹ Prevalence estimates reflect BRFSS methodological changes started in 2011. These estimates should not be compared to prevalence estimates before 2011.

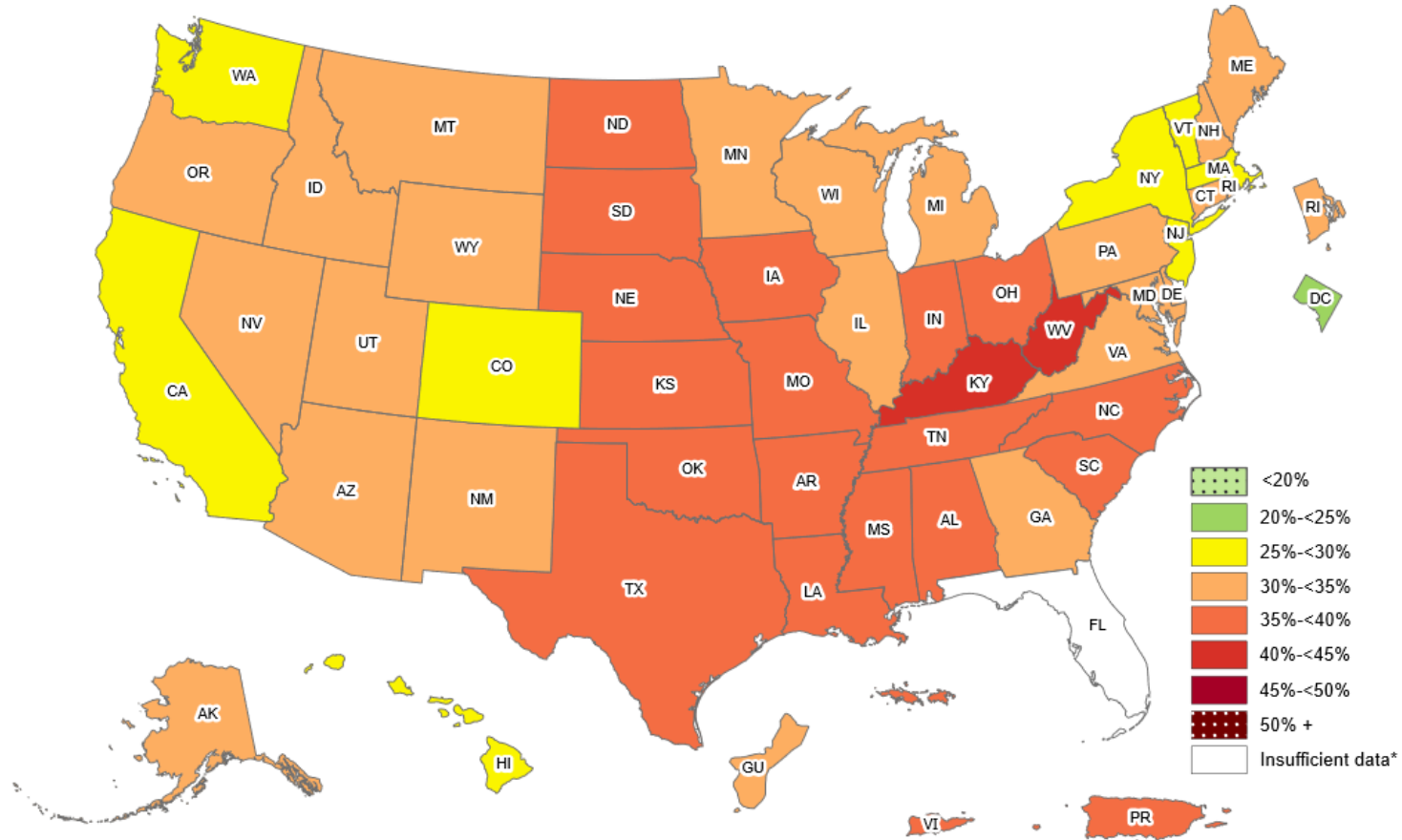


*Sample size <50, the relative standard error (dividing the standard error by the prevalence) $\geq 30\%$, or no data in a specific year.



Prevalence¹ of Self-Reported Obesity Among U.S. Adults by State and Territory, BRFSS, 2021

¹ Prevalence estimates reflect BRFSS methodological changes started in 2011. These estimates should not be compared to prevalence estimates before 2011.

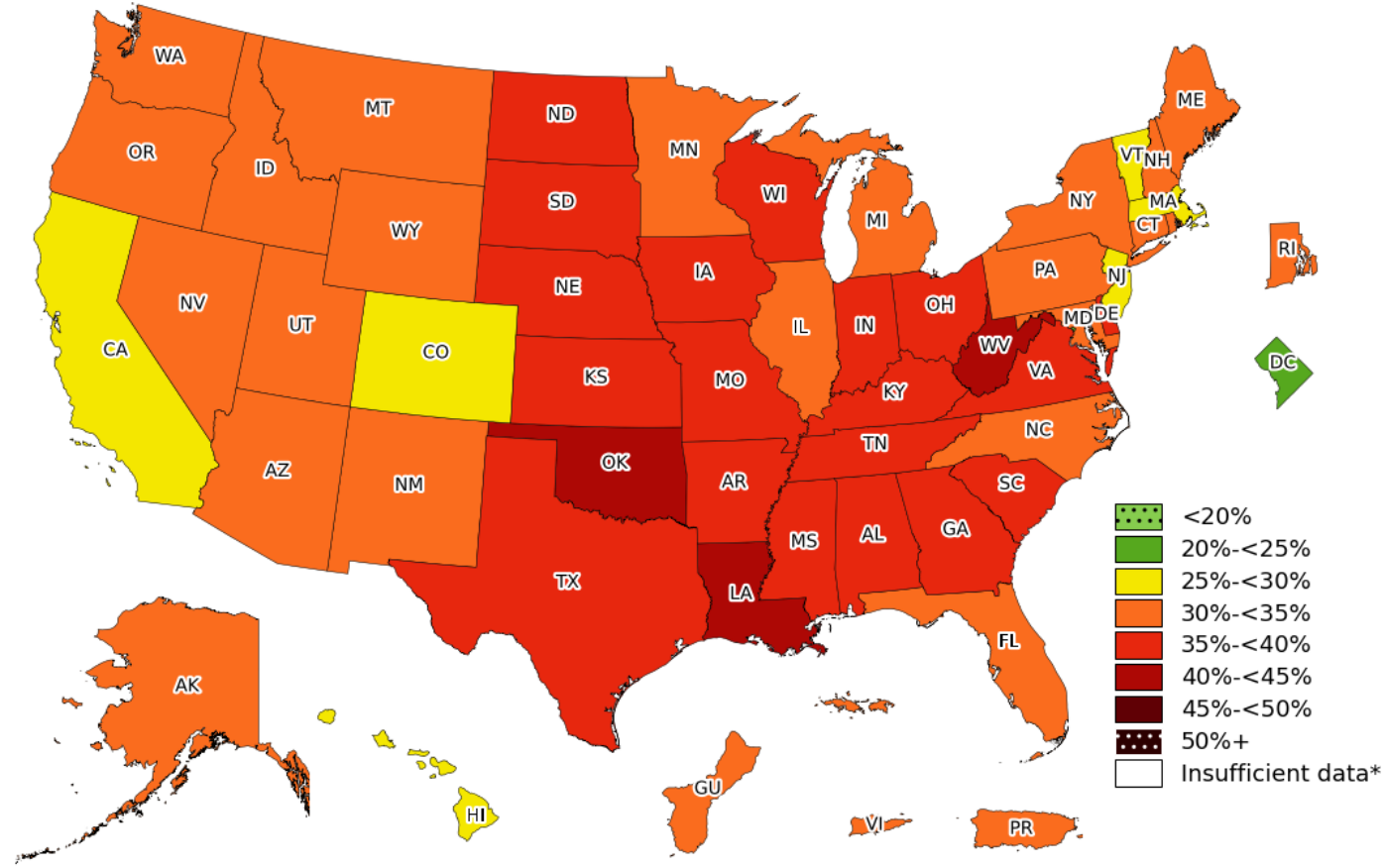


*Sample size <50, the relative standard error (dividing the standard error by the prevalence) $\geq 30\%$, or no data in a specific year.



Prevalence¹ of Obesity Based on Self-Reported Weight and Height Among US Adults by State and Territory, BRFSS, 2022

¹ Pr
com



*Sample size <50, the relative standard error (dividing the standard error by the prevalence) ≥30%, or no data in a specific year.



Prevalence[¶] of Self-Reported Obesity Among U.S. Adults by State and Territory, BRFSS, 2022

Summary

- ❑ No state or territory had a prevalence of obesity less than 20%.
- ❑ The District of Columbia had a prevalence of obesity between 20% and <25%.
- ❑ 6 states had a prevalence of obesity between 25% and <30%.
- ❑ 22 states, Guam, Puerto Rico and Virgin Islands had a prevalence of obesity between 30% and <35%.
- ❑ 19 states (Alabama, Arkansas, Delaware, Georgia, Indiana, Iowa, Kansas, Kentucky, Mississippi, Missouri, Nebraska, North Dakota, Ohio, South Carolina, South Dakota, Tennessee, Texas, Virginia, and Wisconsin) had a prevalence of obesity between 35% and <40%.
- ❑ 3 states (Louisiana, Oklahoma, and West Virginia) had a prevalence of obesity 40% or greater.

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

<http://www.cdc.gov/obesity/data/prevalence-maps.html>



Prevalence Summary by Age

39.8% among
adults aged
20-39 years

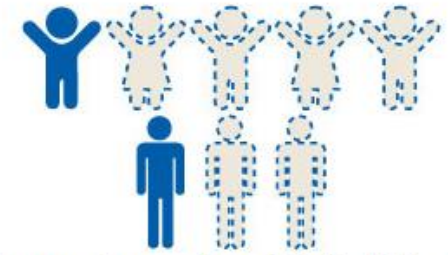
44.3% among
adults aged
40-59 years

41.5% among
adults aged
60+ years

Obesity is common, serious and costly

- The medical costs for people with obesity were **\$1,861 higher** than those of normal weight.

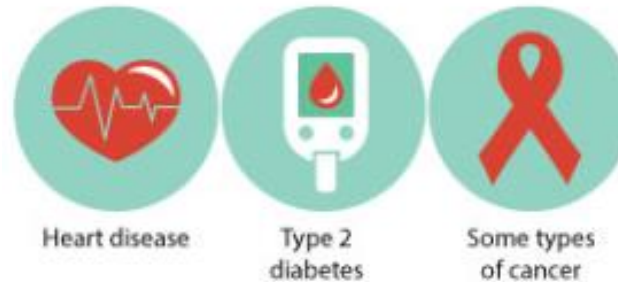
Obesity costs the US healthcare system nearly \$173 billion a year.



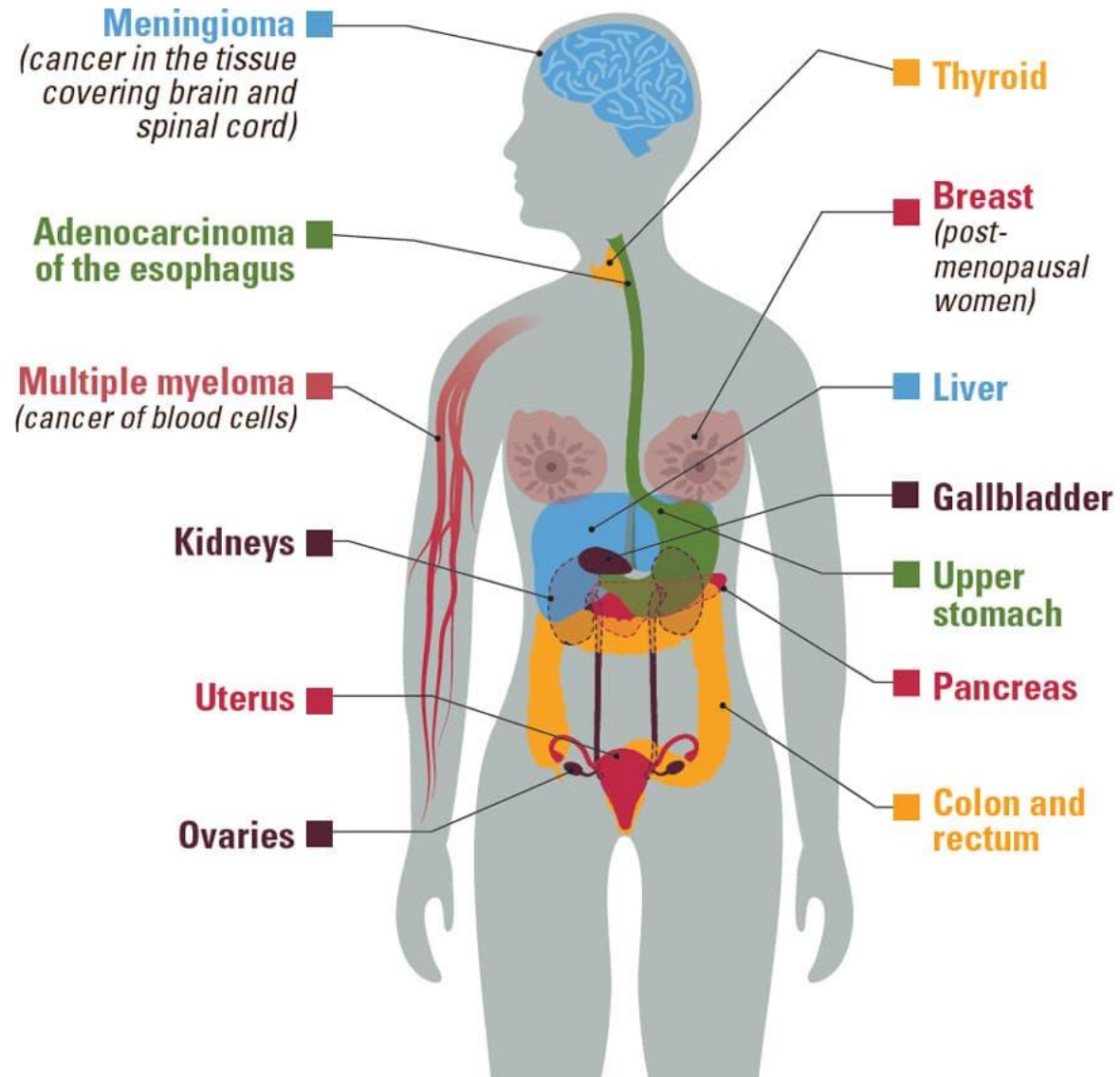
1 in 5 children and more than 1 in 3 adults struggle with obesity.

Children with obesity are more likely to have obesity as adults.

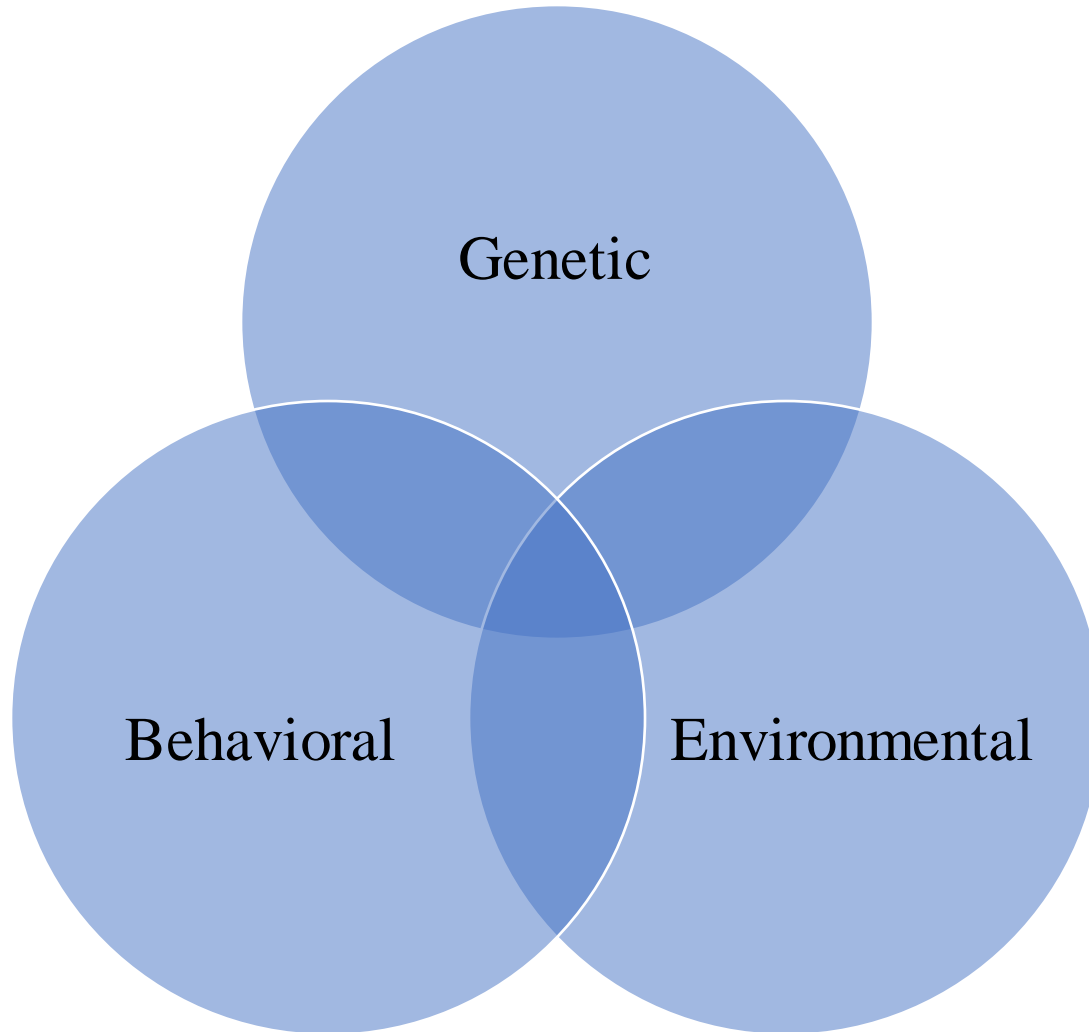
Adults with obesity have higher risk for developing:



13 cancers are associated with overweight and obesity



Obesity is a Complex Disease



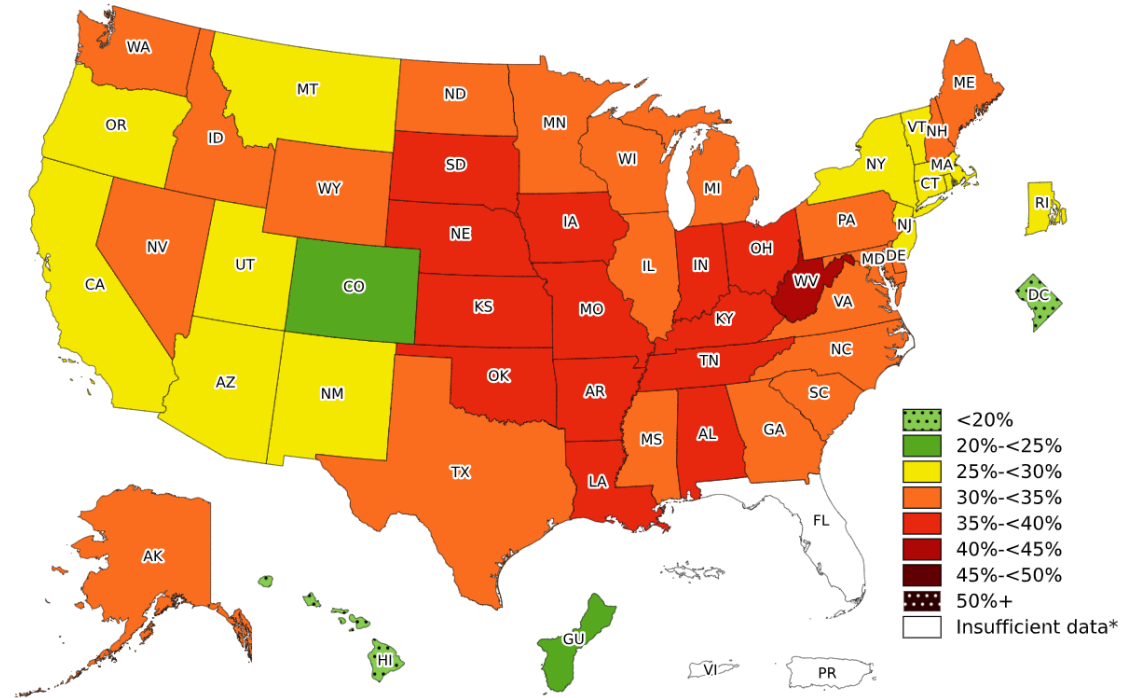
Obesity is a complicated disease. Many things contribute to being overweight including **eating** and **exercise habits**, whether your **parents** were overweight, and the overall **environment** that you live in. Any solution to weight problems must address each of these issues.

Racial/Healthcare Disparities play a role



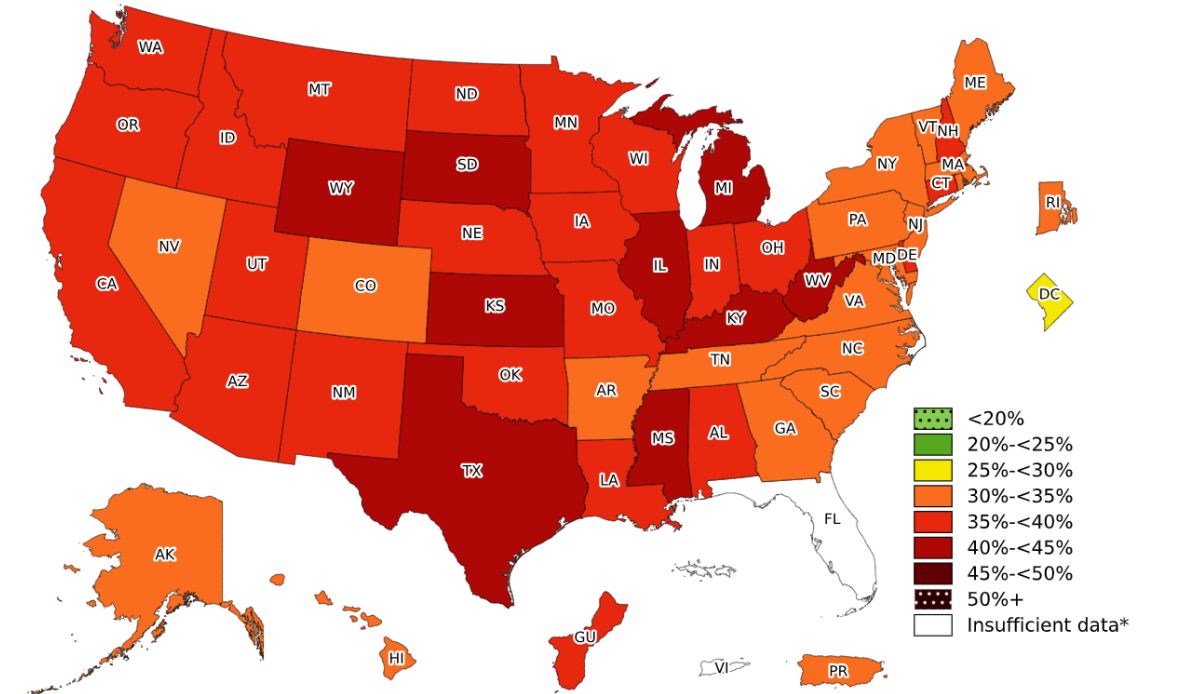
Non-Hispanic White Adults

Prevalence of Obesity Based on Self-Reported Weight and Height Among Non-Hispanic White Adults by State and Territory, BRFSS, 2020–2022



Hispanic Adults

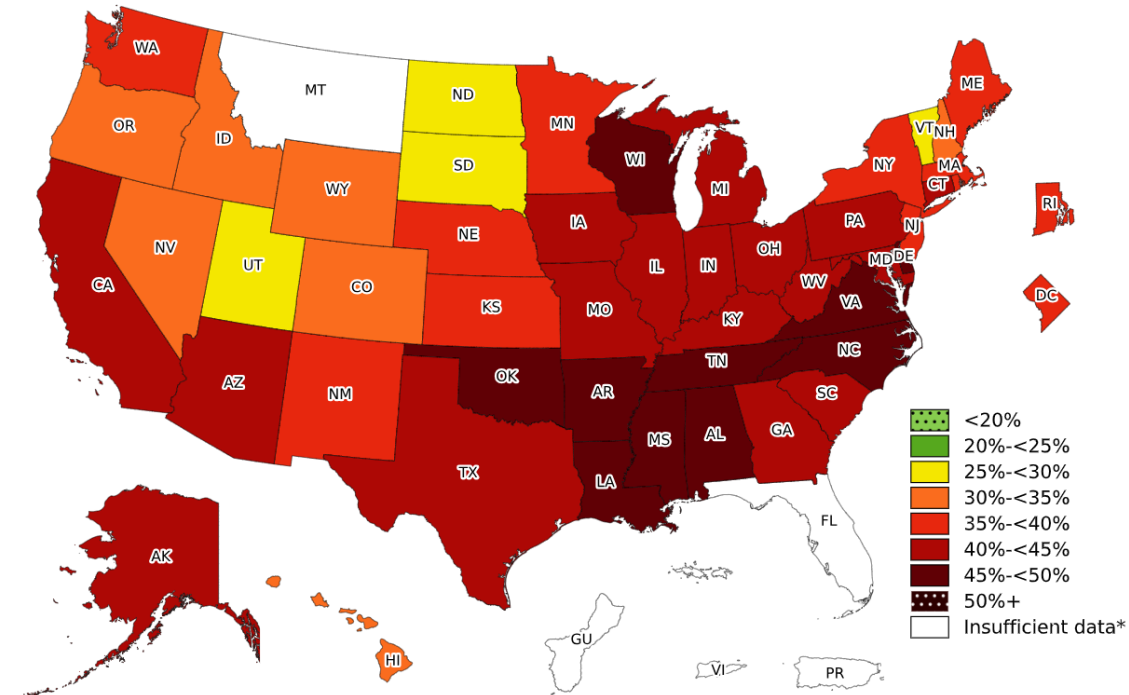
Prevalence of Obesity Based on Self-Reported Weight and Height Among Hispanic Adults by State and Territory, BRFSS, 2020–2022



Racial/Healthcare Disparities play a role

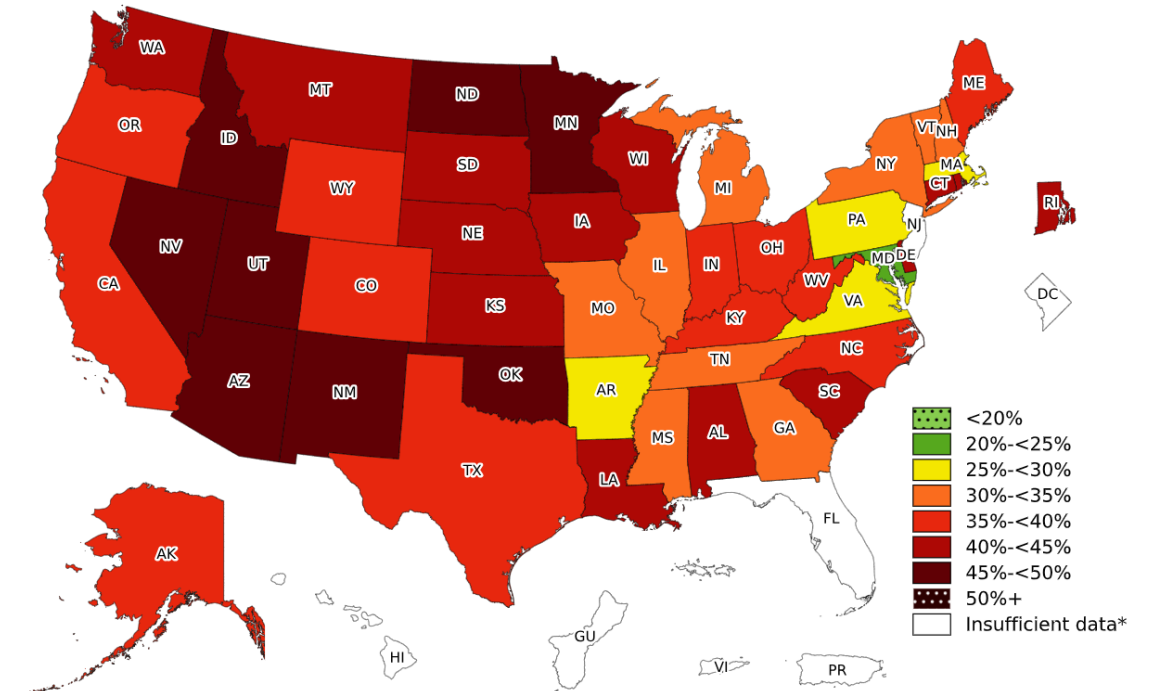
Non-Hispanic Black Adults

Prevalence of Obesity Based on Self-Reported Weight and Height Among Non-Hispanic Black Adults by State and Territory, BRFSS, 2020–2022

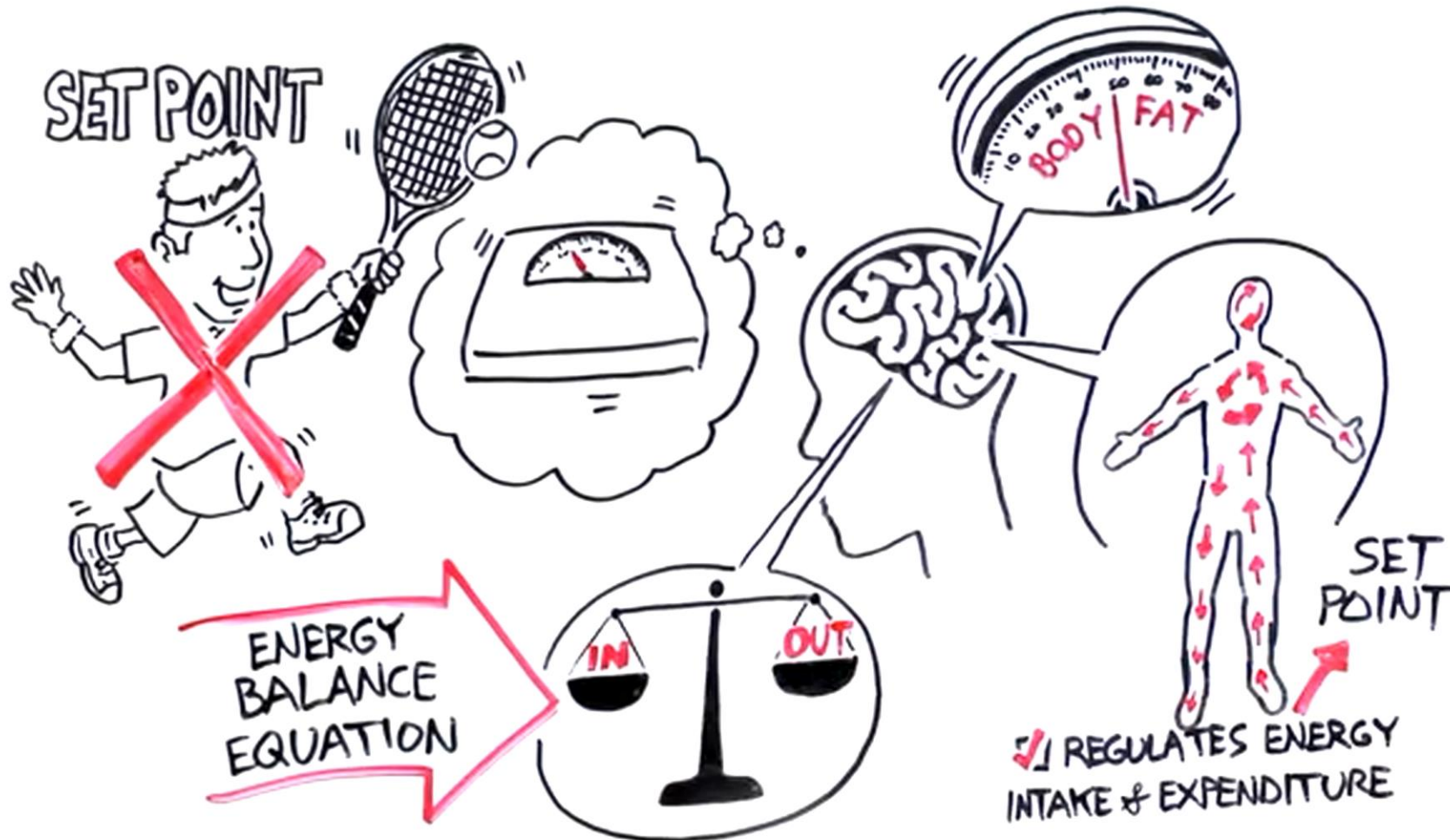


Non-Hispanic American Indian or Alaska Native Adults

Prevalence of Obesity Based on Self-Reported Weight and Height Among Non-Hispanic American Indian or Alaska Native Adult by State and Territory, BRFSS, 2020–2022



Why is it so hard to lose weight?



**GENETICS AND
EPIGENETICS**

**ENDOCRINE
CAUSES**

**IMMUNOLOGICAL
CAUSES**

NEUROBEHAVIORAL

**GUT
MICROBIOME**

MEDICATIONS

ENVIRONMENT



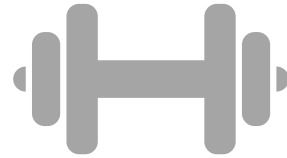
SET POINT

Among many others....

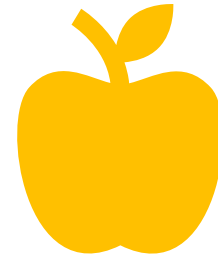
Total Energy Expenditure



Resting Energy
Expenditure



Activity Induced Energy
Expenditure *modifiable



Diet Energy Expenditure

**What is the success rate for
treating obesity (BMI ≥ 35) with
diet and exercise alone?**

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treating obesity (BMI ≥ 35) with
diet and exercise alone?**

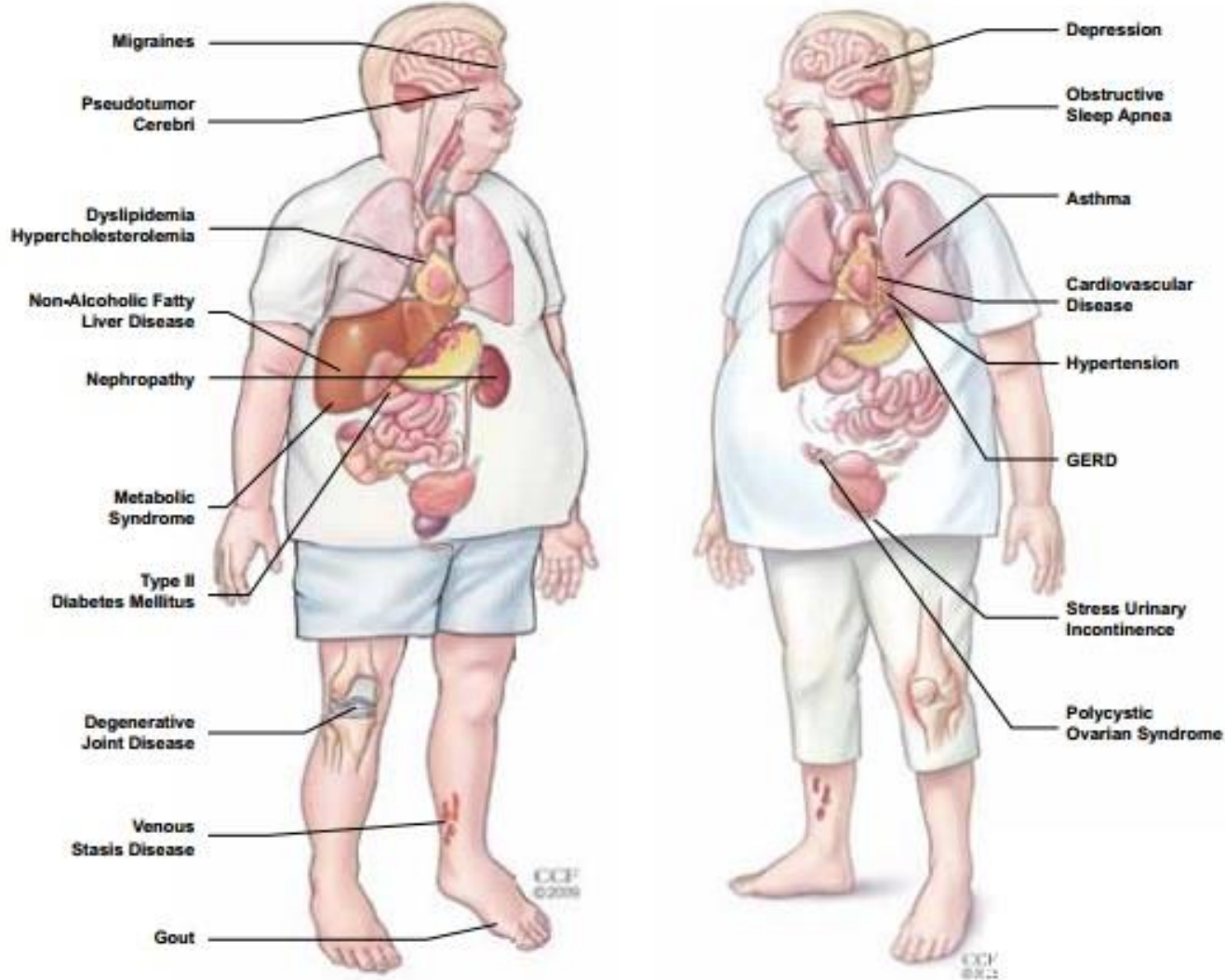
1% !!!

For a BMI ≥ 40 ?

For a BMI ≥ 40 ?

1/ 2000 = .0005% !!!

Physiological Impact of Obesity



Overlooked Problems in Severe Obesity

UNABLE TO:

CUT TOENAILS	73
CROSS LEGS (THIGHS)	85
BUCKLE SEAT-BELT	27
FIT IN THEATER SEAT	36
MAINTAIN GOOD HYGIENE	21
URINATE ACCURATELY (MEN)	52
WALK DOWN STAIRS (UNLESS BACKWARDS)	16

%OF PATIENTS

WILL NOT:

UNDRESS IN FRONT OF SPOUSE	73
WEAR SHORT SLEEVES IN SUMMER	68
SLEEP IN ROOM WITH SIGNIFICANT OTHER (SNORERS)	81





METABOLIC & BARIATRIC SURGERY

THE AMERICAN SOCIETY FOR METABOLIC & BARIATRIC SURGERY

Overview

- Metabolic/bariatric surgery is the most effective and long-lasting treatment for severe obesity resulting in significant weight loss and the improvement, prevention or resolution of many related diseases including type 2 diabetes, heart disease, hypertension, sleep apnea and certain cancers.^{1,2}
 - Studies show bariatric surgery may reduce a patient's risk of premature death by 30-50%.^{3,4}
- Bariatric surgery is as safe or safer than some of the most commonly performed surgeries in America including gallbladder surgery, appendectomy and knee replacement.⁵

Effectiveness

- Studies show patients typically lose the most weight 1-2 years after bariatric surgery and see substantial weight improvements in obesity-related conditions.^{6,7}
 - Patients may lose as much as 60% of excess weight six months after surgery, and 77% of excess weight as early as 12 months after surgery.⁸
 - On average, five years after surgery, patients maintain 50% of their excess weight loss.⁹
- Majority of bariatric surgery patients with diabetes, dyslipidemia, hypertension, and obstructive sleep apnea experience remission of these obesity-related diseases.¹⁰

Condition/Disease	Remission Rate
Type 2 Diabetes	92%
Hypertension	75%
Obstructive Sleep Apnea	96%
Dyslipidemia	76%
Cardiovascular Disease	58%

Quality of Life After Bariatric Surgery

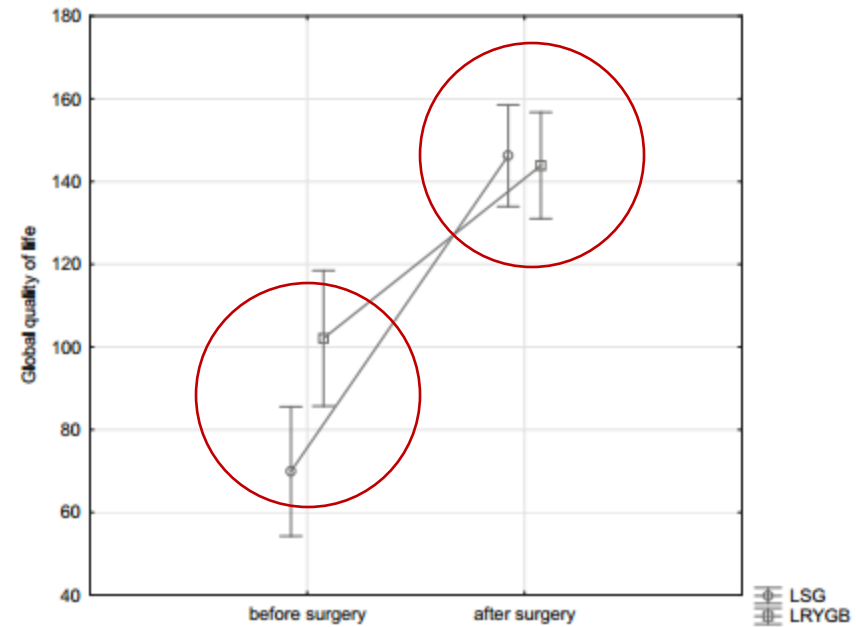
Piotr Major · Maciej Matłok · Michał Pędziwiatr ·
Marcin Migaczewski · Piotr Budzyński · Maciej Stanek ·
Michał Kisielewski · Michał Natkaniec ·
Andrzej Budzyński

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Abstract

Introduction and Purpose Morbid obesity together with obesity-related diseases has a negative impact on the quality of life. The aim of the study was to assess the quality of life amongst patients with morbid obesity as well as the impact of bariatric treatment on body weight and obesity-related diseases in addition to conducting an analysis of changes in the quality of life after surgical treatments, in the context of the surgical procedure type and degree of body weight loss.



Safety & Risks

- The risks of severe obesity outweigh the risks of metabolic/bariatric surgery for many patients.^{11,12}
 - The risk of death associated with bariatric surgery is about 0.1% and the overall likelihood of major complications is about 4%.¹⁴

Economics of Bariatric Surgery

- The average cost of bariatric surgery ranges between \$17,000 and \$26,000.¹⁵
- Because of the reduction or elimination of obesity-related conditions and associated treatment-costs:
 - Estimates suggest third-party payers will recover bariatric surgery costs within 2 to 4 years.¹⁶
 - Healthcare costs are reduced by 29% within five years of bariatric surgery.¹⁷

	Diet	Surgery
Appetite	↑	↓
Hunger	↑	↓
Satiety	↓	↑
Reward-based eating	↑	↓
Energy expenditure	↓	↑
Stress response	↑	↓

Surgery is
the Un-Diet

Evolution of Weight Loss Surgery



INITIAL OPERATIONS
1960'S



EXPERIMENTAL THERAPY
1970-1991



NIH CONSENSUS
CONFERENCE 1991



SURGERY IS AN ACCEPTED
THERAPY FOR OBESITY

NIH Consensus Conference 1991

Surgery is the **only** approach that provides consistent, permanent weight loss for patients with severe obesity.

Major updates to 1991 National Institutes of Health guidelines for bariatric surgery

- Metabolic and bariatric surgery (MBS) is recommended for individuals with a body mass index (BMI) ≥ 35 kg/m², regardless of presence, absence, or severity of co-morbidities.
- MBS should be considered for individuals with metabolic disease and BMI of 30-34.9 kg/m².
- BMI thresholds should be adjusted in the Asian population such that a BMI ≥ 25 kg/m² suggests clinical obesity, and individuals with BMI ≥ 27.5 kg/m² should be offered MBS.
- Long-term results of MBS consistently demonstrate safety and efficacy.
- Appropriately selected children and adolescents should be considered for MBS.

(Surg Obes Relat Dis 2022;18:1345–1356.) © 2022 The Author(s) Published by Elsevier Inc on behalf of American Society for Metabolic & Bariatric Surgery (ASMBS) and Springer Nature on behalf of International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO). All rights reserved. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Keywords: Obesity; Metabolic and bariatric surgery; IFSO; ASMBS; Criteria; Indications

ASMBS, 2022

Who qualifies for bariatric surgery?

- BMI ≥ 40
- BMI ≥ 35 AND 1-2 obesity-related comorbidities (DM2, OSA, HTN, etc.)
- Along with patient selection criteria*

DO NOT qualify:

- BMI ≥ 35 with no comorbidities
- BMI ≤ 34.99 with or without comorbidities

Patient Selection Criteria

- Focus on improved health
- Absence of overt mental illness or substance abuse
- Understanding of rationale, risks, benefits, and requirement for lifelong follow-up and vitamin supplements
- Patients willing to assume some responsibility for result/ motivation

Surgery is JUST a tool

patient understands that obesity is a disease and should be treated as such

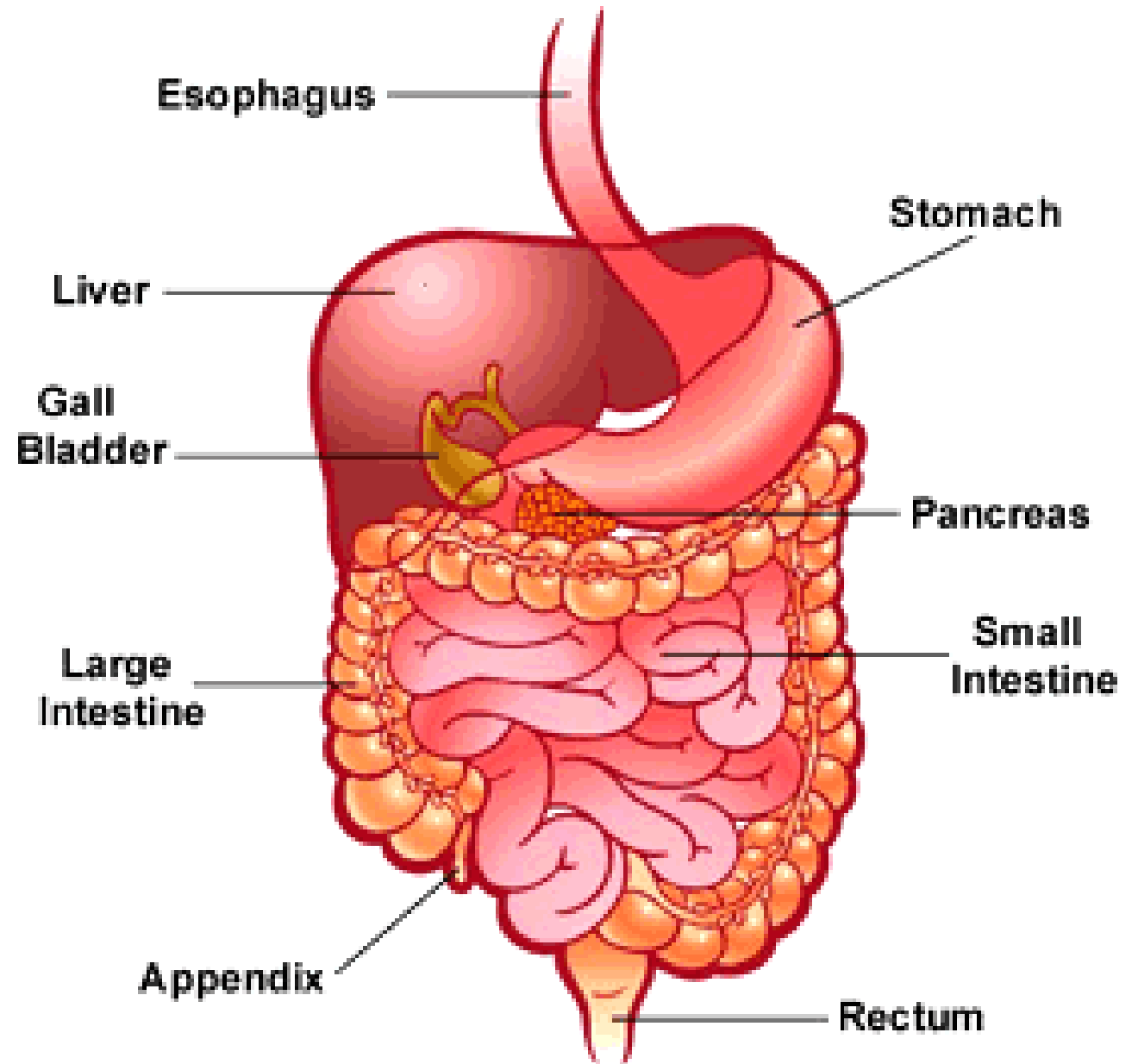
Surgery alone is not enough

- Nutrition education (read labels, plan meals, etc.)
- Daily exercise
- A lifelong commitment to taking daily vitamins
- A lifelong commitment to follow-up appointments
- Some will need a multimodal approach (addition of weight loss medications)
- Understand the risk of addiction transfer
 - Smoking
 - Alcohol
 - Narcotics



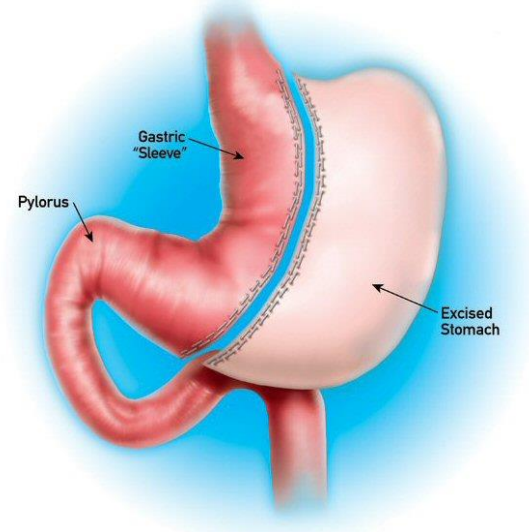
*Now let's talk about
bariatric surgery...*

Normal Anatomy



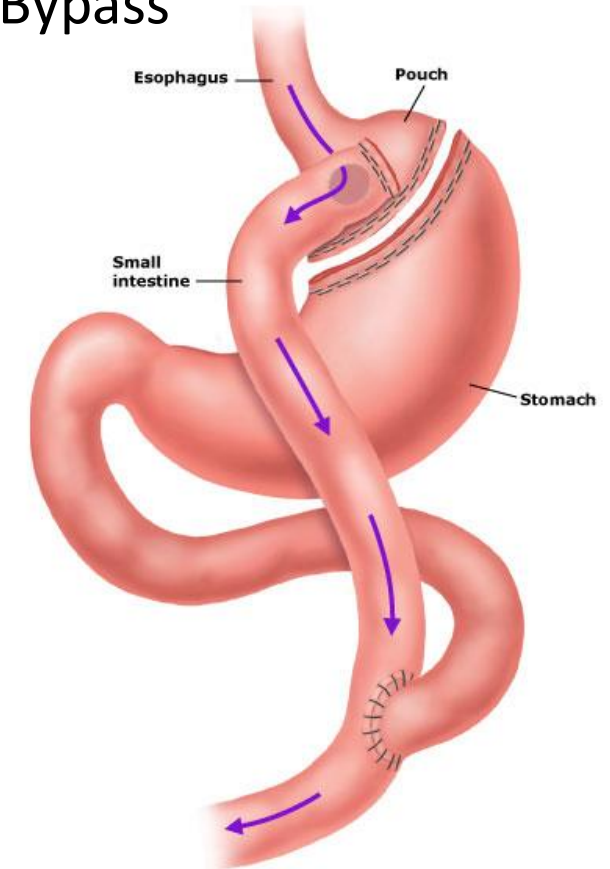
Weight Loss Surgery Options

Sleeve



- Restriction & Metabolic change
- No intestinal bypass
- Few nutritional issues
- 50-70% EWL

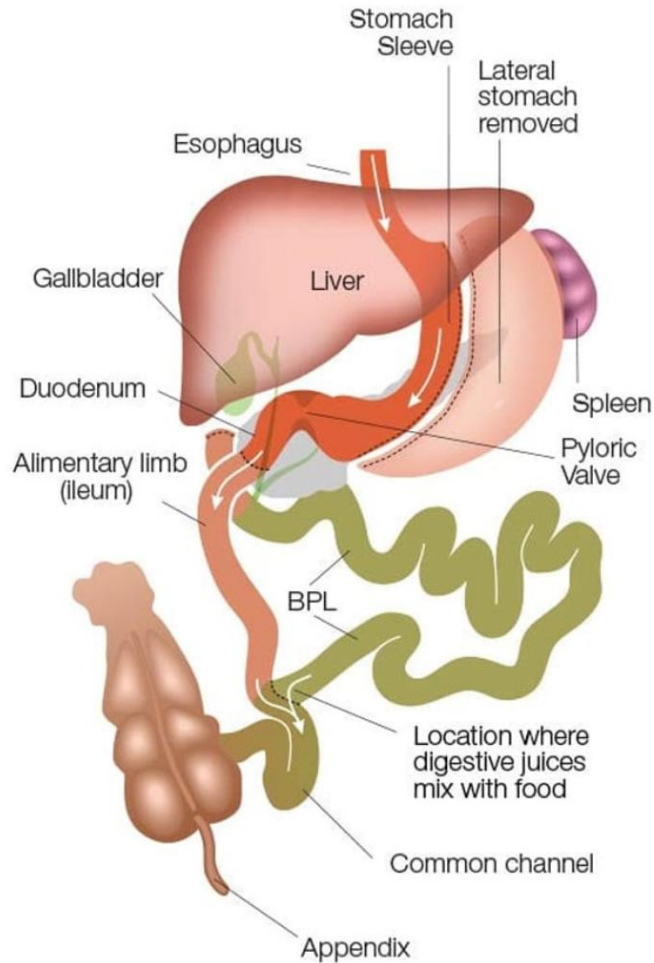
Roux-en-Y Bypass



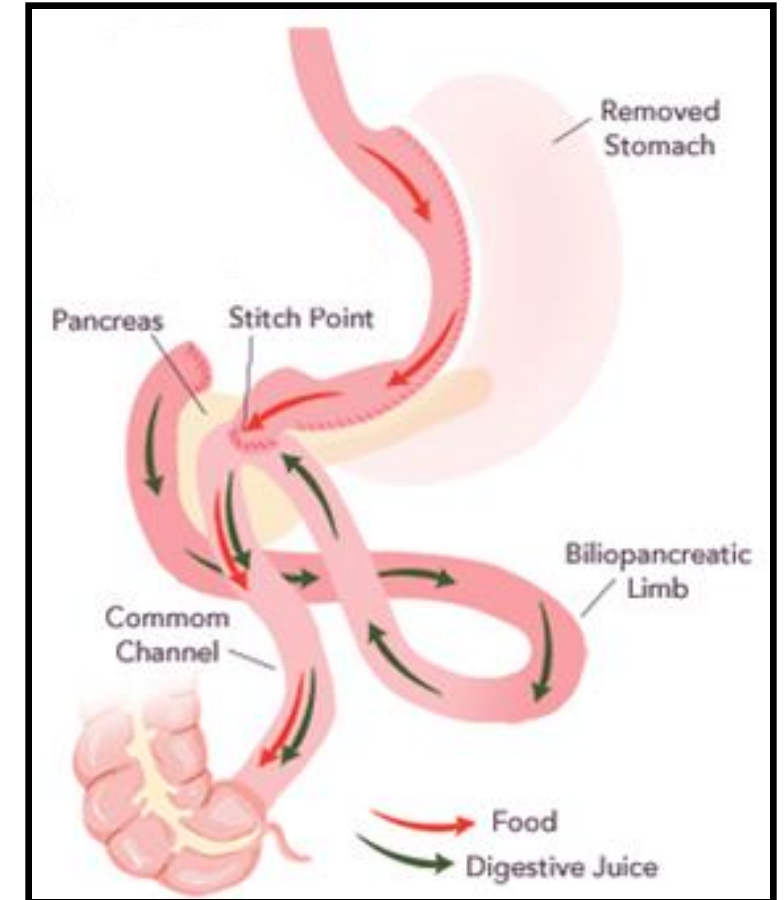
- Restriction, Malabsorption & Metabolic change
- Bypass lower stomach and upper small intestine
- Nutritional issues / dumping syndrome
- Risk of internal hernia
- Must avoid medications that will injure the pouch (Ibuprofen, Motrin, Aleve, etc.) → marginal ulcers
- 60-80% EWL

Traditional Duodenal Switch

Loop Duodenal Switch



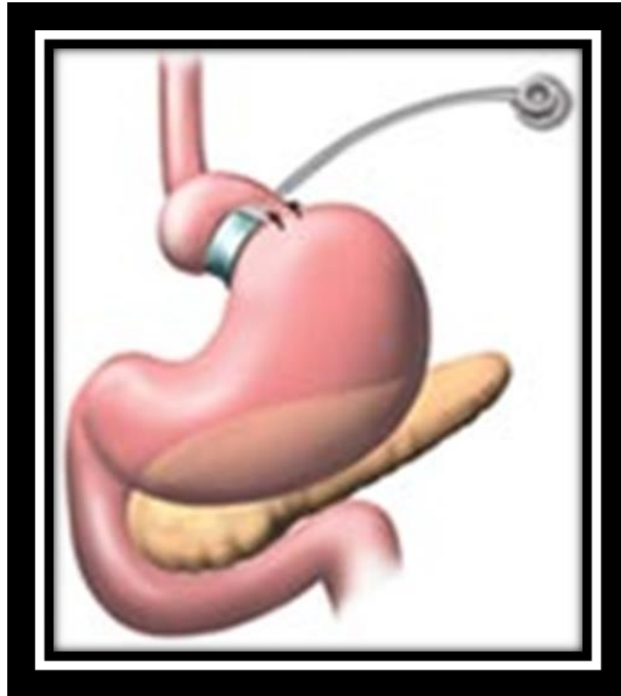
- Restriction, Malabsorption & Metabolic change
- Bypass small intestine, leaving ~300cm for the common channel (thus bypassing ~2/3 of the upper small intestine)
- Higher risk of severe (but preventable) nutritional deficiencies
- dumping syndrome
- 80+% EWL



Laparoscopic Adjustable Gastric Band

Rarely performed in the US now → NO metabolic effect

- Restriction only
- Foreign body / removable
- Less effective weight loss i.e. not advised for super morbid obesity (class III)
- Nutritional issues but no malabsorption



Risks:

Lack of adequate weight loss

Band erosion

Band infection

Band intolerance symptoms (nausea, vomiting, discomfort or pain)

Band slippage

Difficulty swallowing

Esophageal Dysmotility and/or Dilatation

Esophagitis

Gastroesophageal reflux disease (GERD)

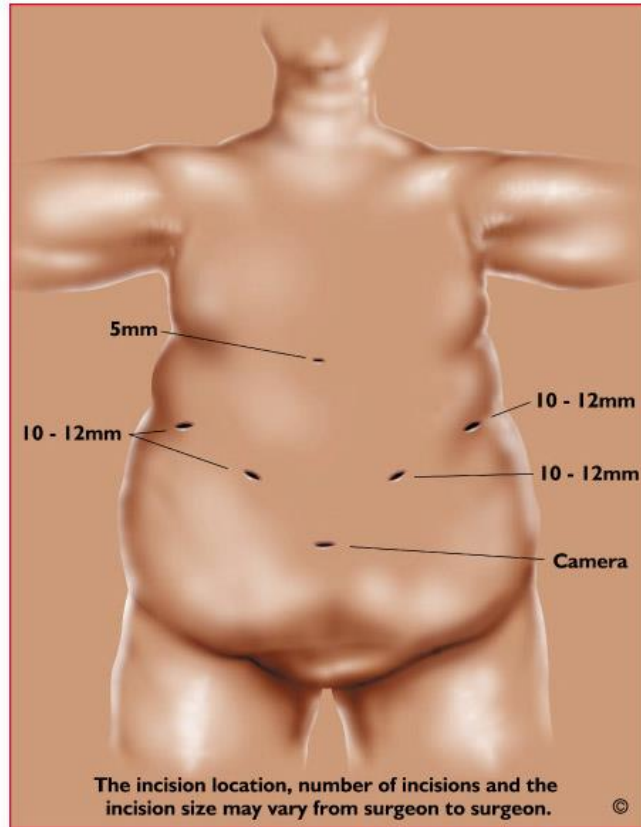
Pouch dilation (enlarging of the stomach pouch that forms above the band)

Port infection

Flipped or migrated port

Laparoscopic Approach

Incisions for Laparoscopic Weight Loss Surgery



Robotic Laparoscopic Approach

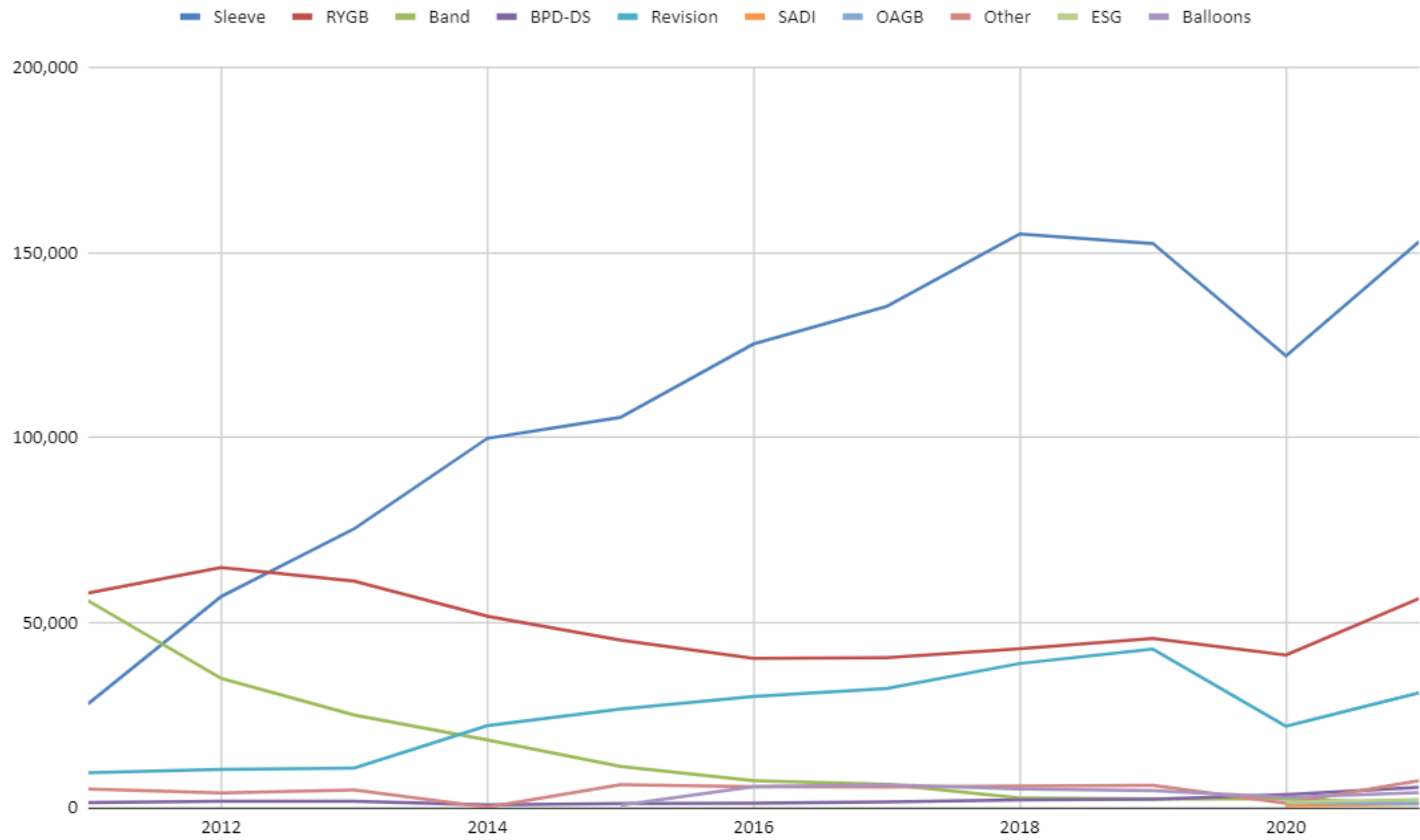


Estimate of Bariatric Surgery Numbers, 2011-2019

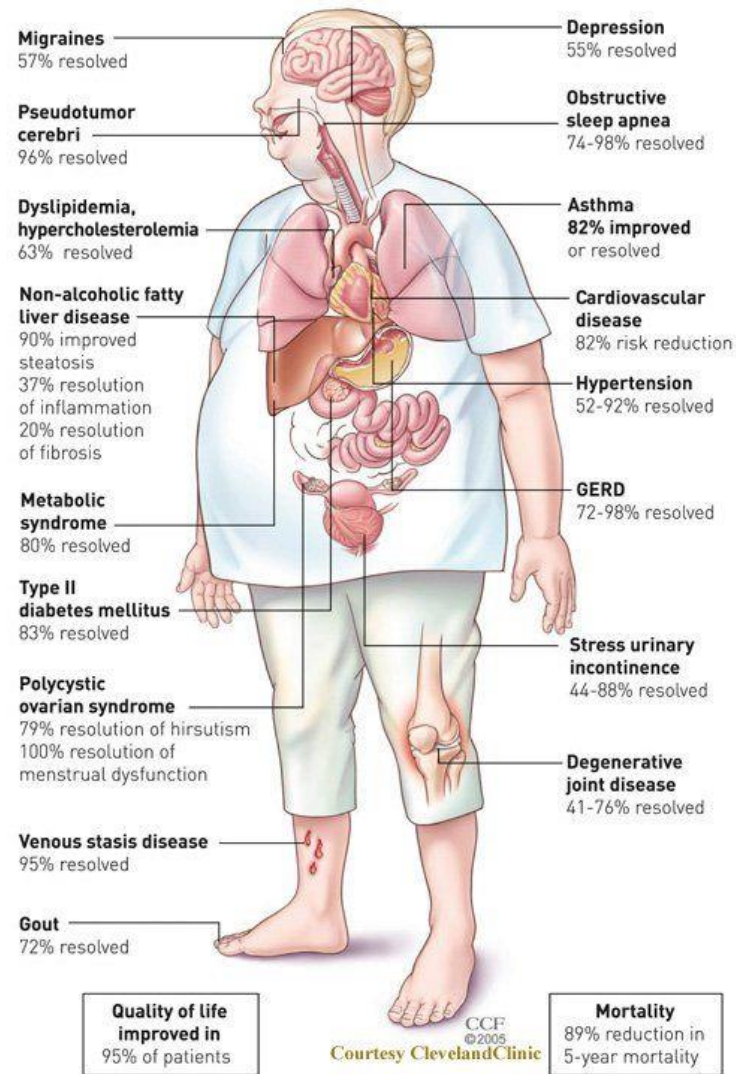
	2011	2012	2013	2014	2015	2016	2017	2018	2019*
Total	158,000	173,000	179,000	193,000	196,000	216,000	228,000	252,000	256,000
Sleeve	17.8%	33.0%	42.1%	51.7%	53.6%	58.1%	59.4%	61.4%	59.4%
RYGB	36.7%	37.5%	34.2%	26.8%	23.0%	18.7%	17.8%	17.0%	17.8%
Band	35.4%	20.2%	14.0%	9.5%	5.7%	3.4%	2.7%	1.1%	0.9%
BPD-DS	0.9%	1.0%	1.0%	0.4%	0.6%	0.6%	0.7%	0.8%	0.9%
Revision	6.0%	6.0%	6.0%	11.5%	13.6%	14.0%	14.1%	15.4%	16.7%
Other	3.2%	2.3%	2.7%	0.1%	3.2%	2.6%	2.5%	2.3%	2.4%
Balloons	—	—	—	—	0.3%	2.6%	2.8%	2.0%	1.8%

The ASMBS total bariatric procedure numbers are based on the best estimation from available data (BOLD, ACS/MBSAQIP, National Inpatient Sample Data and outpatient estimates)

**New methodology for estimating outpatient procedures done at non-accredited centers.*



Co-morbidity Reduction After Bariatric Surgery



Key Takeaways:

- Obesity is a multifactorial disease
 - There is a complex interaction between genetics, environment and behavior that contributes to one's "set point"
 - Obesity is a disease that has a widespread negative effect on one's health and wellbeing
 - Bariatric surgery is the most effective treatment for obesity, and can improve obesity-related co-morbidities
 - **Diabetes** related mortality reduced 92%
 - **Cancer** related mortality reduced 60%
 - **CAD** related mortality reduced 58%
- Other treatment options now exist