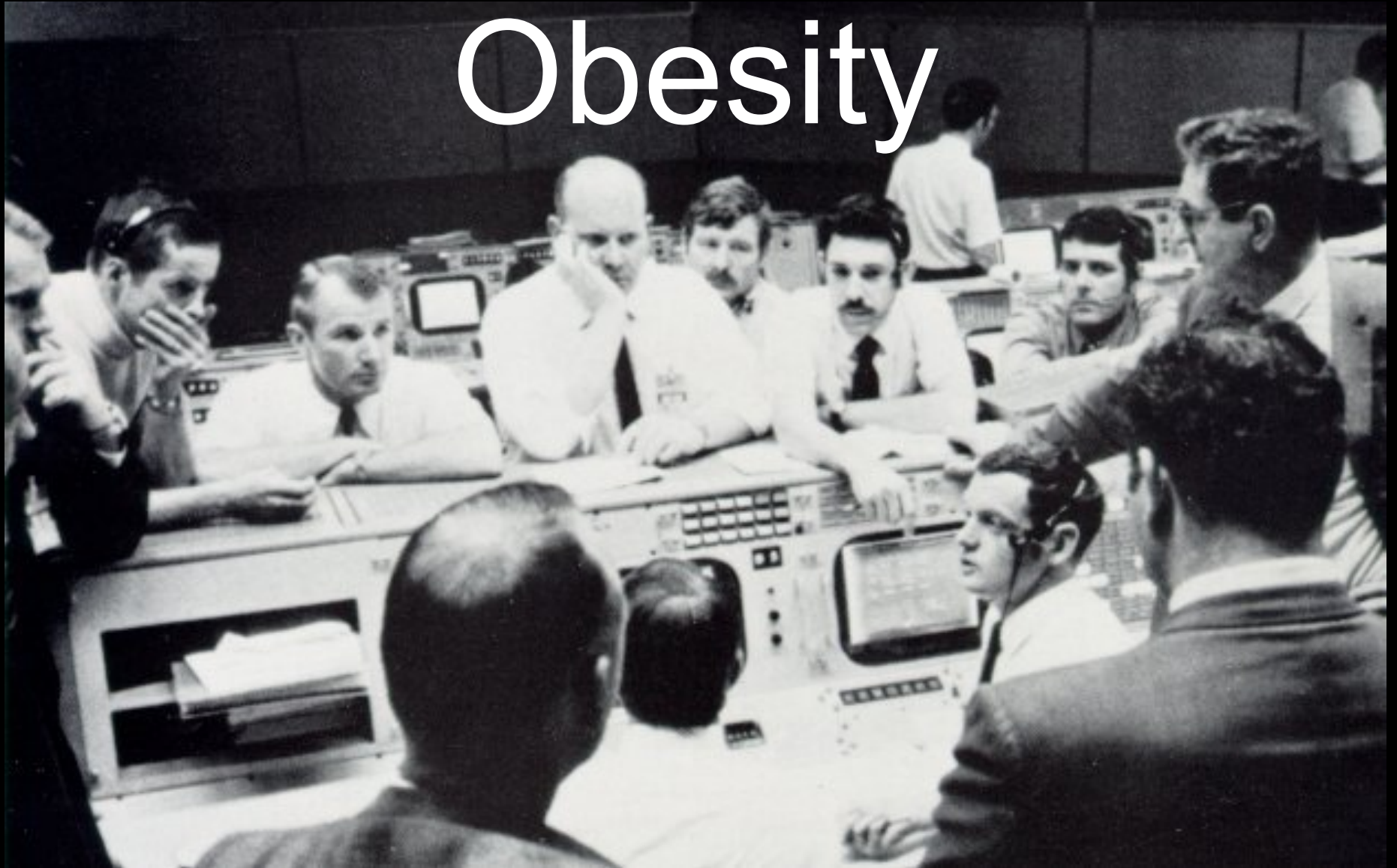


Obesity



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February 7, 2014
Grand Itasca Clinic & Hospital

Prevalence in the US

- Adults
 - 34% are overweight
 - 35.7% are obese
 - = 70% of adults are overweight or obese!
 - Doubled since 1980
- Children
 - 16.9% of children are obese
 - Age 2-5: 10%
 - Age 6-11: 20%
 - Age 12-19: 18%
 - 18.6% boys, 15% girls
 - Tripled since 1980
 - Significant racial and ethnic disparities

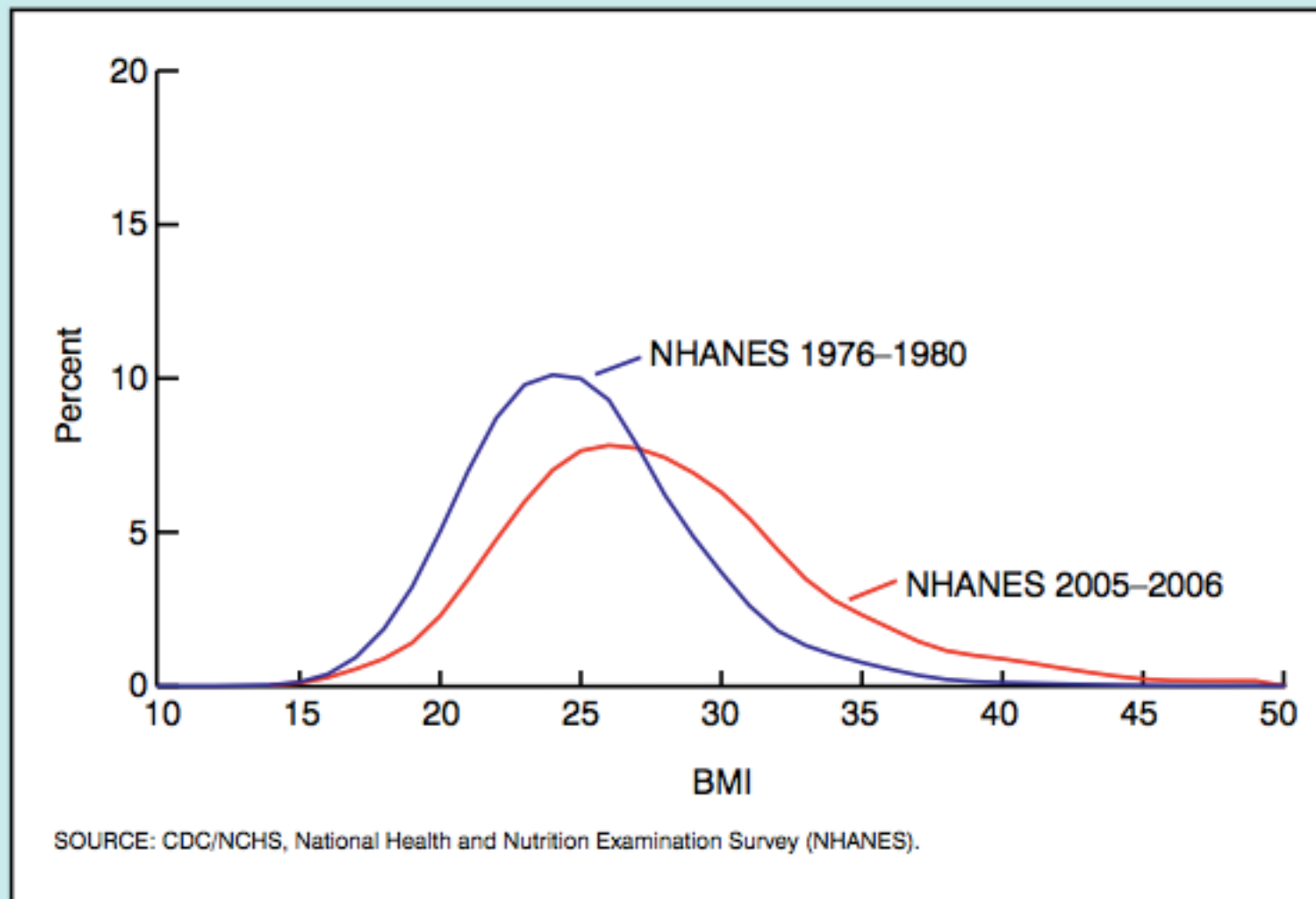
1. <http://www.cdc.gov/obesity/data/adult.html>

2. Ogden, *et al.* Prevalence of Obesity in the United States, 2009 - 2010. *NCHS Data Brief*. <http://www.cdc.gov/nchs/data/databriefs/db82.pdf>

3. <http://www.census.gov/2010census/>

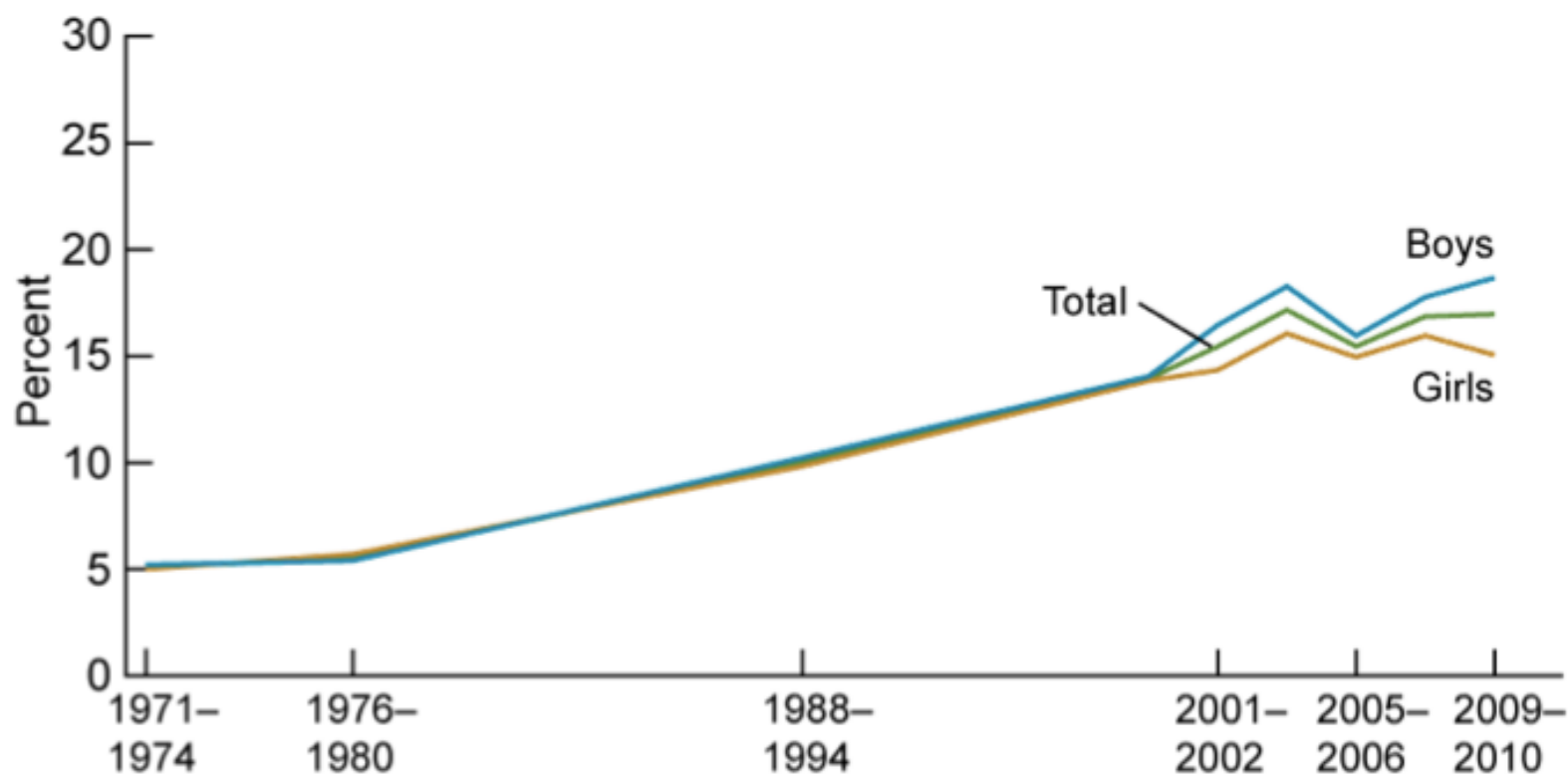
Changing America: Adults

Figure 3. Changes in the distribution of body mass index (BMI) between 1976–1980 and 2005–2006, adults aged 20–74 years: United States



Changing America: Pediatrics

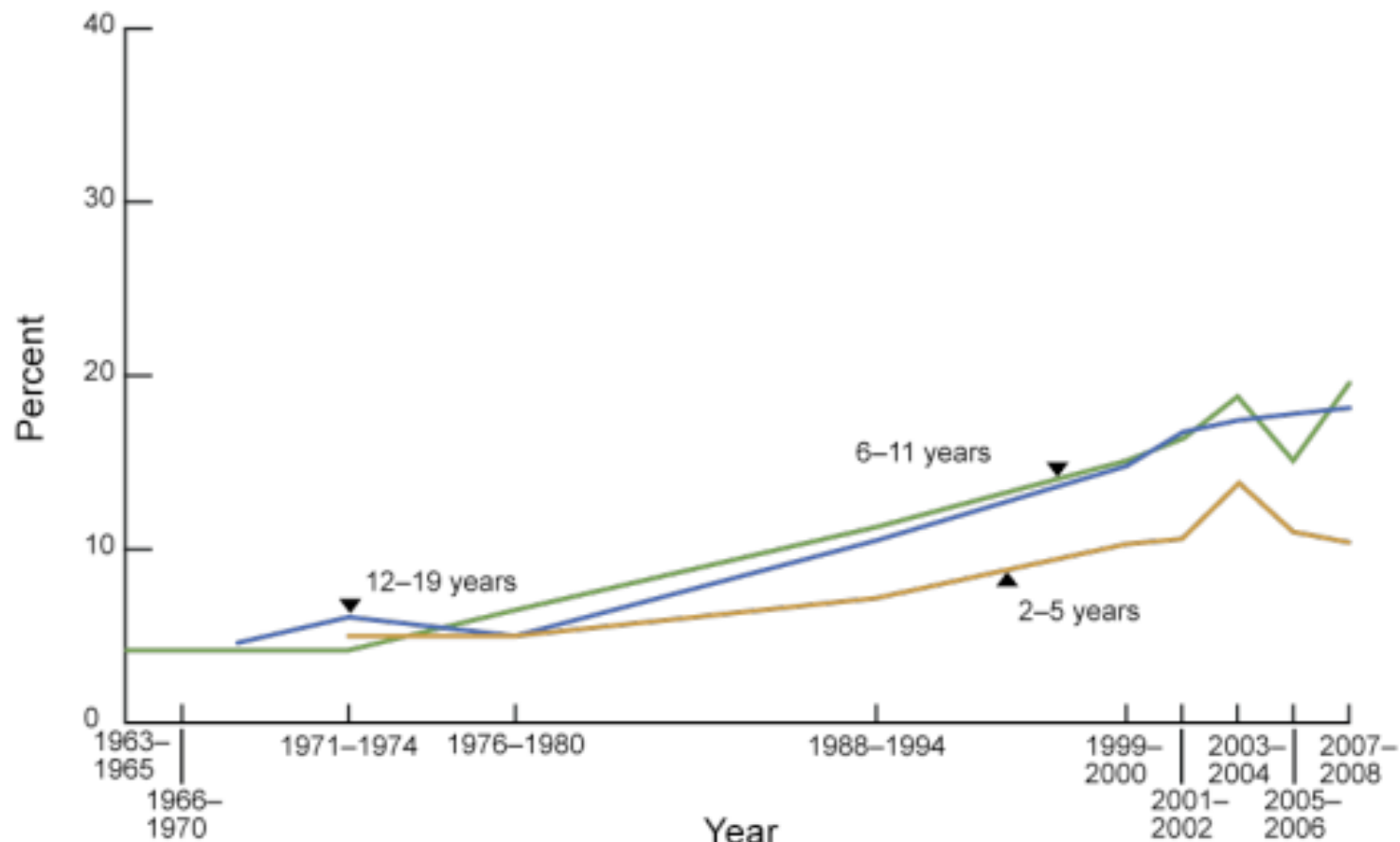
Figure 1: Trends in obesity among children and adolescents aged 2–19 years, by sex: United States, 1971–1974 through 2009–2010



NOTE: Obesity is body mass index greater than or equal to the 95th percentile of the sex- and age-specific 2000 CDC growth charts.
SOURCES: CDC/NCHS, National Health and Nutrition Examination Surveys (NHANES) I–III; and NHANES, 1999–2000, 2001–2002, 2003–2004, 2005–2006, 2007–2008, and 2009–2010.

Changing America: Pediatrics

Figure 1. Trends in obesity among children and adolescents: United States, 1963–2008

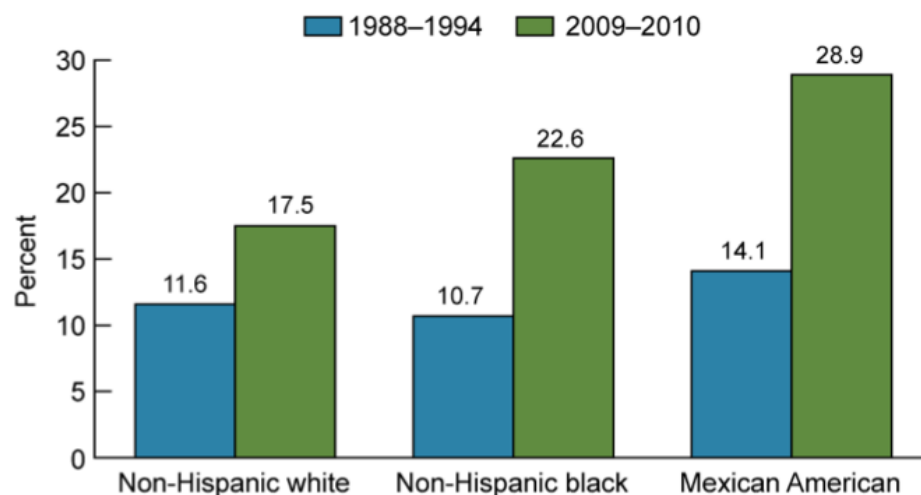


NOTE: Obesity is defined as body mass index (BMI) greater than or equal to sex- and age-specific 95th percentile from the 2000 CDC Growth Charts.

SOURCES: CDC/NCHS, 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, and 2007–2008.

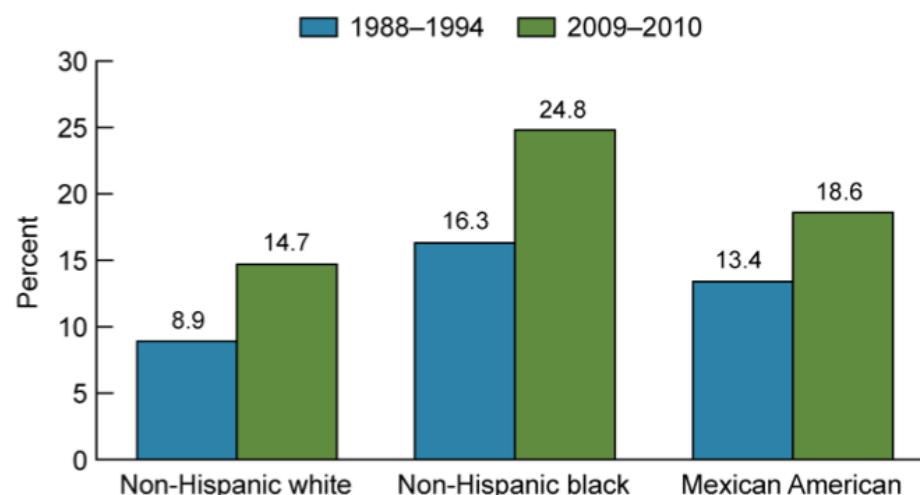
Changing America: Pediatrics

Figure 2: Prevalence of obesity among boys aged 12–19 years, by race and ethnicity: United States, 1988–1994 and 2009–2010

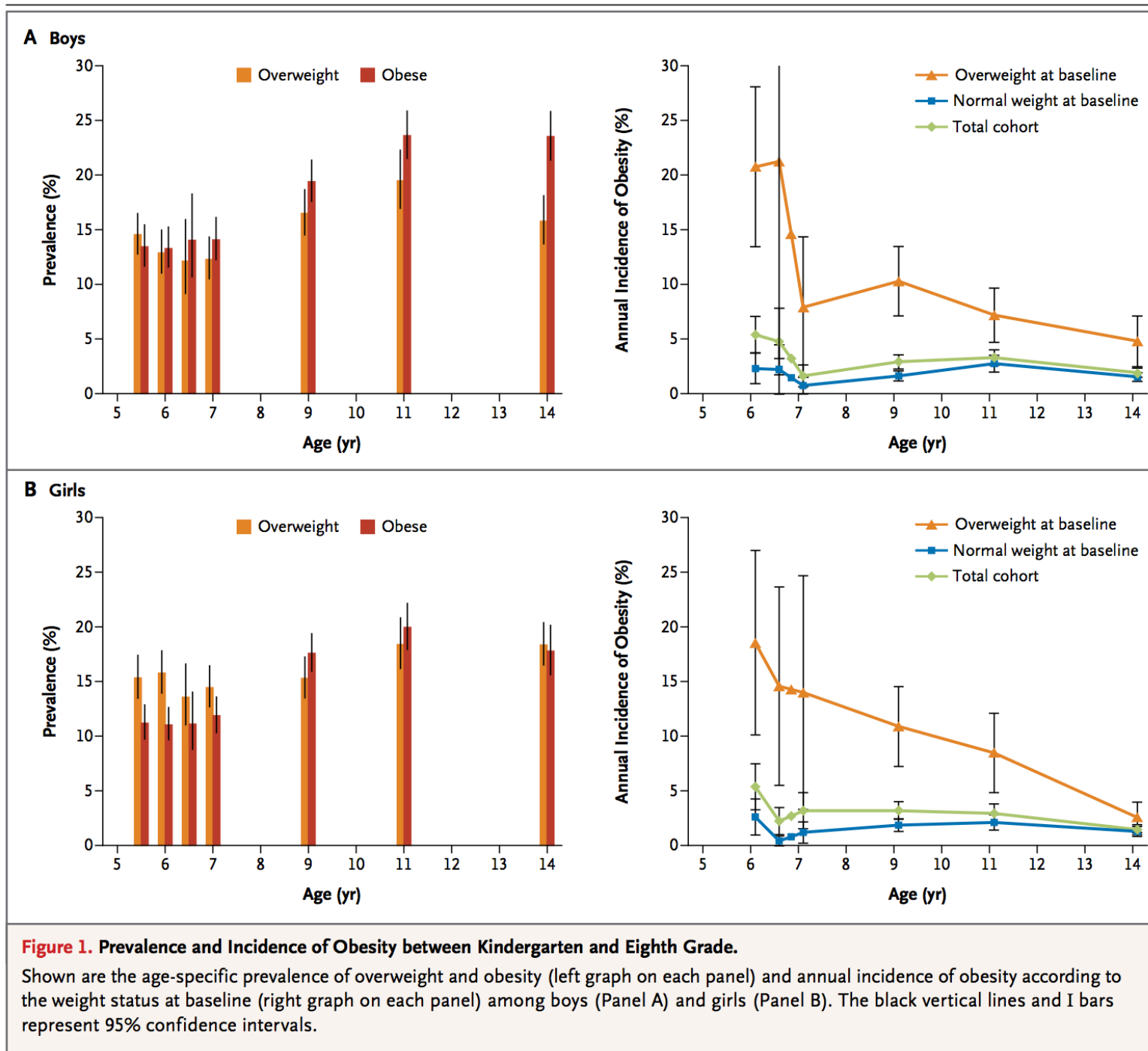


NOTE: Obesity is body mass index greater than or equal to the 95th percentile of the sex- and age-specific 2000 CDC growth charts.
SOURCES: CDC/NCHS, National Health and Nutrition Examination Survey (NHANES) III, 1988–1994, and NHANES, 2009–2010.

Figure 3: Prevalence of obesity among girls aged 12–19 years, by race and ethnicity: United States, 1988–1994 and 2009–2010



NOTE: Obesity is body mass index greater than or equal to the 95th percentile from the sex- and age-specific 2000 CDC growth charts.
SOURCES: CDC/NCHS, National Health and Nutrition Examination Survey (NHANES) III, 1988–1994, and NHANES, 2009–2010.



Causes

- Who knows?
 - Genetic factors
 - Breastfed vs formula fed
 - Overeating
 - Under activity
 - Cost
 - Availability of food: types and choices
 - PCOS, Hypothyroidism, Cushing
 - Bacteria
 - ...

Breastfeeding

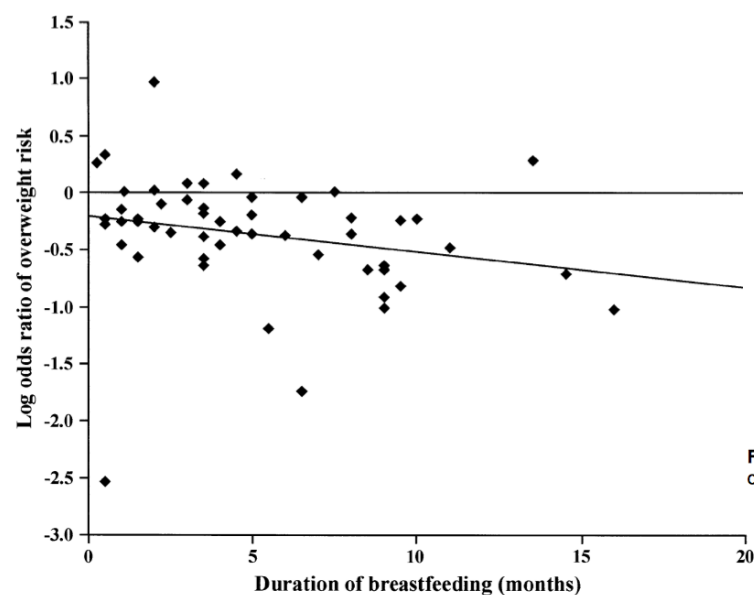


FIGURE 1. Scatterplot and meta-regression line of log odds ratio of risk of overweight/obesity associated with breastfeeding, according to duration of breastfeeding. A total of 17 studies provided 52 estimates of duration of breastfeeding and overweight. Weighted meta-regression revealed a significant inverse linear relation between the duration of breastfeeding and the risk of overweight (regression coefficient = 0.94, 95% confidence interval: 0.89, 0.98).

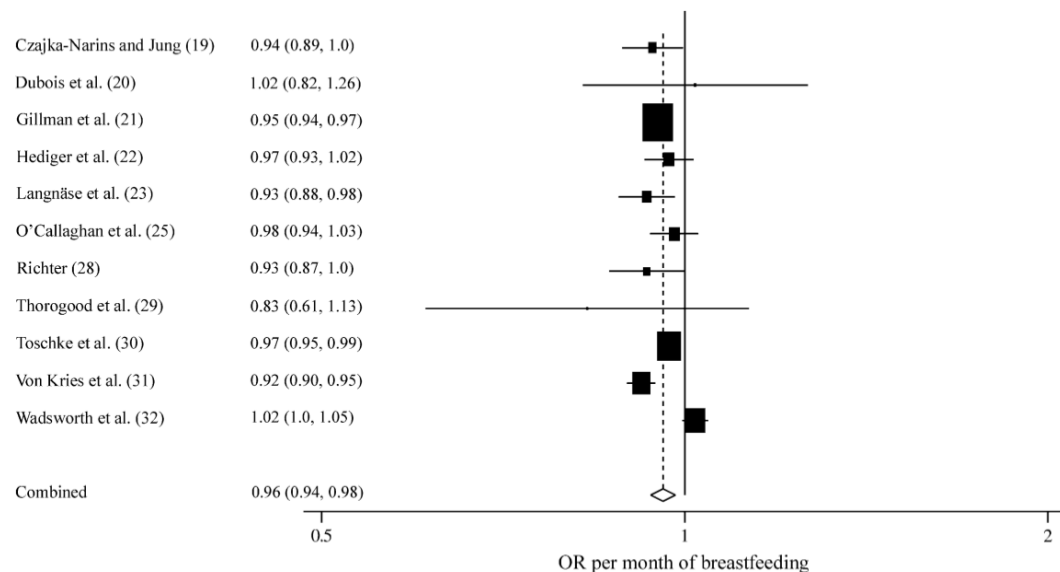


FIGURE 2. Odds ratios (with corresponding 95% confidence intervals in parentheses) for overweight, per month of breastfeeding. Studies are ordered alphabetically by first author. The pooled or "combined" odds ratio (OR) was calculated by a random-effects model.

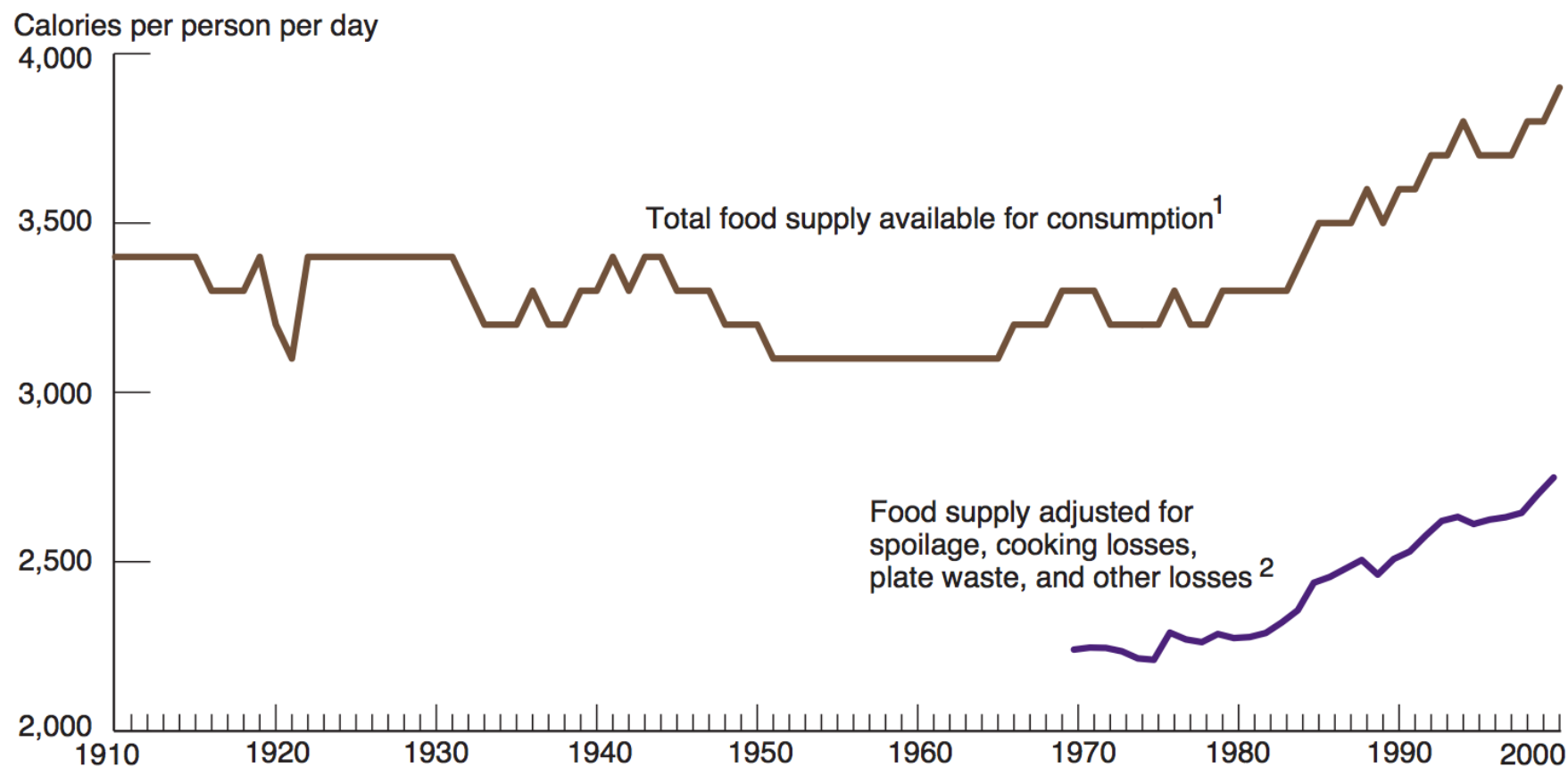
Hypothyroidism?

- “Maybe I have a glandular problem”
- Folks treated for hyperthyroidism do gain weight
- Those treated for hypothyroidism have unchanged weight at 1 year
- Treatment of subclinical hypothyroidism has no effect on weight

1. Hoogwerf, Nuttall. Long-term weight regulation in treated hyperthyroid and hypothyroid subjects. *Am J Med*. June 1984. Vol 76, Issue 6. Abstract-only reviewed
2. Pears, et al. Long-term weight changes in treated hyperthyroid and hypothyroid patients. *Scott Med J*. Dec 1990. 35(6):180-2. Abstract-only reviewed.
3. Bray, et al. Etiology and natural history of obesity. *UpToDate*. Accessed Jan 2014.

Availability of food

Figure 1—Calories From the U.S. Per Capita Food Supply, Adjusted for Losses, Increased 20 Percent Between 1982 and 2000



¹ Rounded to the nearest hundred.

² Not calculated for years before 1970.

Source: USDA's Center for Nutrition Policy and Promotion; USDA's Economic Research Service.

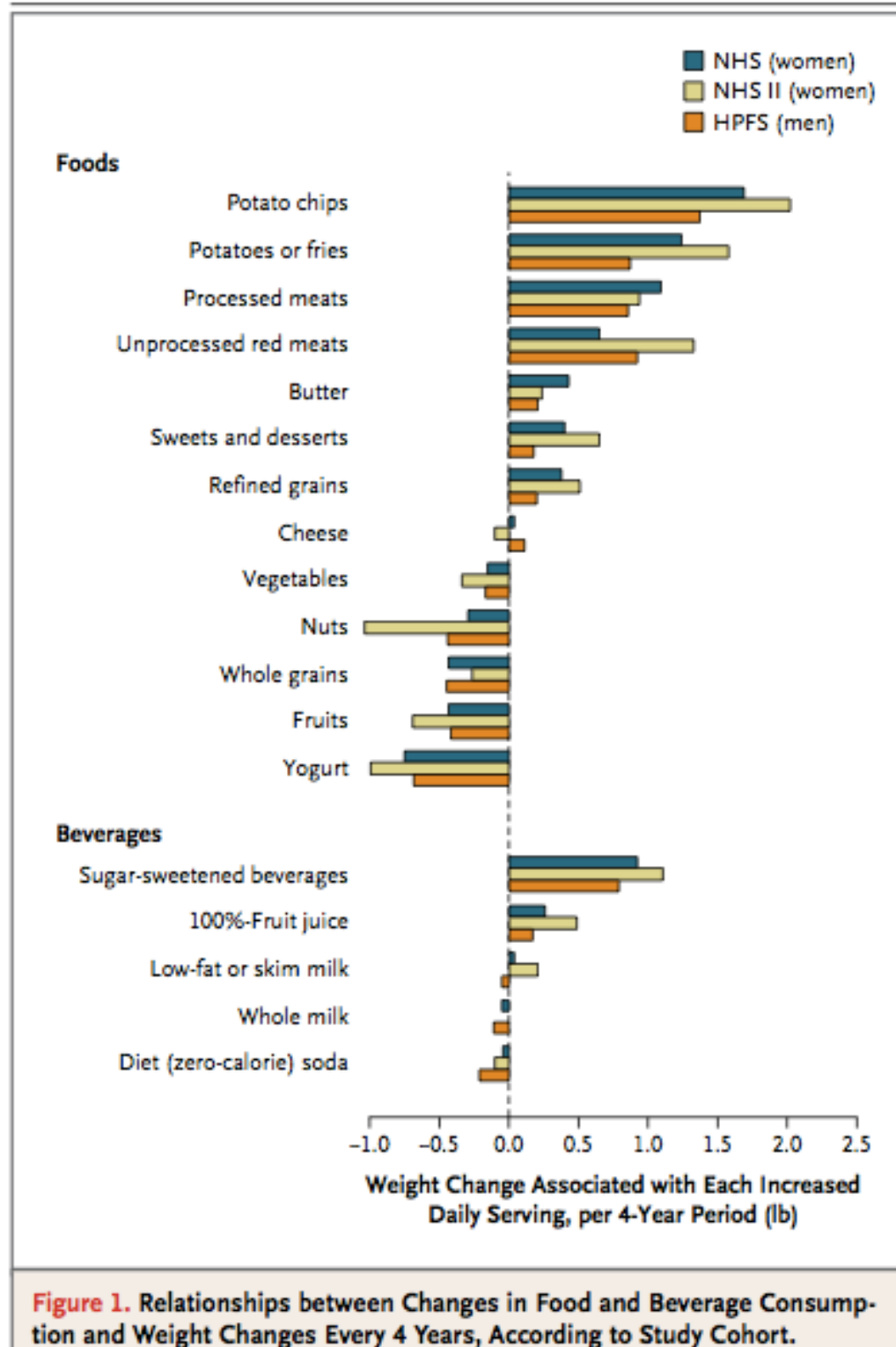
Dietary Habits

- 120,877 US men & women
- Prospective trial
- Baseline:
 - Non-obese (mean BMI 23.7)
 - No chronic diseases
- F/u between 12 and 20 years

Newsflash:

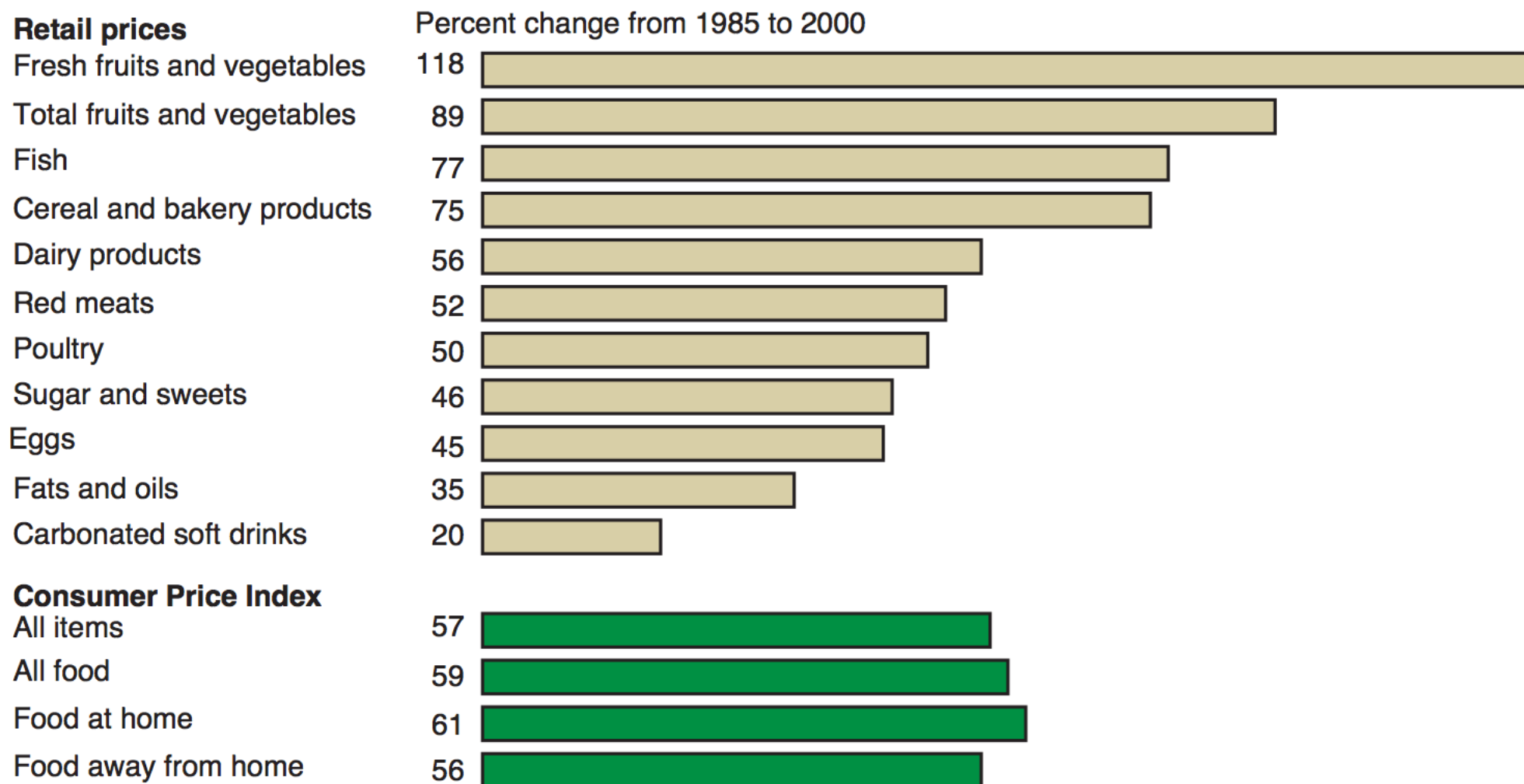
People who eat more potato chips, gained more weight.

1. Mozaffarian, et al. Changes in Diet and Lifestyle and Long-Term Weight Gain in Women and Men. NEJM. June 2011. 364;25. 2392-404.



Cost of food

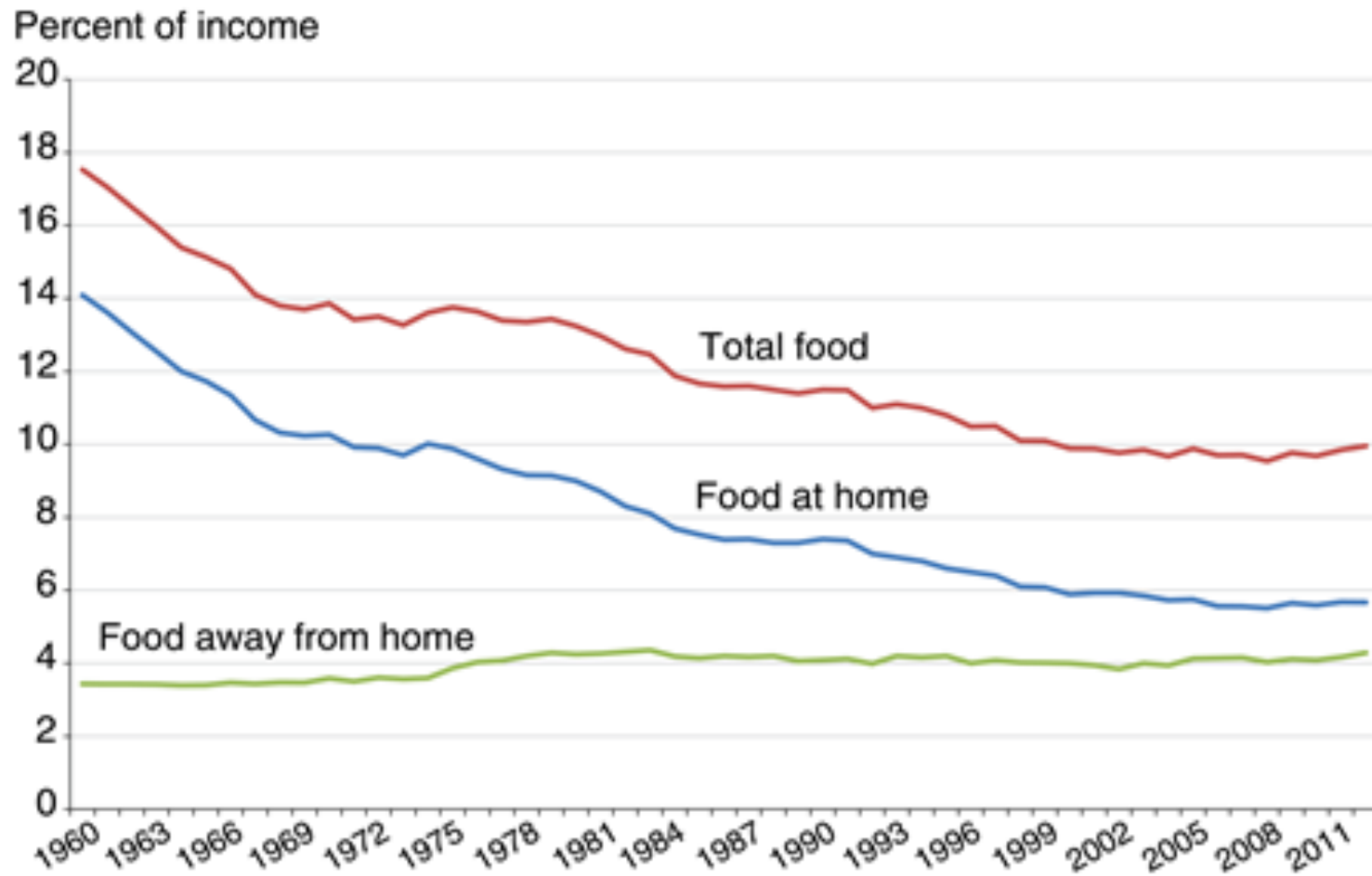
Figure 4—Fruits and Vegetables Have Led Retail Food-Price Increases



Source: Calculated by USDA's Economic Research Service from the Consumer Price Index.

Cost of food

Percent of per capita disposable income spent on food in the United States, 1960-2012



Source: USDA, Economic Research Service, Food Expenditure Series.

High-fructose corn syrup?

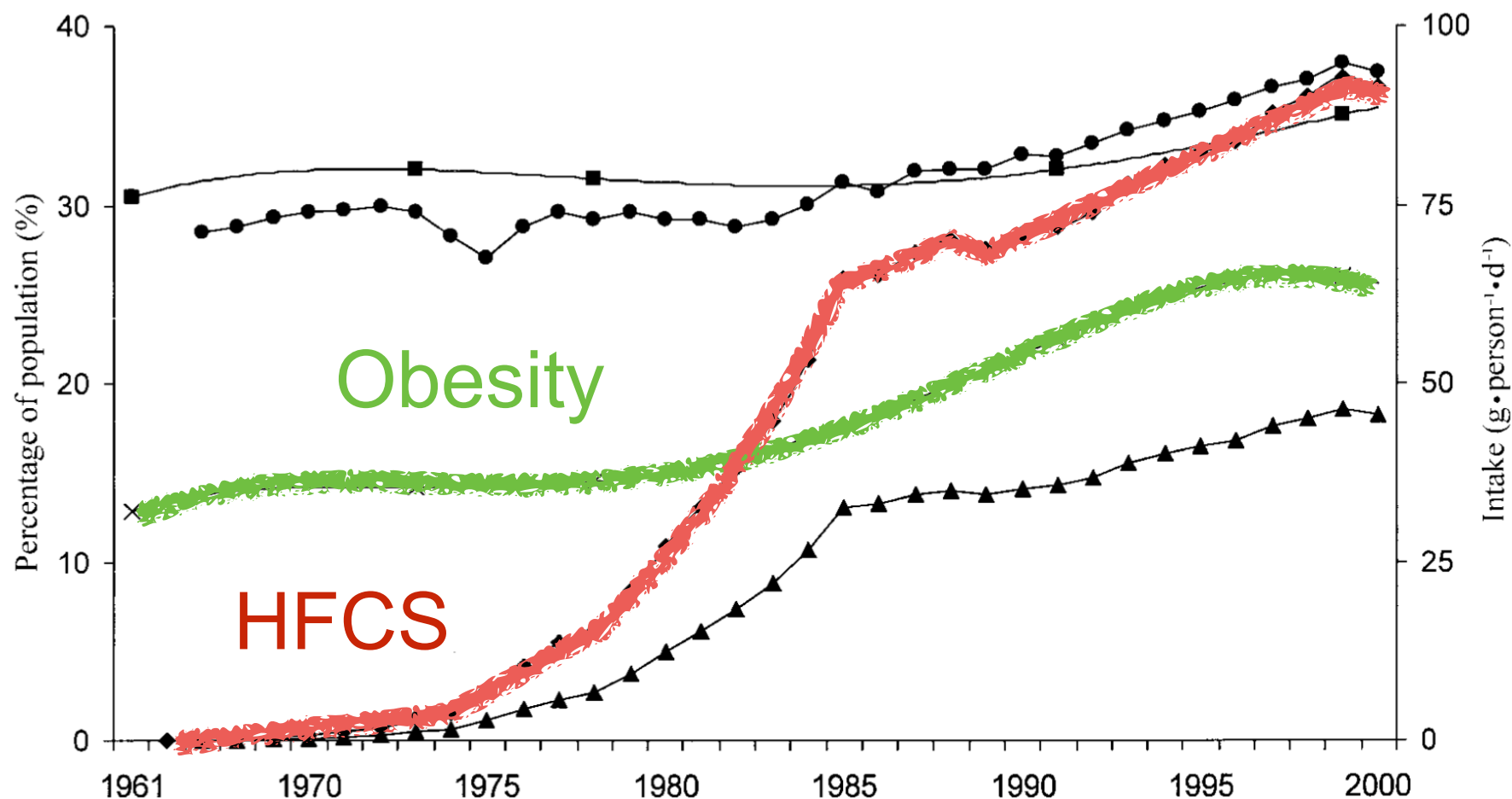


FIGURE 1. Estimated intakes of total fructose (●), free fructose (▲), and high-fructose corn syrup (HFCS, ◆) in relation to trends in the prevalence of overweight (■) and obesity (x) in the United States. Data from references 7 and 35.

1. Bray, *et al.* Consumption of high-fructose corn syrup in beverages may play a role in the epidemic of obesity. *Am J Clin Nutr.* 2004;79:537-43.

Don't forget about medications...

Drugs that Produce Weight Gain

- Thioridazine
- Olanzapine
- Quetiapine
- Risperidone
- Clozapine
- Amitriptyline
- Nortriptyline
- Imipramine
- Mirtazapine
- Paroxetine
- Valproate
- Carbamazepine
- Gabapentin
- Insulin
- Sulfonylureas
- Thiazolidinediones
- Pizotifen
- Cyproheptadine
- Propranolol
- Terazosin
- Contraceptives
- Glucocorticoids
- Progestational steroids

Psychiatric

Anticonvulsant

Glycemic control

Hormonal

Overweight, who cares?

Table 1. Obesity-Associated Health Problems

Resulting from the metabolic effects of enlarged fat cells and visceral fat

Type 2 diabetes

HypertensionDyslipidemia (low HDL-cholesterol levels and high triglyceride levels)

Cardiovascular disease (coronary artery disease, stroke, heart failure, and atrial fibrillation)

Cancer (in men: liver, stomach, pancreas, esophagus, multiple myeloma, rectum, and gall bladder; in women: uterus, kidney, cervix, pancreas, esophagus, gallbladder, breast, liver, ovary, colon, and rectum)

Gastrointestinal disease (GERD, erosive gastritis, gall bladder disease, gall stones, cholecystectomy, and nonalcoholic steatohepatitis)

Kidney disease (kidney stones, chronic renal disease, and end-stage renal disease)

Endocrine changes (hyperinsulinemia and insulin resistance, disturbed menstrual cycles, and altered cortisol metabolism)

Infertility (the polycystic ovarian syndrome)

Obstetrical risks (Caesarean section, hypertension, stillbirth, and neonatal mortality)

Resulting from increased body mass

Bone and joint diseases (osteoarthritis and hospitalization for back disorders)

Pulmonary disease (sleep apnea, pulmonary embolism, and sleep-disordered breathing)

Social stigmatization

GERD = gastroesophageal reflux disease; HDL = high-density lipoprotein.

Where does this data come from?

- Women's Health Initiative (n = 90,000)
- USRT (n = 80,000)

Who are we worried about?



CLASSIFICATION OF OVERWEIGHT AND OBESITY BY BMI, WAIST CIRCUMFERENCE AND ASSOCIATED DISEASE RISK*

	BMI (kg/m ²)	Obesity Class	Disease Risk* Relative to Normal Weight and Waist Circumference	
			Men ≤ 102 cm (≤ 40 in) Women ≤ 88 cm (≤ 35 in)	> 102 cm (> 40 in) > 88 cm (> 35 in)
Underweight	<18.5		—	—
Normal [†]	18.5 – 24.9		—	—
Overweight	25.0 – 29.9		Increased	High
Obesity	30.0 – 34.9	I	High	Very High
	35.0 – 39.9	II	Very High	Very High
Extreme Obesity	≥40	III	Extremely High	Extremely High

* Disease risk for type 2 diabetes, hypertension, and CVD.

+ Increased waist circumference can also be a marker for increased risk even in persons of normal weight.

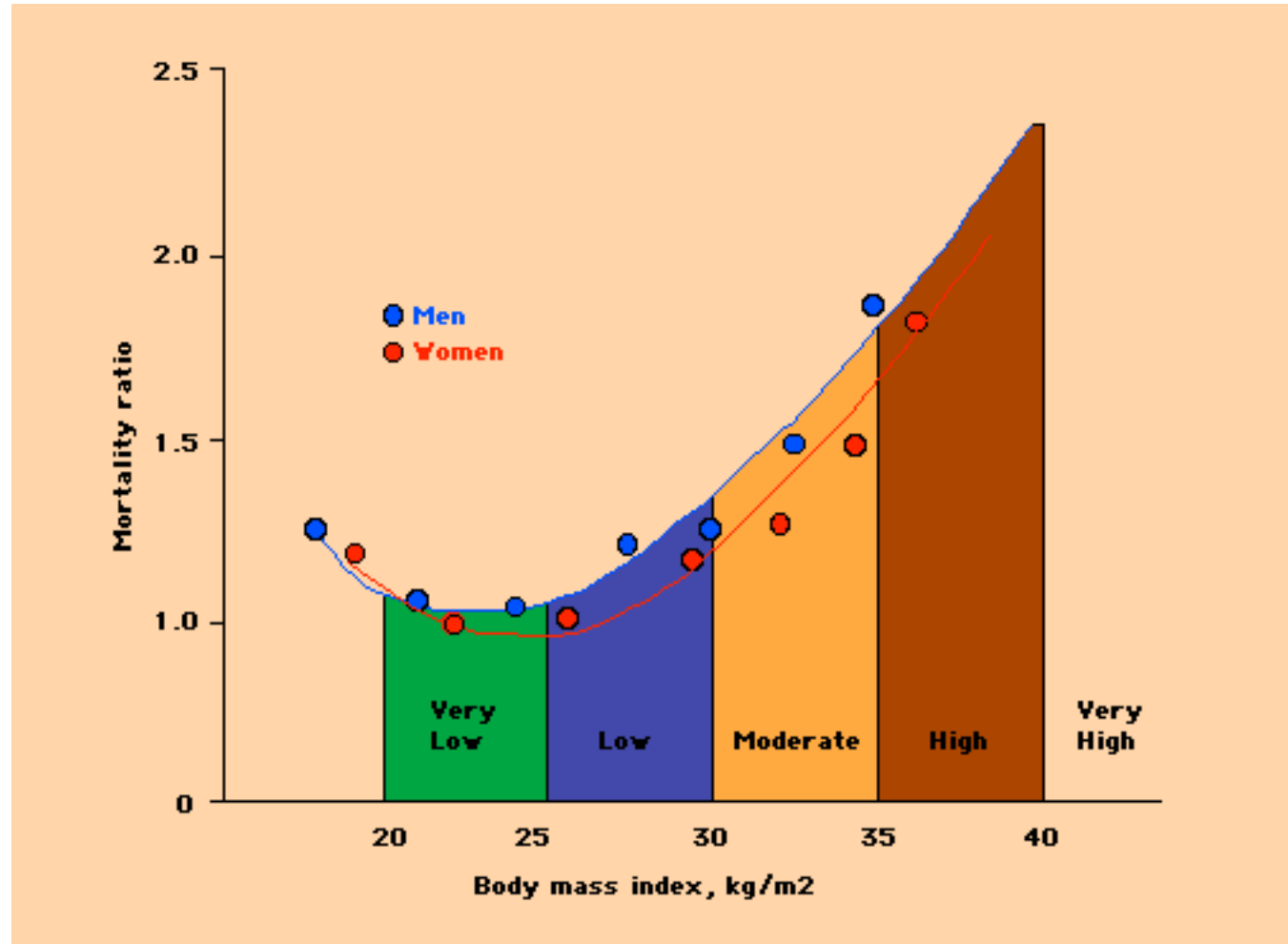
1. *Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: The Evidence Report*. NIH. 1998. http://www.nhlbi.nih.gov/guidelines/obesity/ob_gdlns.pdf

Lifespan



American Cancer Society

- n=750,000
- First major study correlating death rates to weight
- One of the first to factor out smoking



Relation between mortality and body mass index At a body mass index below 20 kg/m² and above 25 kg/m² there is an increase in relative mortality for men and women. Data from Lew, EA. *Ann Intern Med* 1985; 103:1024.

1. Lew, *et al.* Variations in Mortality by weight among 750,000 men and women. *J Chron Dis.* 1979;32:563-76.
2. Lew, *et al.* Mortality and Weight: Insured Lives and the American Cancer Society Studies. *Ann Intern Med.* 1985. 103:1024-9.

Lifespan

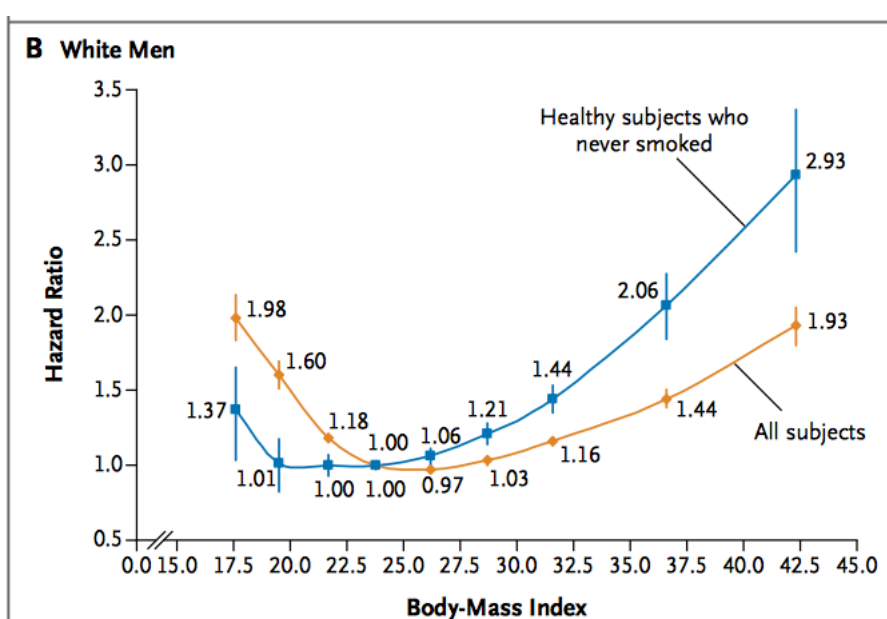
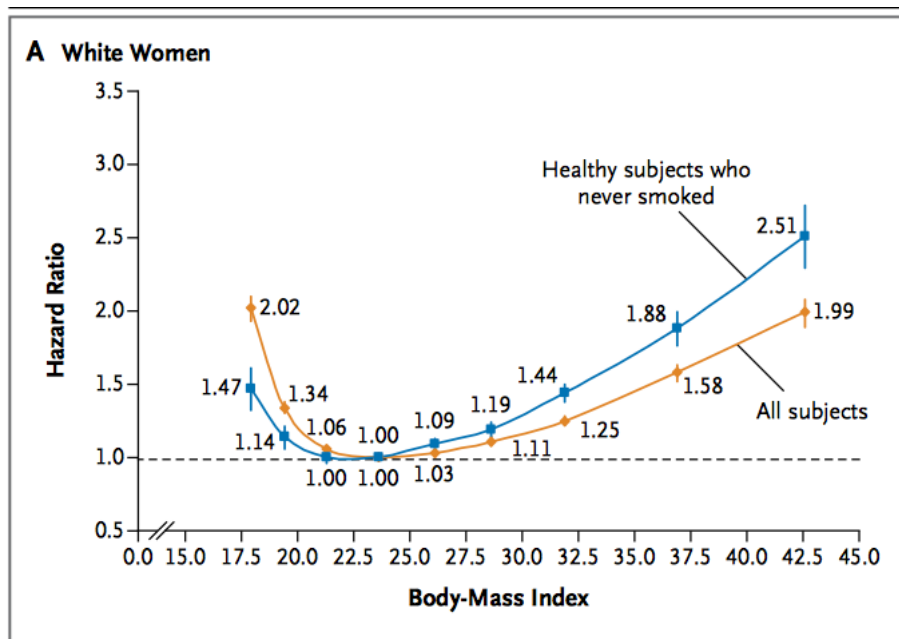


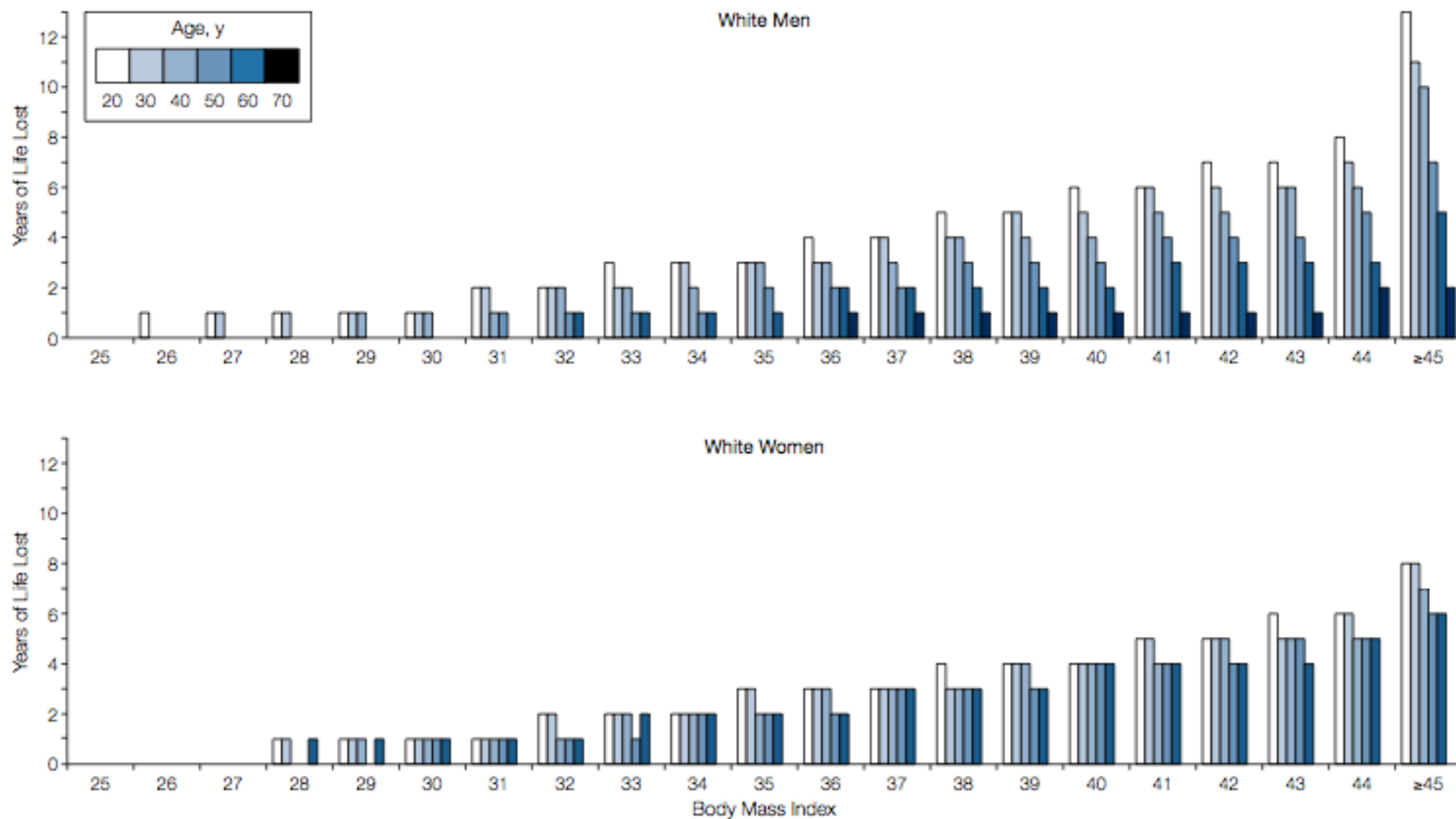
Figure 1. Estimated Hazard Ratios for Death from Any Cause According to Body-Mass Index for All Study Participants and for Healthy Subjects Who Never Smoked.

Hazard ratios and 95% confidence intervals are shown for white women (Panel A) and white men (Panel B). The hazard ratios were calculated with the use of age as the underlying time scale, were stratified by study, and were adjusted for alcohol intake (grams per day), educational level, marital status, and overall physical activity. Subjects were deemed healthy if they had no cancer or heart disease at baseline.

- Pooled data from 19 prospective studies
- Cox regression analysis
- n=1.46 million adults
- Ages 19-84, median 58

Lifespan

Figure 1. Years of Life Lost Among White Men and Women



Increased risk for disease

- Italian National Health survey
 - n=72,284
 - Epidemiological study
 - Interviews
 - One of the first studies to show increased incidence for specific disease states

Table 3 *Relative risk estimates (and 95% confidence intervals) for the prevalence of selected diseases or groups of diseases according to body mass index among Italian females aged 15 or over. The 1983 National Health Survey.*

Disease or group of diseases	Estimated overall prevalence/1000 females aged 15 or over	Relative risk estimates† among females with body mass index (kg/m ²)			
		< 20	20-24.9	25-29.9	≥ 30
Diabetes	43.8	0.71 (0.59-0.78)	1 ≠	1.59 (1.41-1.79)	2.40 (2.09-2.77)
Hypertension	96.5	0.78 (0.69-0.89)	1 ≠	1.54 (1.41-1.67)	1.91 (1.71-2.13)
Myocardial infarction	7.3	1.19 (0.83-1.70)	1 ≠	0.92 (0.68-1.23)	1.56 (1.30-1.87)
Other heart diseases	57.1	1.11 (0.96-1.28)	1 ≠	1.28 (1.15-1.43)	1.50 (1.30-1.73)
Haemorrhoids or varices	58.8	0.77 (0.67-0.89)	1 ≠	1.36 (1.22-1.50)	1.46 (1.26-1.69)
Chronic bronchitis	35.3	1.11 (0.94-1.32)	1 ≠	1.01 (0.88-1.15)	1.43 (1.20-1.70)
Emphysema or respiratory insufficiency	13.4	1.63 (1.28-2.06)	1 ≠	1.07 (0.86-1.34)	1.40 (1.06-1.86)
Bronchial asthma	24.8	0.98 (0.79-1.20)	1 ≠	1.17 (1.00-1.38)	1.99 (1.65-2.40)
Allergy	36.2	0.96 (0.83-1.11)	1 ≠	0.98 (0.85-1.13)	0.96 (0.77-1.19)
Anaemias	19.9	1.21 (1.01-1.45)	1 ≠	0.78 (0.64-0.95)	0.65 (0.47-0.90)
Gastroduodenal ulcer	28.9	1.06 (0.89-1.25)	1 ≠	0.89 (0.77-1.04)	0.79 (0.62-1.00)
Cholelithiasis	39.3	0.83 (0.70-0.98)	1 ≠	1.31 (1.16-1.48)	1.38 (1.16-1.64)
Liver cirrhosis	2.0	0.81 (0.39-1.69)	1 ≠	1.31 (0.79-2.17)	0.93 (0.41-2.13)
Urolithiasis	12.2	0.85 (0.63-1.13)	1 ≠	1.62 (1.31-2.00)	1.67 (1.25-2.24)
Renal insufficiency	12.9	1.38 (1.06-1.81)	1 ≠	1.34 (1.07-1.68)	2.17 (1.67-2.82)
Arthritis	214.7	0.75 (0.69-0.81)	1 ≠	1.35 (1.27-1.44)	1.56 (1.42-1.70)
Psychiatric and neurological disorders	72.8	1.09 (0.98-1.22)	1 ≠	1.09 (0.99-1.21)	1.13 (0.98-1.30)

† Mantel-Haenszel estimates adjusted for age in decades.

≠ Reference category.

What about kids?

Complications of Childhood Obesity.	
Psychosocial	Poor self-esteem Anxiety Depression Eating disorders Social isolation Lower educational attainment
Neurologic	Pseudotumor cerebri
Endocrine	Insulin resistance Type 2 diabetes Precocious puberty Polycystic ovaries (girls) Hypogonadism (boys)
Cardiovascular	Dyslipidemia Hypertension Coagulopathy Chronic inflammation Endothelial dysfunction

Pulmonary	Sleep apnea Asthma Exercise intolerance
Gastrointestinal	Gastroesophageal reflux Steatohepatitis Gallstones Constipation
Renal	Glomerulosclerosis
Musculoskeletal	Slipped capital femoral epiphysis Blount's disease* Forearm fracture Back pain Flat feet

* Blount's disease is a growth disorder of the tibia that causes the lower leg to angle inward (tibia vara).

Kids are at increased risk too

- There is growing evidence that cardiovascular disease risk factors start in childhood, and persist into adulthood.
- NHANES data
 - n=3383 kids ages 12-19
 - Increased weight was associated with an increased risk for pre-diabetes and diabetes (and other CVD risks)

TABLE 2 Distribution of BMI and Selected CVD Risk Factors Over Time Among US Adolescents, NHANES 1999–2008 (*N* = 3383)

Risk Factor	1999–2000 <i>n</i> = 788 % (SE)	2001–2002 <i>n</i> = 797 % (SE)	2003–2004 <i>n</i> = 744 % (SE)	2005–2006 <i>n</i> = 692 % (SE)	2007–2008 <i>n</i> = 362 % (SE)
BMI ^a					
Overweight	15 (1.54)	14 (1.78)	17 (2.02)	16 (1.69)	15 (2.81)
Obese	18 (2.66)	16 (1.21)	19 (3.01)	19 (3.09)	20 (2.99)
Blood pressure ^b					
Prehypertensive	12 (1.53)	11 (1.64)	10 (1.35)	12 (1.71)	10 (1.82)
Hypertensive	5 (0.89)	4 (0.97)	3 (0.74)	4 (1.38)	3 (0.91)
LDL-C ^c					
Borderline-high	14 (2.44)	18 (2.34)	13 (1.43)	15 (2.03)	13 (2.58)
High	9 (1.67)	9 (2.13)	6 (1.06)	7 (1.48)	6 (1.26)
HDL-C ^d					
Low	9 (1.47)	8 (0.94)	6 (1.42)	3 (1.41)*	3 (0.79)*
Fasting blood glucose ^e					
Prediabetes and Diabetes	9 (1.79)	15 (1.83)*	13 (1.99)	16 (1.87)*	23 (2.56)*

^a Based on the 2000 Centers for Disease Control gender-specific growth charts for the United States. Available at www.cdc.gov/growthcharts. Overweight and obesity are defined as having a BMI >85th to <95th percentile or >95th percentile, respectively. Normal wt was defined as having an age- and gender-specific BMI >5th to <85th percentile.

^b Blood pressure (for ages 12–17 y prehypertensive = systolic blood pressure (SBP) or diastolic (DBP) blood pressure ≥90th percentile to <95th percentile, and hypertensive = SBP or DBP ≥95th percentile; for ages 18 to 19 y prehypertension = SBP ≥120 mm Hg to ≤139 mm Hg or DBP ≥80 mm Hg to ≤89 mm Hg and hypertensive = SBP ≥140 mm Hg or DBP ≥90 mm Hg).

^c Low-density lipoprotein cholesterol (high = LDL-C ≥130 mg/dL).

^d High-density lipoprotein cholesterol (low = HDL-C <35 mg/dL).

^e Fasting blood glucose >99 mg/dL or reported physician diagnosis as a patient with diabetes.

* *P* < .05.

People who are overweight or obese
live shorter lives
and
have more medical problems
compared to normal weight individuals

Does body composition matter?

Yes.

- “Fit and obese” better than “unfit and lean”
 - Observational cohort study of 21,925 men
 - 8 year follow up
 - Adjusted for age, smoking, alcohol, etc.
 - Fitness calculated with:
 - Body composition analysis (skin fold or hydrostatic weight)
 - Maximal treadmill exercise test
 - Unfit = bottom 20% for each age group
 - Results:
 - Unfit lean men had *twice the risk* of all cause mortality compared to fit lean men
 - Fit obese men had *the same risk* as fit lean men

Does body composition matter?

Yes.

- Looking at obesity and abdominal adiposity
 - NHANES data
 - 5799 men and 6429 women
 - 12 year follow-up
 - Multivariate analysis
 - Results:
 - Increased waist-to-hip and waist-to-thigh ratios correlated with increase in mortality
 - BMI and waist circumference had J-shaped curves

Lose weight → Healthier?

Yes.

- Finnish Diabetes Prevention Group study
 - RCT
 - n=522 all with impaired fasting glucose
 - Average BMI 31
 - Intervention arm counseling on weight loss, low fat diet, physical activity
 - Results: Incidence of diabetes
 - Control: 23%
 - Intervention: 11%

5% weight loss = 58% risk reduction to develop diabetes

Lose weight → Healthier?

Yes.

- Framingham study
 - Retrospective study using Framingham cohort
 - 623 middle-aged (30-49 years) and 605 older (50-65 years)
 - Follow-up: 48 years
 - Mean baseline BMI 27
 - Results:

15 lb weight loss reduced risk to develop hypertension by:
– 28% in middle-aged group
– 37% in older adults

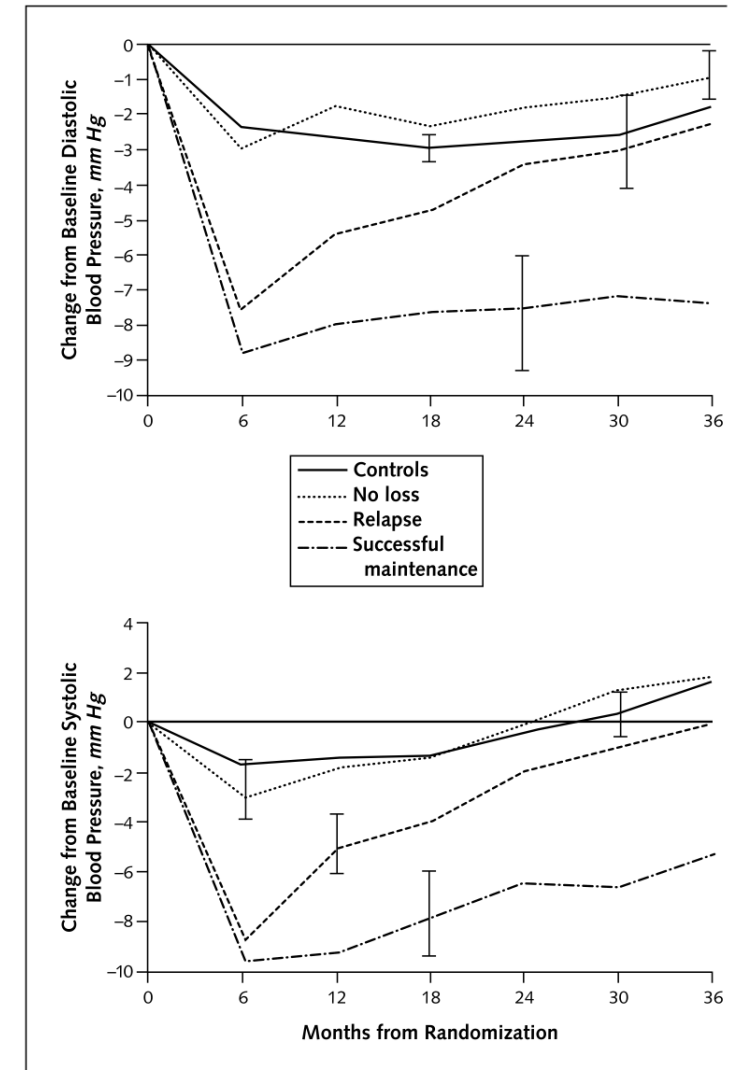
Lose weight → Healthier?

Yes.

- TOHP II (Trials of Hypertension Prevention)
 - Multi-center, RCT
 - n=1191
 - Followed 3-4 years
 - Average BMI 31
 - Intervention: 3 years of group meetings, individual counseling on dietary change, physical activity
 - Results:

10 lb weight loss = 65% risk reduction to develop hypertension

Figure 3. Mean change in diastolic (top) and systolic (bottom) blood pressure.



A weight loss of
just 5-10%
can help reduce the chances a patient will
develop diabetes and hypertension.

Realistic Goals

How much weight do you think your patients *want* to lose?

- 60 obese women treated at University of Pennsylvania
 - Mean BMI 36.3
 - Mean Age 40
 - Ethnic diversity
 - Everyone on calorie restricted diet, cognitive-behavioral weight education, exercise
- The women were asked to set weight loss goals...

Realistic Goals



- **Dream Weight**

- Weight you would choose if you could weigh whatever you wanted



- **Happy Weight**

- This weight is not as ideal as the first one. It is a weight, however, that you would be happy to achieve



- **Acceptable Weight**

- A weight that you would not be particularly happy with, but one that you could accept, since it is less than your current weight



- **Disappointed Weight**

- A weight that is less than your current weight, but one that you could not view as successful in any way. You would be disappointed if this were your final weight after the program.

Realistic Goals

The women's goals (on average)
how much they wanted to lose:



- Dream: 38 kg (84 lbs)



- Happy: 31 kg (68 lbs)



- Acceptable: 25 kg (55 lbs)



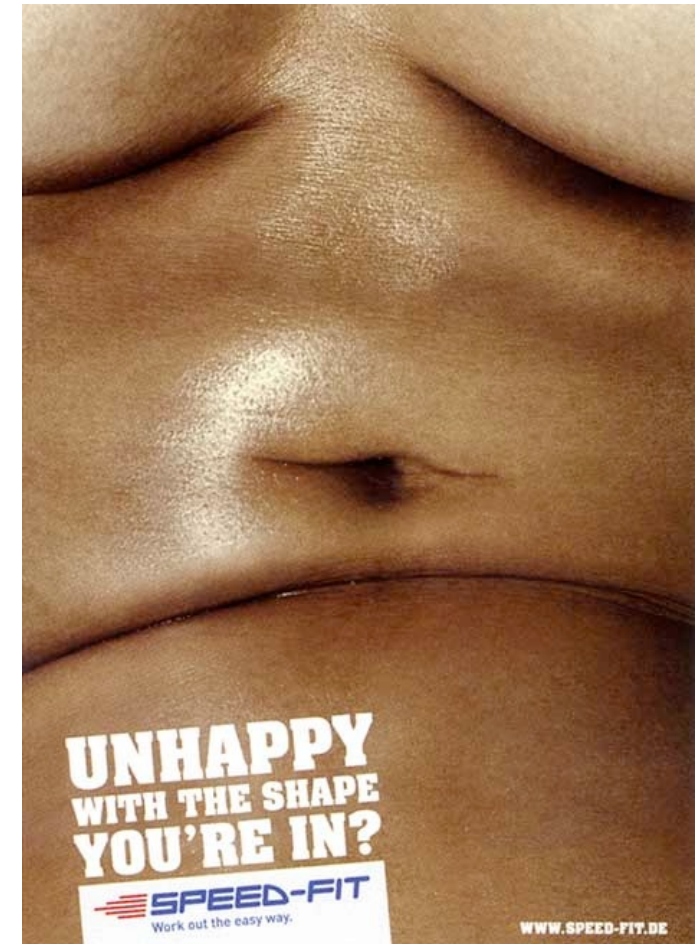
- Disappointed: 17 kg (37 lbs)

*How many of the women do you think
reached each of these goals?*



Realistic Goals

- How did they do?
 - Lost an average of 16.3 +/- 7.2 kg
- Who made their goals?
 - Dream: *none*
 - Happy: 9%
 - Acceptable: 24%
 - Disappointed: 20%
 - *47% didn't even achieve their "disappointed weight" goal !*



The eyewitness is unreliable

- n=2032, high school students
- Asked to report height, weight, and body image perception
- Then all weighed and measured
- Results:
 - Overestimated underweight and overweight
 - >20% at risk for overweight or overweight
perceived themselves as underweight

The eyewitness is unreliable

- n=15,593, adults, NHANES data
- “Do you consider yourself now to be overweight, underweight, or about the right weight?”
- 28% of women, and 30% of men misclassified their own status
- 38% of *normal* weight women considered themselves *overweight*
- 33% of *overweight* men considered themselves “*about the right weight*” or “*underweight*”

Do we bring it up?

Nope.

- Telephone survey, random numbers
- all 50 states
- n=12,835, 18+, BMI 30+
- Only 42% had been advised to lose weight

What terms should I use?

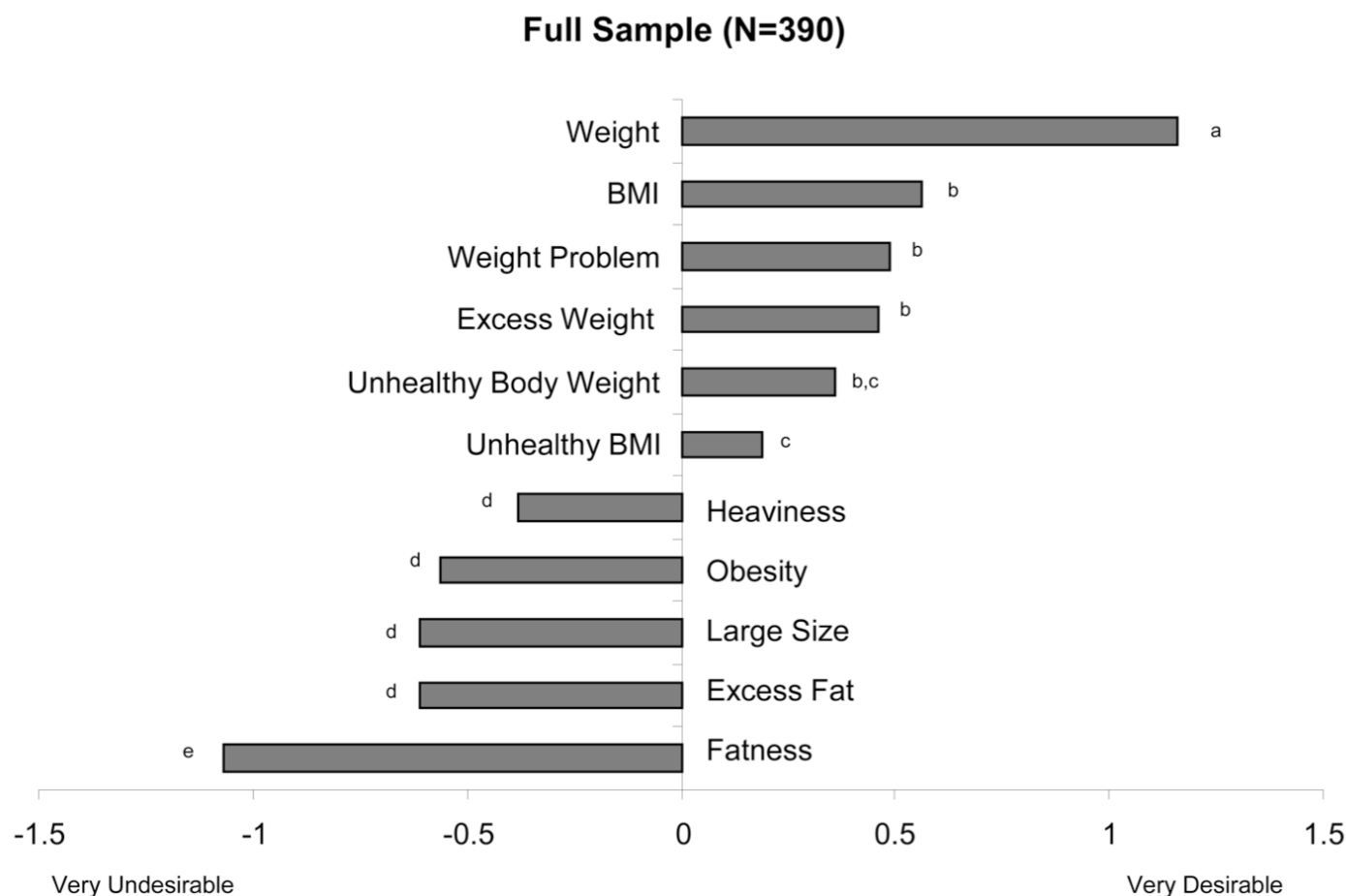


Figure 1.

Mean ratings of the 11 terms to describe excess weight, as determined for the full sample of participants. Terms with different letters differ significantly from each other ($p < 0.05$).

1. Volger, *et al.* Patients' Preferred Terms for Describing their Excess Weight: Discussing Obesity in Clinical Practice. *Obesity*. Jan 2012. 20(1).

What do patients want?

- n=410
- Survey
- Most overweight (84%) and obese (97%) thought they needed to lose weight
- Discussed with their physician?
 - Obese: 49%
 - Overweight: 24%
- Advice most wanted by patients:
 1. dietary advise
 2. help with setting realistic weight goals
 3. exercise recommendations

So now what?



Eat right and exercise.

Exercise alone isn't enough.

- Just exercise: 3 kg weight loss
- Diet, or Diet & Exercise: 11 kg weight loss

*To lose a pound a week through exercise, you need to
walk 5 miles per day
7 days a week!*

Tomorrow we start our diet for
real...



Dietary changes and Exercise

- Obese older adults
 - n=93
 - Mean BMI 37
 - Mean age 70
- RCT, intent-to-treat analysis
 - Control
 - Diet
 - Exercise
 - Diet + Exercise

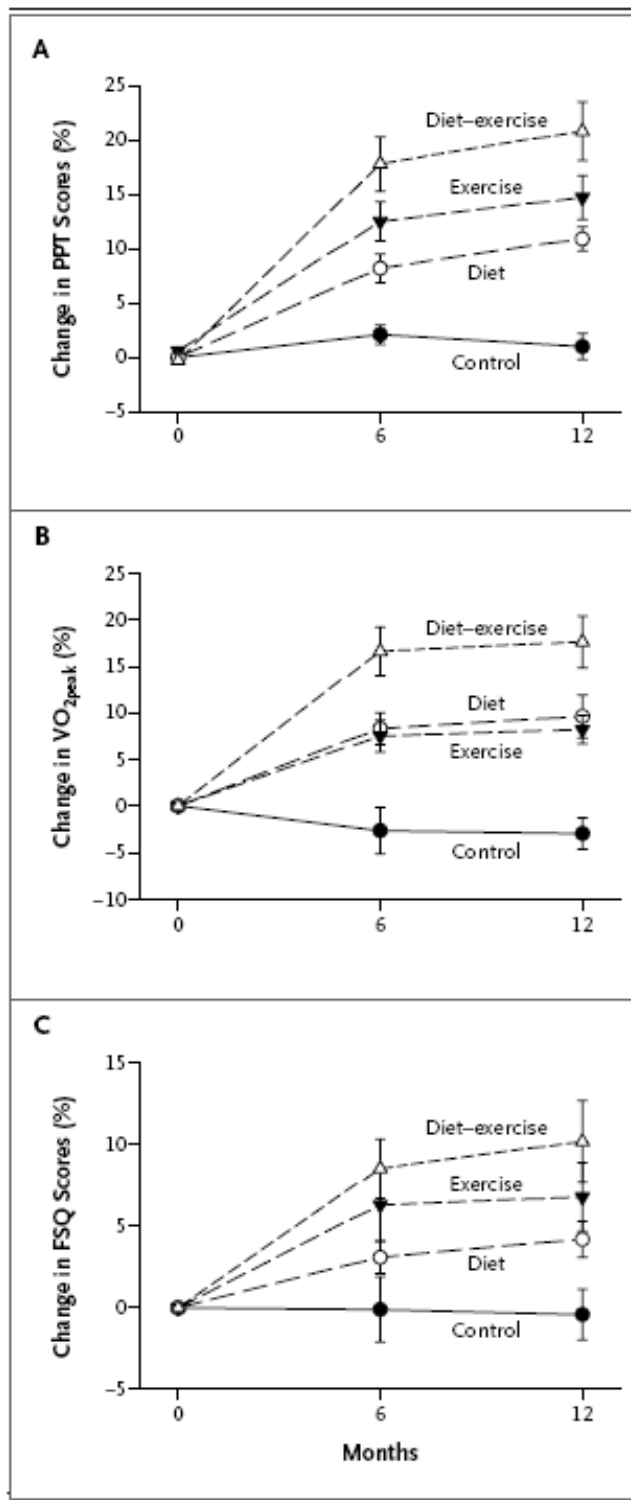


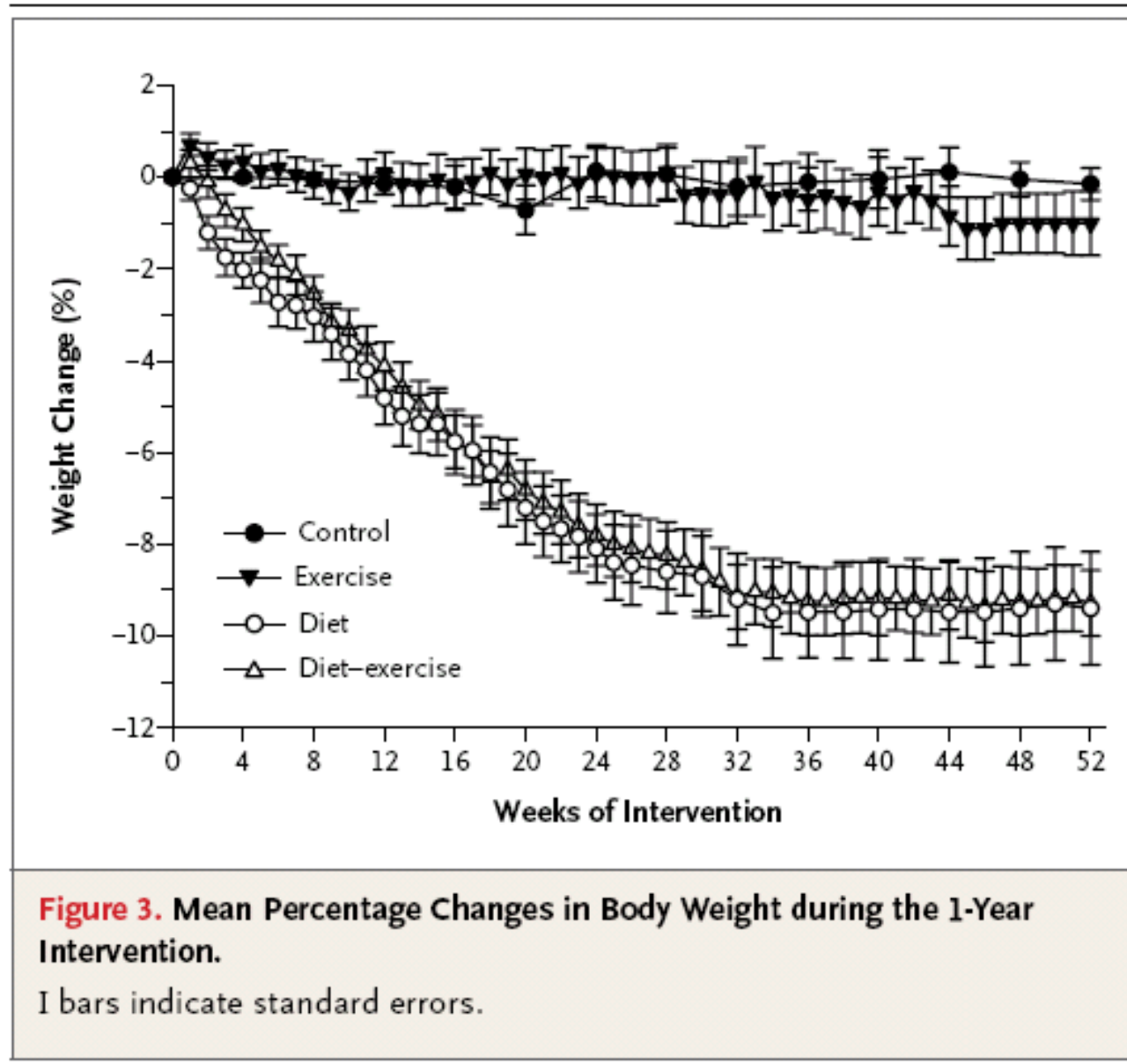
Figure 2. Mean Percentage Changes in Objective and Subjective Measures of Frailty during the 1-Year Intervention.

The objective measures of frailty included the scores on the Physical Performance Test (PPT), which range from 0 to 36, with higher scores indicating better physical status (Panel A), and the peak oxygen consumption (VO_{2peak}) (Panel B). The scores on the Functional Status Questionnaire (FSQ), which range from 0 to 36, with higher scores indicating better functional status, were used as a subjective measure of frailty (Panel C). The change in the scores on the PPT was the primary outcome. In Panels A and B, the change in the diet-exercise group differed significantly from the changes in the exercise group and in the diet group, and the changes in the exercise group and in the diet group differed significantly from that in the control group. In Panel C, the change in the diet-exercise group differed significantly from that in the diet group, and the changes in the exercise group and in the diet group differed significantly from that in the control group. I bars indicate standard errors.

1. Villareal, *et al.* Weight Loss, Exercise or Both and Physical Function in Obese Older Adults. *N Engl J Med.* Mar 2011;364:1218-29



Dietary changes >> exercise



Controls
&
Exercise only

Diet
&
Diet + Exercise

Work it off...

How much exercise does it take to burn off
for a 160 lb person walking 3 mph



36 min

150 kcal



58 min

242 kcal



1 to 3 hr

250 - 600 kcal
(depending on size and options)



2 hr 8 min

540 kcal

VIACOM

Childhood obesity.
Don't take it lightly.

Food Stamps can help. Call 1-888-328-3483 to see if you qualify.

4151

VIACOM

my kinda
shoppin'
spree

Dollar **M** Menu

1152

**Complete Your Meal
With A Mega Jug**

for only
\$2.99

pepsi

MEGA JUG

And KFC Will Donate \$100 To

JDRF Juvenile Diabetes Research Foundation International

Help Us Find A Cure!

How can we get kids to a healthy weight?

- Obese children(ages 8-16)
 - Mixed ethnic backgrounds
 - Mean BMI 36
 - Mean age 12
- RCT
 - Control
 - Intervention:
 - Better food choices program (40 min session)
 - Exercise, lead by exercise physiologists (50 min)
- n=209 (174 in final analysis)

Children

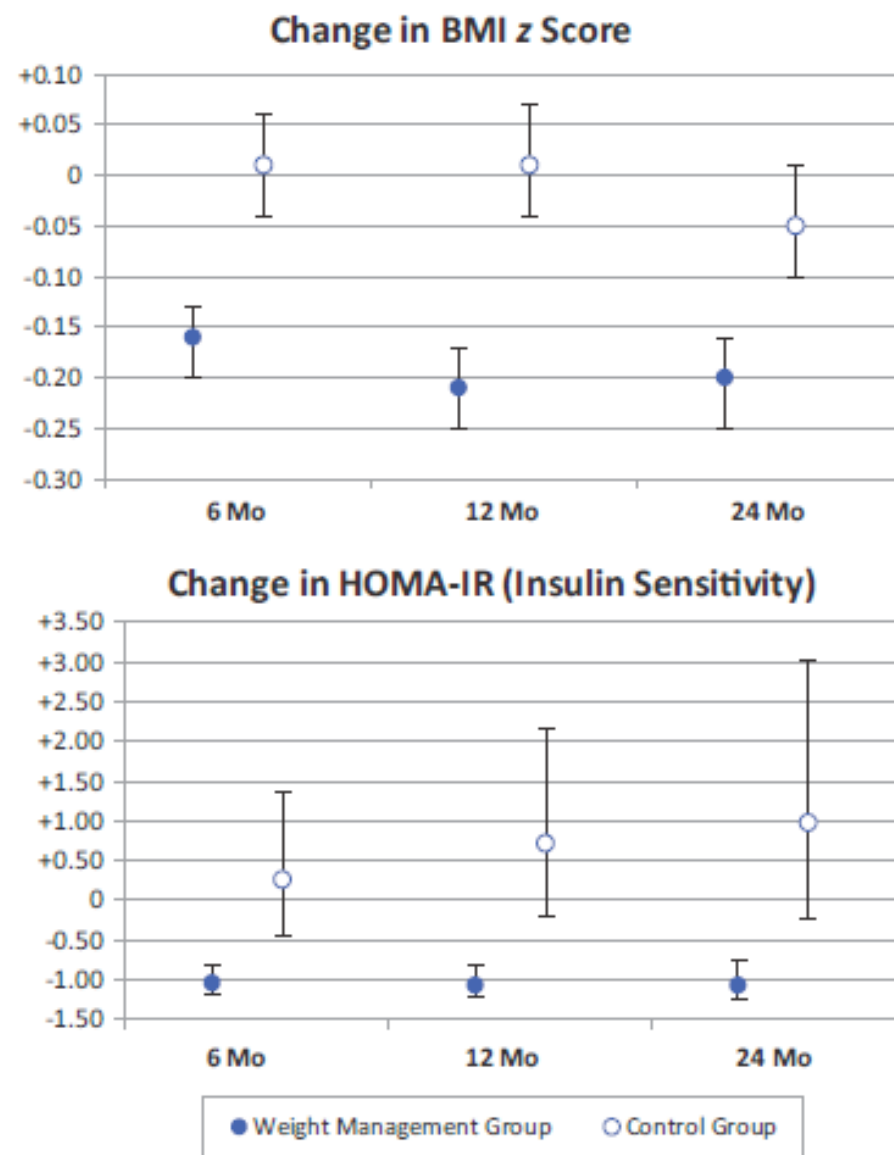


FIGURE 2

Changes from 6, 12, and 24 months are from baseline. At 6 months (weight management group, $n = 86$; control group, $n = 49$) $P < .0001$ for BMI z score, and $P = .0001$ for HOMA-IR; at 12 months (weight management, $n = 75$; control group, $n = 44$) $P < .0001$ for BMI z score and HOMA-IR; and at 24 months (weight management group, $n = 45$; control group, $n = 31$) $P < .0001$ for BMI z score, and $P = .0001$ for HOMA-IR.

1. Savoye, *et al.* Long-Term Results of an Obesity Program in an Ethnically Diverse Pediatric Population. *Pediatrics*. Mar 2011. Vol 127, No 3. 402-10.

Lets look at the other kids data...

- Meta analysis
- Goal to evaluate benefits/harms of weight management interventions for overweight/obese children
- Categorized by intensity
 - Very low < 10 hours
 - Low 10 - 25 hours
 - Medium 26 - 75 hours
 - e.g. at least weekly hour-long meetings for 6 months
 - High > 75 hours
 - e.g. twice-weekly hour-long meetings for 6 months, and weekly hour-long meetings for 6 months

Lets look at the other kids data...

Review: Childhood Overweight (Childhood Obesity, USPSTF)
 Comparison: 01 Short-term Change in BMI After Behavioral Interventions
 Outcome: 08 Short-term Change in Weight (BMI, BMI SDS, Percent Overweight), Standardized ES, Grouped

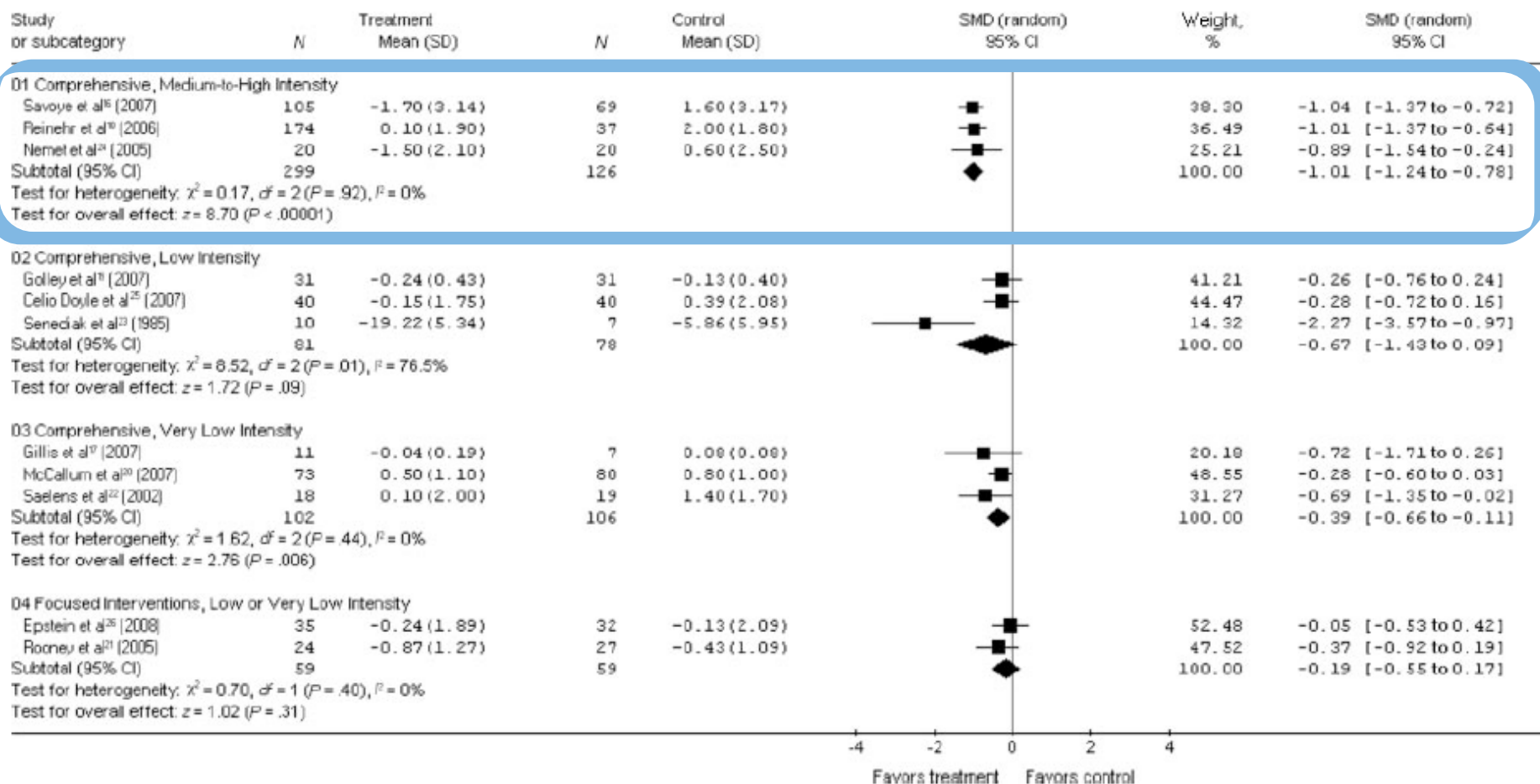


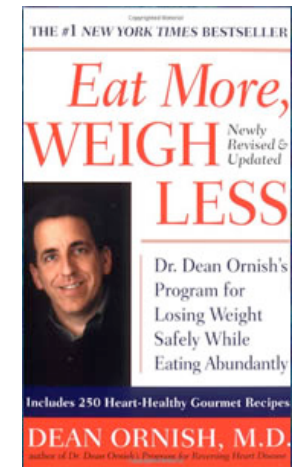
FIGURE 3

Pooled analysis: short-term weight change effect size (ES) of behavioral interventions (KQ1). SMD indicates standardized mean difference.

- Whitlock, et al. Effectiveness of Weight Management Interventions in Children: A Targeted Systematic Review for the USPSTF. *Pediatrics*. Feb 2010. Vol 125, No 2. e396-e418.

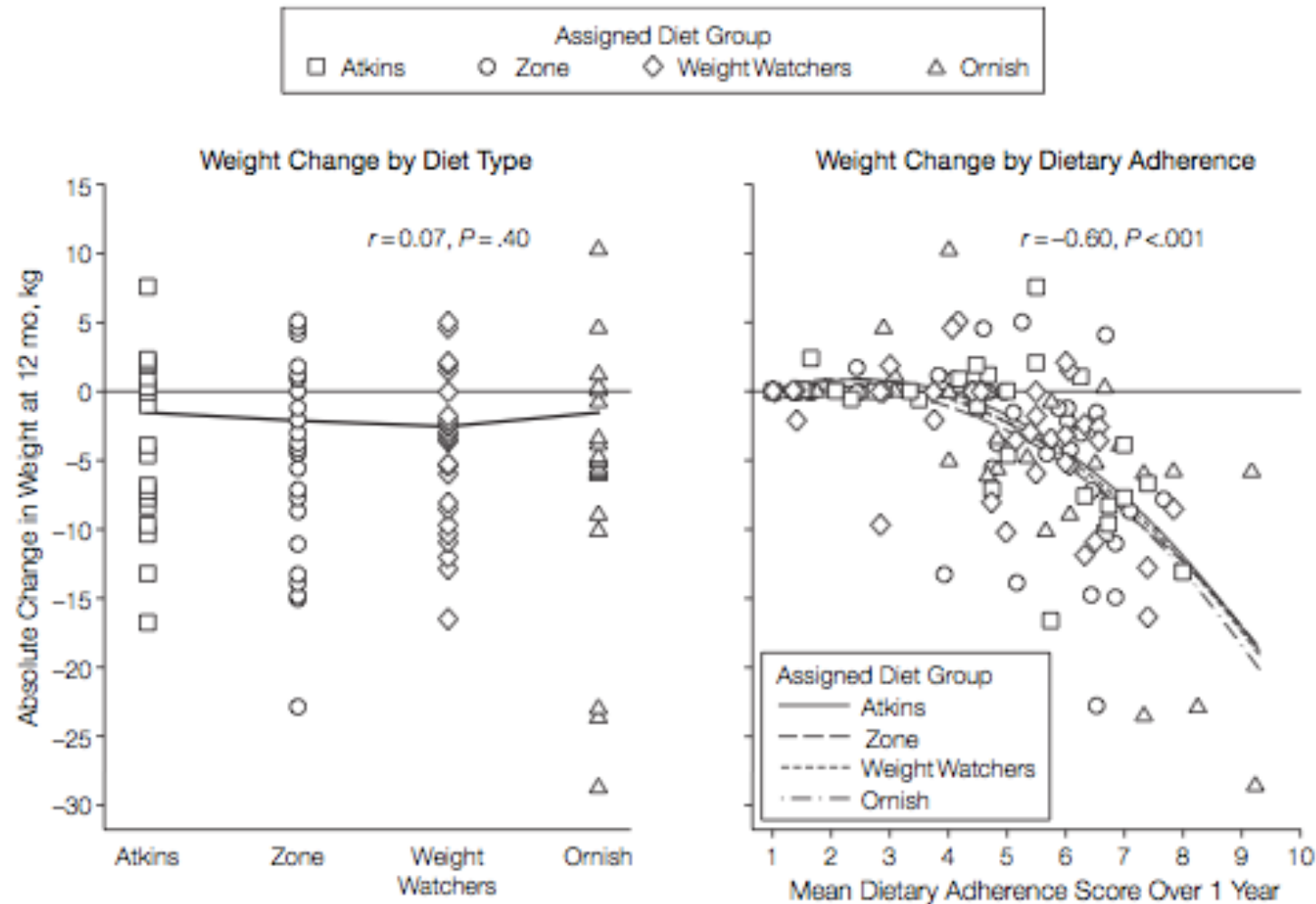
Commercial/Fad diets

- Single center (Boston)
- RCT
- NIH funded
- n=160
- Randomized to:
 - Atkins (carbohydrate restriction)
 - Zone (macronutrient balance)
 - Weight Watchers (calorie restriction)
 - Ornish (fat restriction)
- All groups averaged 5-6 lb weight loss at 1 year

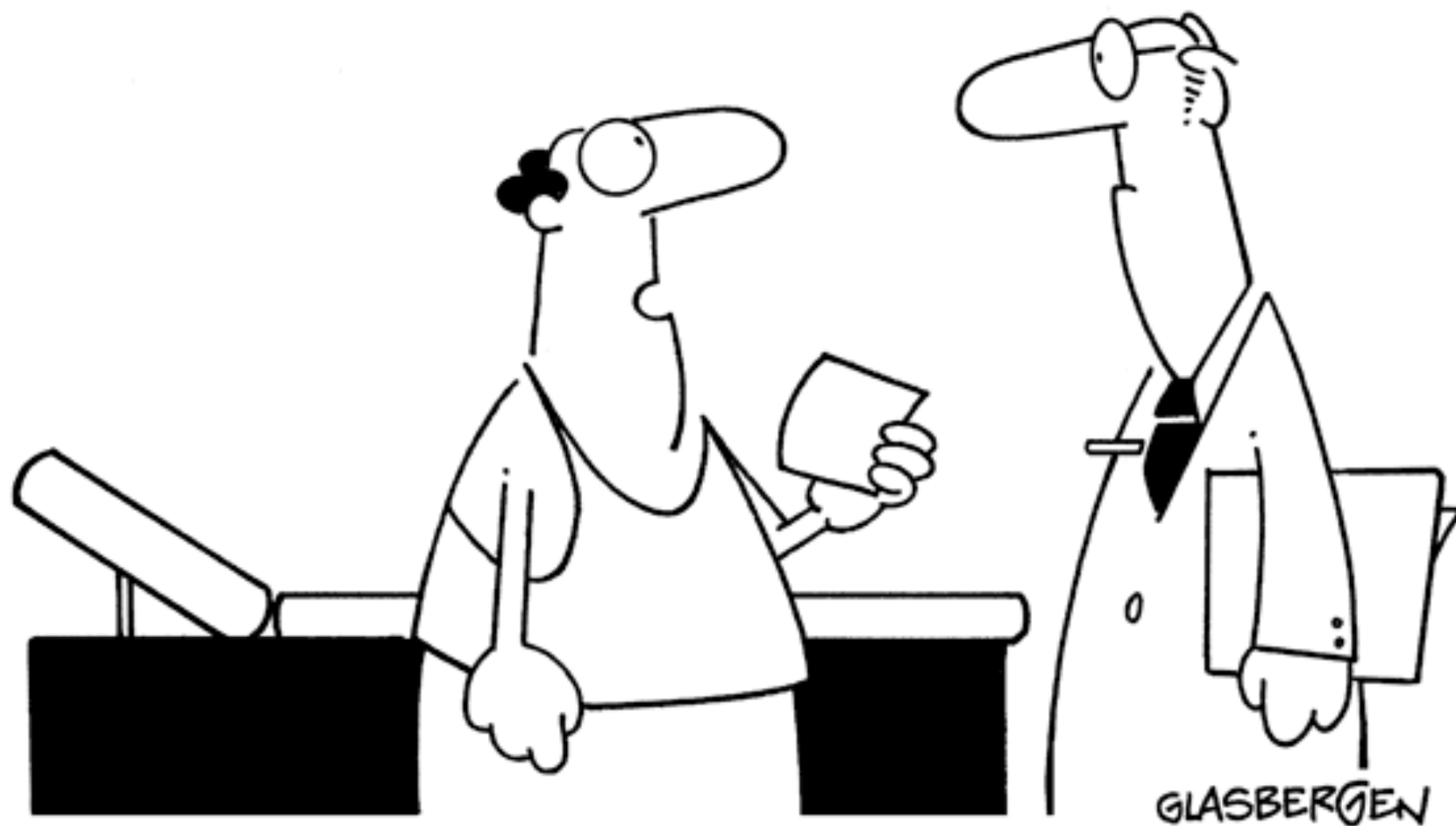


Commercial/Fad diets

Figure 3. One-Year Changes in Body Weight as a Function of Diet Group and Dietary Adherence Level for All Study Participants



1. Dansinger et al. Comparison of the Atkins, Ornish, Weight Watchers, and Zone diets for weight loss and heart disease risk reduction: a randomized trial. JAMA 2005;293:43-53



**“Which ‘sensible diet’ do you want me to follow?
I found 123,942 of them on the internet!”**

Cold hard cash

- RCT
- n=594
- \$5 for each 1% of initial body weight lost
- Paid out at 3, 6 and 12 months
- Max payout: 10% = \$150
- No statistical difference



Cold hard cash



- RCT
- n=105
- Employees at CHOP, BMI 30 - 40
- Monthly weigh-ins, 24 weeks
- Three arms:
 - Control (redirected to NIH website)
 - Individual incentive (\$100 each month if under goal - 0.4 kg/ week)
 - Group incentive (groups of 5, don't know each other, \$500 split each month if all under goal)

Cold hard cash



Table 2. Weight Loss

Measure*	Within-Group Change			Between-Group Difference in Change†		
	Control Group (n = 35)	Individual-Incentive Group (n = 35)	Group-Incentive Group (n = 34)	Individual-Incentive Group vs. Control Group	Group-Incentive Group vs. Individual-Incentive Group	Group-Incentive Group vs. Control Group
Weight loss at 24 wk						
Mean weight loss, kg	0.5	1.7	4.8	1.2	3.2	4.4
95% CI	−1.3 to 2.2	0 to 3.3	3.3 to 6.4	−1.3 to 3.7	0.9 to 5.5	2.0 to 6.7
P value for comparison				0.34	0.008	<0.001
Weight loss at 36 wk						
Mean weight loss, kg	0.4	0.8	3.4	0.3	2.7	2.9
95% CI	−1.2 to 2.1	−0.9 to 2.4	1.7 to 5.1	−2.0 to 2.6	0.4 to 5.0	0.5 to 5.3
P value for comparison				0.81	0.024	0.016

* Measures use both observed and imputed data.

† With Bonferroni correction for 3-way comparison, the threshold for statistical significance was 0.0167.

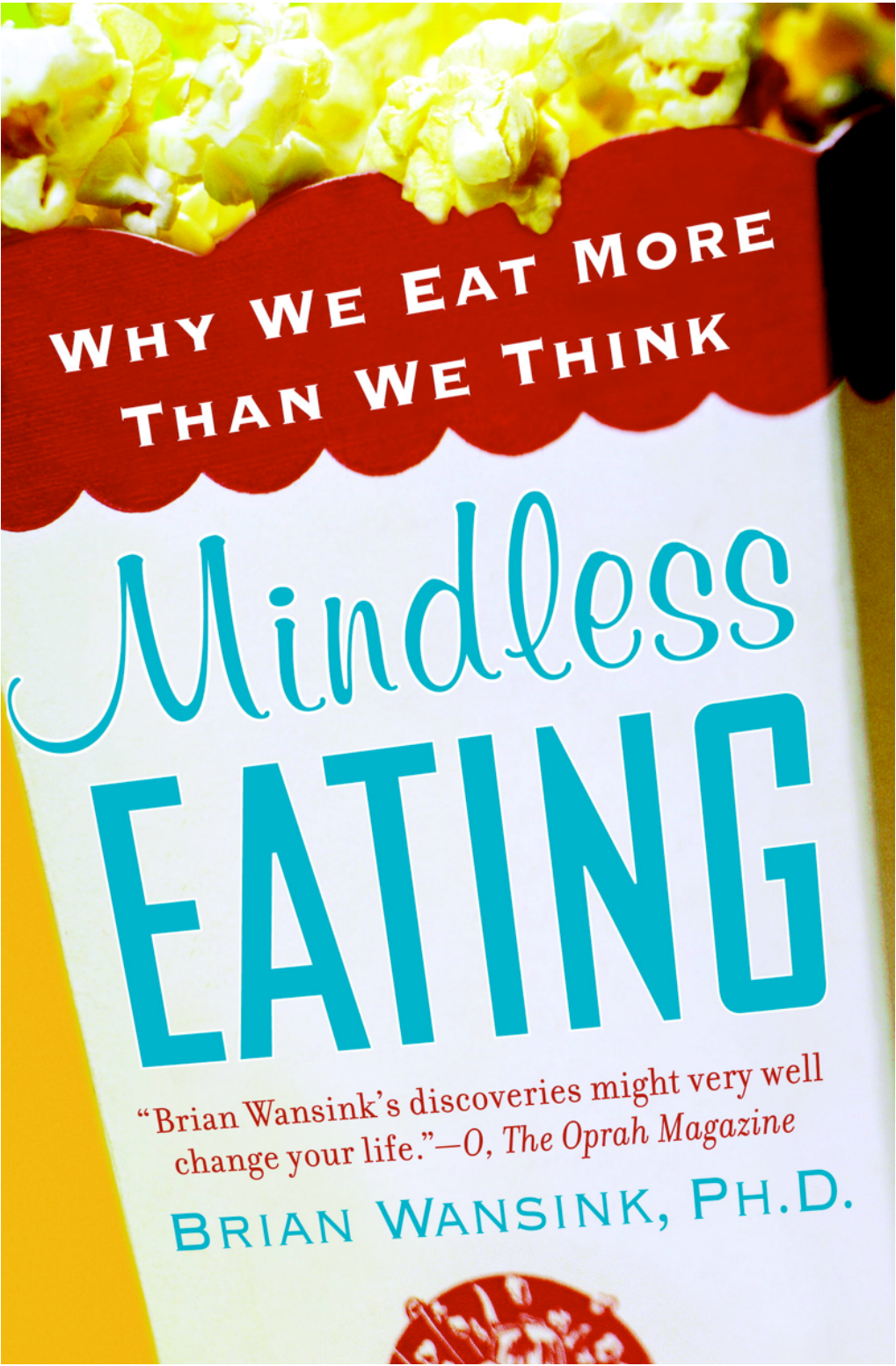
Group > Individual > Control

1. Kullgren, *et al.* Individual- versus Group-Based Financial Incentives for Weight Loss; A Randomized, Controlled Trial. *Ann Int Med.* 2013;158:505-514.

Studying Successes

- National Weight Control Registry
 - Self-selected participants, n=4000
 - Criteria: maintain 30 lb weight loss for 1 year
 - Mean loss of 66 lbs, maintained a mean of 5.5 years
- Keys to success:
 - 89% used both diet and exercise to lose weight
 - 78% eat breakfast every day
 - 75% weigh themselves weekly
 - 62% watch less than 10 hrs of TV per week
 - 90% exercise on average 1 hour per day

People lose weight by
eating healthy and staying active
every day.

A close-up photograph of a red popcorn bucket filled with yellow popcorn. The bucket is tilted, and the popcorn is overflowing. The text is printed on the side of the bucket.

WHY WE EAT MORE
THAN WE THINK

Mindless EATING

*"Brian Wansink's discoveries might very well
change your life."—O, The Oprah Magazine*

BRIAN WANSINK, PH.D.

Bottomless Bowls

- n=34
- Told just a soup-only lunch and a questionnaire
- Asked to rate
 - How much they ate
 - How hungry before
 - How full after
- Controls: regular soup bowls.
- Intervention: *secret*, self-refilling soup bowl system

Both groups rated feeling equally full, but *intervention group ate 73% more!*
(14.7 oz compared to 8.5 oz)

Bottomless Bowls: Visual Cues Bias Soup Intake



Smaller Plates = Smaller Appetites



© 2010 Brian Wansink

Wansink *Physiology & Behavior*, 2010



9 inch plate



12 inch plate (77% more surface area)

Why the French don't get fat:



WHAT SKINNY PEOPLE UNKNOWINGLY DO AT THE CHINESE BUFFET



Two Slices of Pizza



Twenty years ago
500 calories



Today
850 calories

1. <http://www.divinecaroline.com/22178/49492> -- Adapted from the National Heart, Lung, and Blood Institute's (NHLBI) Portion Distortion Quiz (<http://hp2010.nhlbi.nih.gov/portion/index.htm>)

Movie Popcorn



Twenty Years Ago
5 cups
270 calories



Today
Tub
630 calories

Bagel



Twenty Years Ago
3-inch diameter
140 calories



Today—Noah's Plain Bagel
5-6-inch diameter
350 calories

Cheeseburgers



Twenty years ago
333 calories



Today's Burger
590 calories

Cup of Coffee



Twenty years ago
Coffee with milk and sugar
8 ounces
45 calories



Today
Grande café mocha with whip, 2% milk
16 ounces
330 calories

Portion Distortion

What you're served

What's one serving



1/2 lb. cheeseburger, French fries, 3/4 cup ketchup, tomato slice and lettuce.

1,345 calories
53 grams fat



1/4 lb. cheeseburger, half the French fries, 2 tablespoons ketchup, tomato slice and lettuce.

685 calories
33 grams fat

DID YOU KNOW?

- Americans are the heaviest of people in developed countries. The U.S. surgeon general has called obesity a national epidemic.
- 61 percent of Americans are overweight.

- Consuming an extra 100 calories daily for a year, without using them up, can lead to a weight gain of 10 pounds.
- Every gram of carbohydrate or protein equals 4 calories.

- The number of overweight people in the world – 1.1 billion – now equals the number of undernourished people.
- With each decade as we age, we need 100 fewer calories per day.

- Every gram of fat equals 9 calories.
- 10 calories a day (2 hard candies) of unexpended energy puts on an extra pound a year.



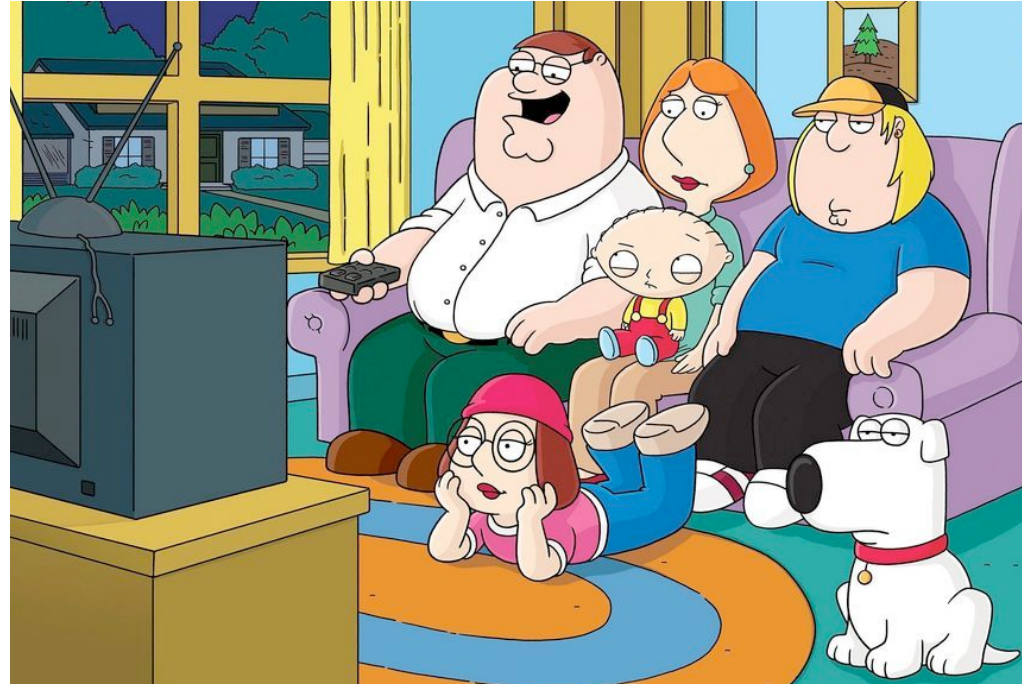
The Chicago Partnership for Health Promotion is funded by the USDA Food Stamp Program, The University of Illinois at Chicago Neighborhoods Initiative is the Land Grant Administrative Hub for CPHP. The USDA, UIC and CPHP are equal opportunity providers and employers. www.cphp.uic.edu

© L S Dean

1960



2014



orlistat (Alli, Xenical)

- Was the only FDA approved treatment until recently
- Inhibits pancreatic lipase, causing steatorrhea
- Can affect fat-soluble vitamin absorption, and can affect warfarin dosing (Vitamin K)
- Can improve LDL by 5-10%
- Side-effects mainly GI (borborygmi, cramping, oily spotting, rarely severe liver injury)
- Pregnancy class X
- Available for long-term use
- Over-the-counter
- 30-day supply costs ~ \$160



lorcaserin (Belviq)

- Rx: 10mg PO BID x 12 weeks
- Serotonin (5HT_{2C}) receptor agonist
- Has anorexigenic effects
- Targets satiety center in the brain, makes patients feel full sooner and eat less
- Patients lost on average 5%, with 1/3 losing 10%
- Schedule IV due to hallucinogenic properties, potential for dependency
- Pregnancy class X
- 30-day supply costs ~ \$250
- Similar to fenfluramine (Fen-Phen)
- Which was 5HT_{2B} receptor agonist
- lorcaserin has not been associated with valvular disease and pulmonary hypertension *yet...*

1. Micromedex
2. Bray, *et al.* Drug Therapy of Obesity. *Up To Date*. Accessed Jan 2014.
3. <http://en.wikipedia.org/wiki/Lorcaserin>



phentermine/topiramate (Qsymia)

- phentermine
 - Sympathomimetic amine (aka stimulant)
 - Thought to reduce appetite via stimulation of hypothalamus
 - FDA approved up to 12 weeks (Schedule IV)
 - Patients lose on average 8 lb in 6 months
- topiramate
 - Anticonvulsant
 - Mechanism unknown, effect seen in a *six-month dosing trial*
 - Patients lose on average 13 lb in 1 year



1. Micromedex
2. Bray, *et al.* Drug Therapy of Obesity. *Up To Date*. Accessed Jan 2014.

phentermine/topiramate (Qsymia)

- Patients lose an average of 20 lbs in 1 year
- Many side-effects:
 - dizziness, insomnia, tingling hands/feet, impaired cognition, tachycardia, hypotension, etc
 - Pregnancy class X
- Multiple strengths, and requires increasing dose over time
- When completed, requires taper to reduce risk of seizure
- Physician training required
- 30-day supply costs ~ \$120 - 185



1. Micromedex
2. Bray, *et al.* Drug Therapy of Obesity. *Up To Date*. Accessed Jan 2014.
3. Qsymia Prescribing Training. <http://www.qsymiarems.com>

Obesity with Diabetes

- metformin
- pramlintide (Amylin)
- exenatide (Byetta)
- liraglutide (Victoza)

Herbal remedies

Metabolic and Herbal Dietary Supplements Marketed to Facilitate Weight Loss

- Chromium picolinate
- Hydroxymethyl butyrate
- Pyruvate
- Conjugated linoleic acid
- Calcium
- Ephedra
- Green tea extract
- Garcinia cambogia
- Yohimbine
- Hoodia
- Bitter orange
- Chitosan
- Glucomannan
- Guar gum
- Psyllium

Safety and effectiveness unknown

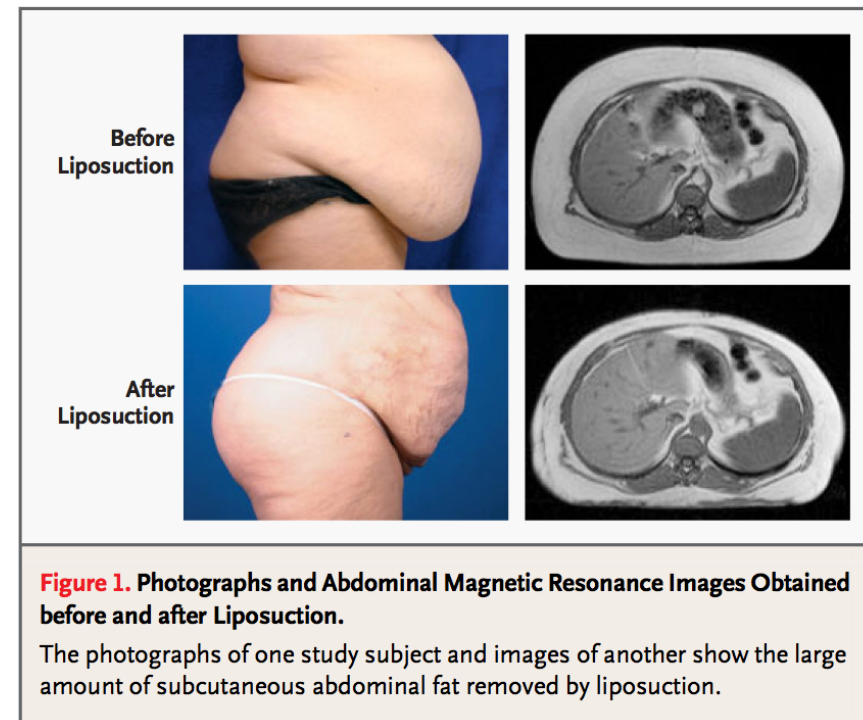
Your patients are likely taking some of these

Mechanisms:

- Diuretic
- Laxatives
- Stimulants
- Thyroid-containing

Liposuction?

- Observational study
- n=13 women, 7 had DM-II
- Measured many markers before and after
(insulin sensitivity, hs-CRP, IL6, TNF α , adiponectin, blood pressure, plasma glucose, insulin, cholesterol)
- No difference



Bariatric Surgery

Should be considered & shown to work best when:

- BMI > 40, or
- BMI > 35 with serious comorbid conditions (eg OSA, DM, joint disease, etc)



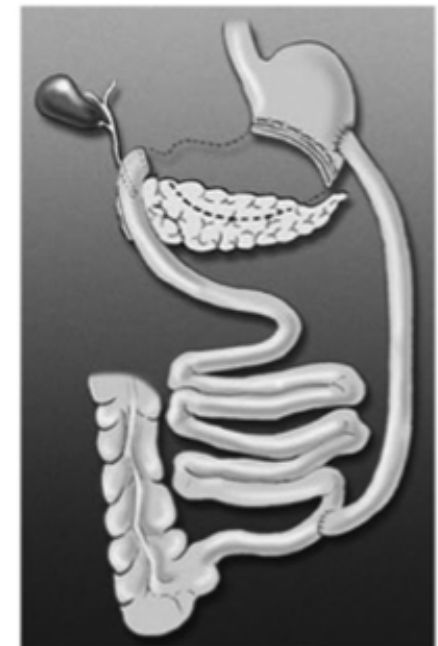
Roux-en-Y Gastric Bypass
(RYGB)



Vertical Banded Gastroplasty
(VBG)



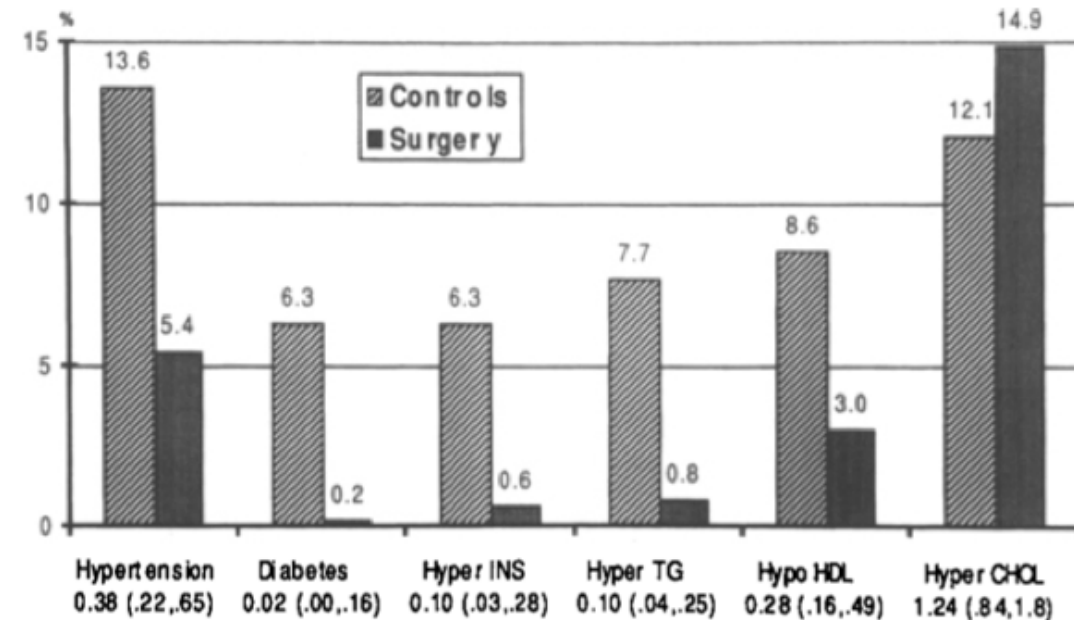
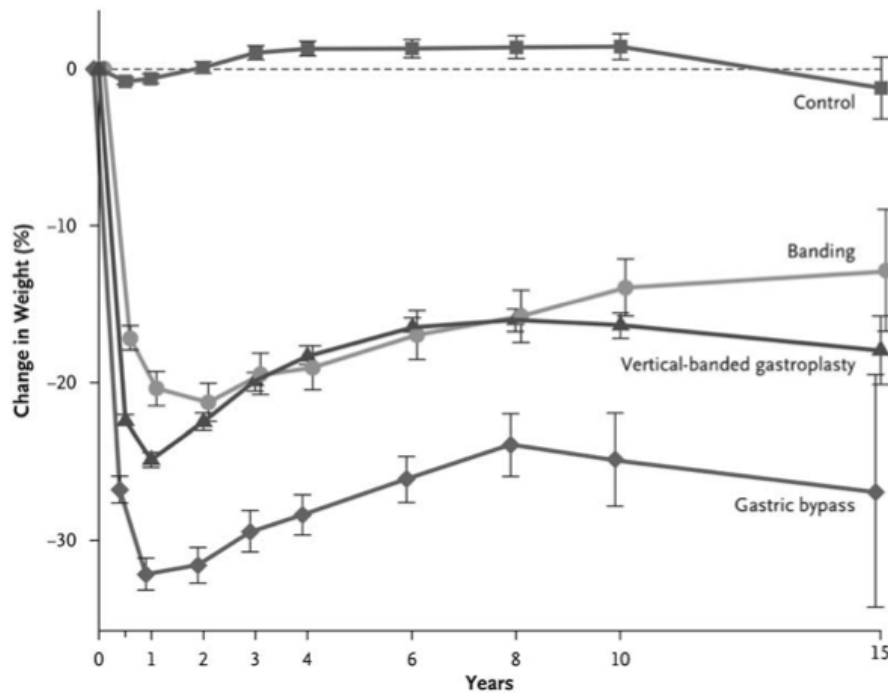
Adjustable Gastric Band
(Band)



Biliopancreatic Diversion
(BPD) with Duodenal Switch

Bariatric Surgery

- Swedish Obese Subjects study
 - n=4047
 - Most patients have most weight loss at 1 year
 - Unadjusted overall mortality was reduced by 23.4%
 - 15 years follow-up (working on 20)

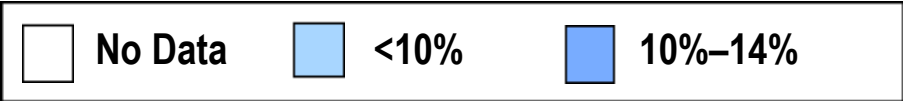
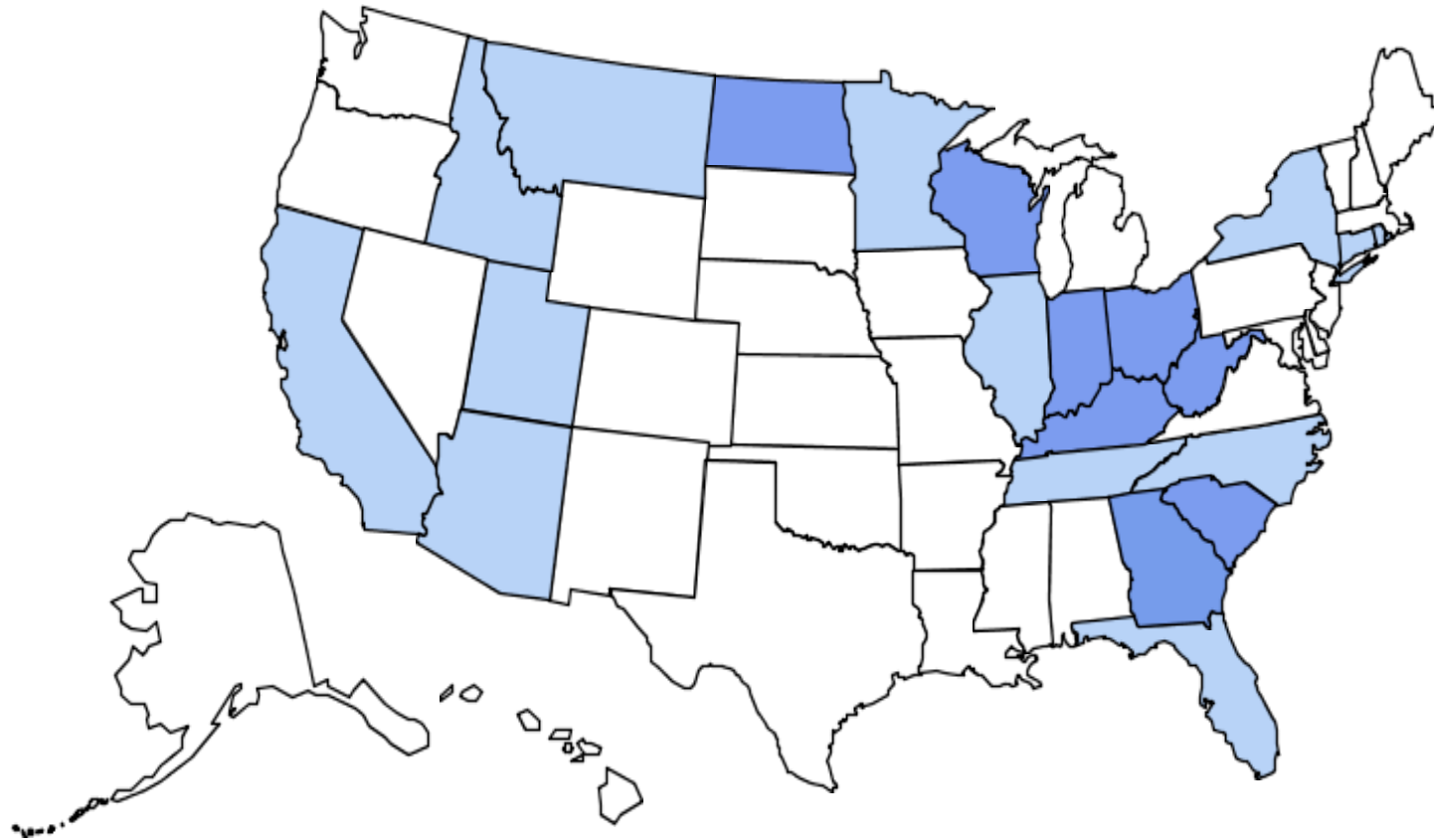


1. Sjostrom. Bariatric surgery and reduction in morbidity and mortality: experiences from the SOS study. *International Journal of Obesity* (2008) 32, S93–S97
2. Sjostrom, *et al.* Reduction in Incidence of Diabetes, Hypertension and Lipid Disturbances after Intentional Weight Loss Induced by Bariatric Surgery: The SOS Intervention Study. *Obesity Research*. Sept 1999. Vol 7 No 5.

Obesity Trends* Among U.S. Adults

BRFSS, 1985

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

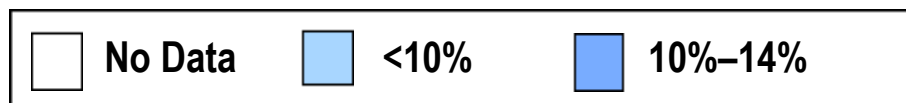
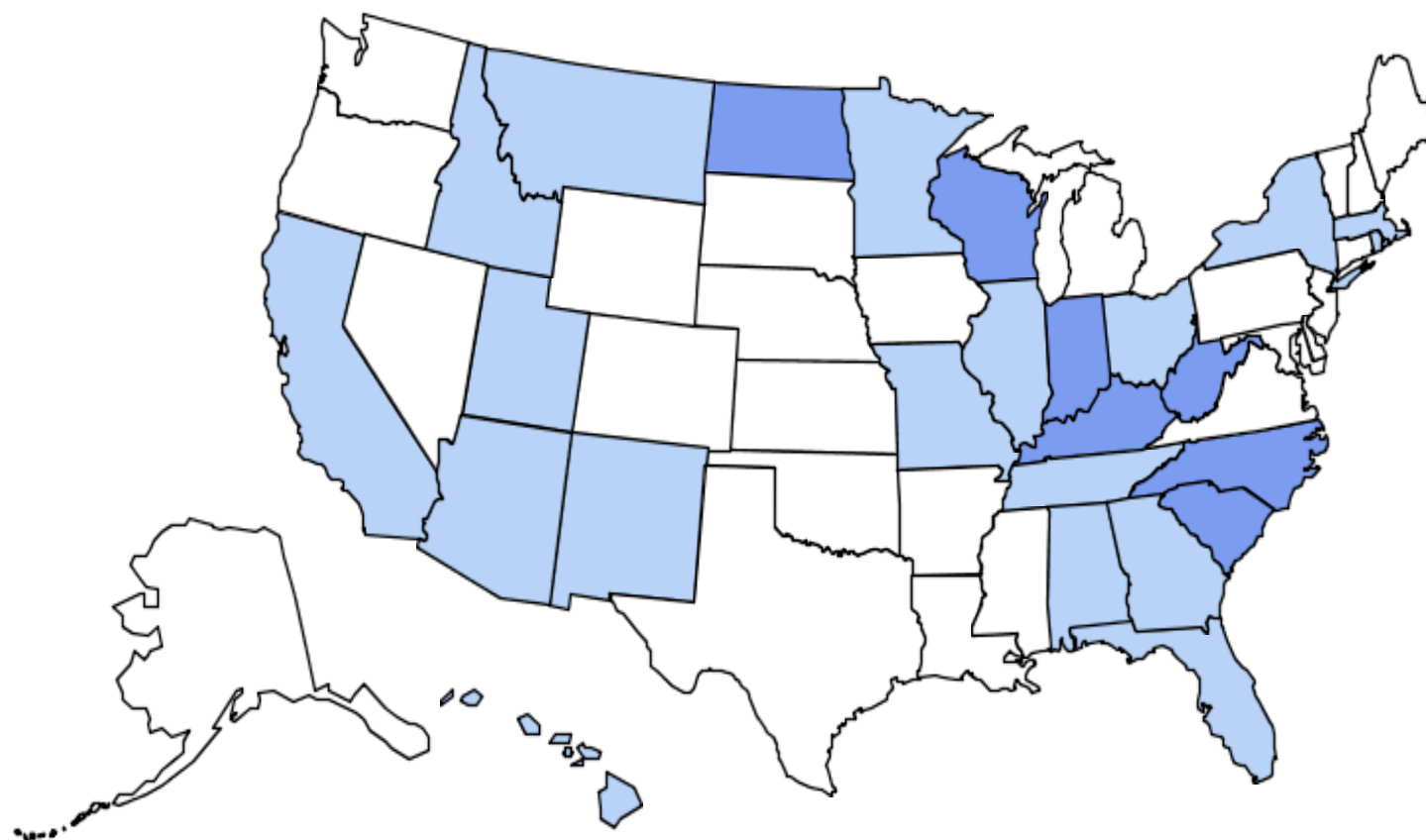


Source: CDC Behavioral Risk Factor Surveillance System.

Obesity Trends* Among U.S. Adults

BRFSS, 1986

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

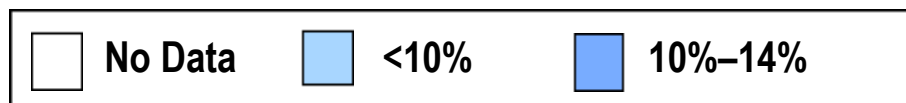
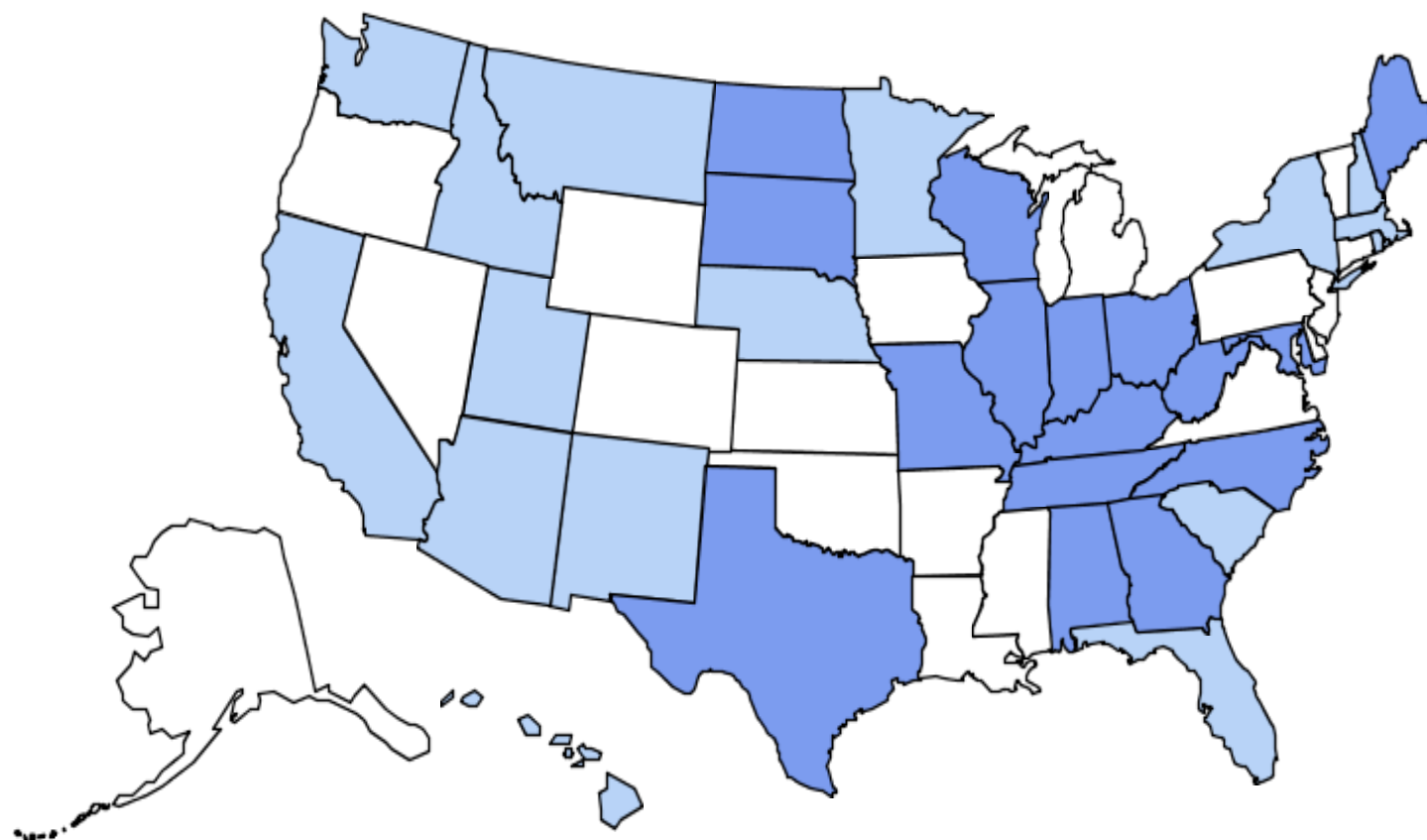


Source: CDC Behavioral Risk Factor Surveillance System.

Obesity Trends* Among U.S. Adults

BRFSS, 1987

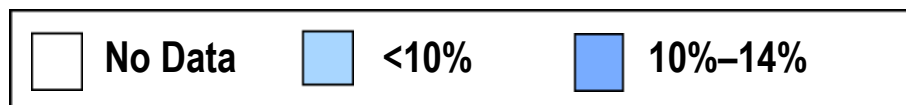
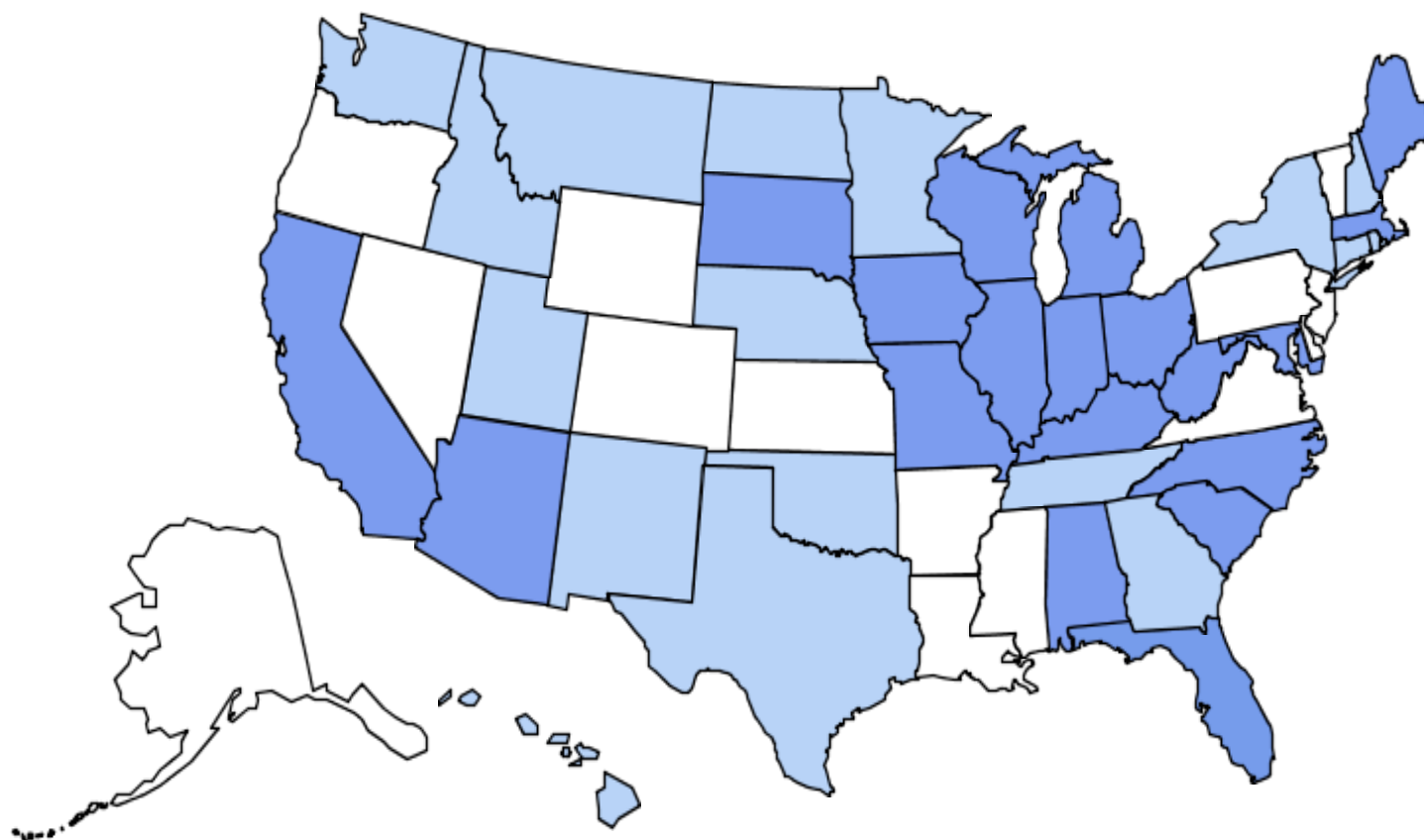
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Obesity Trends* Among U.S. Adults

BRFSS, 1988

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

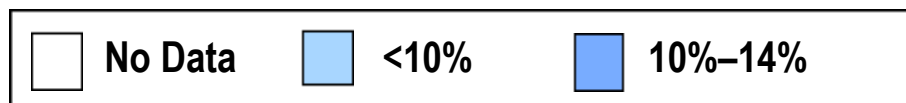
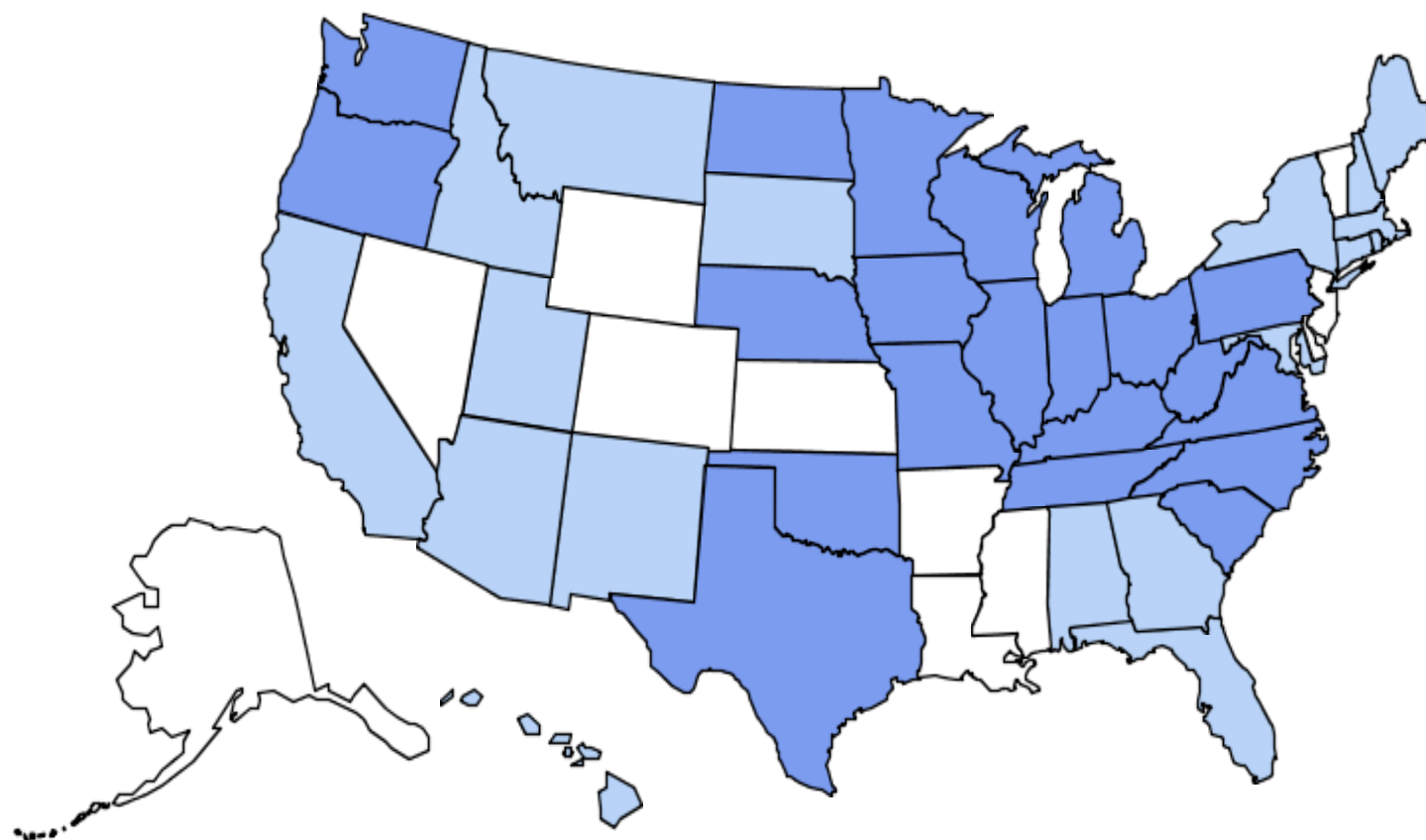


Source: CDC Behavioral Risk Factor Surveillance System.

Obesity Trends* Among U.S. Adults

BRFSS, 1989

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

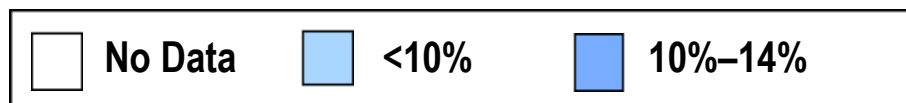
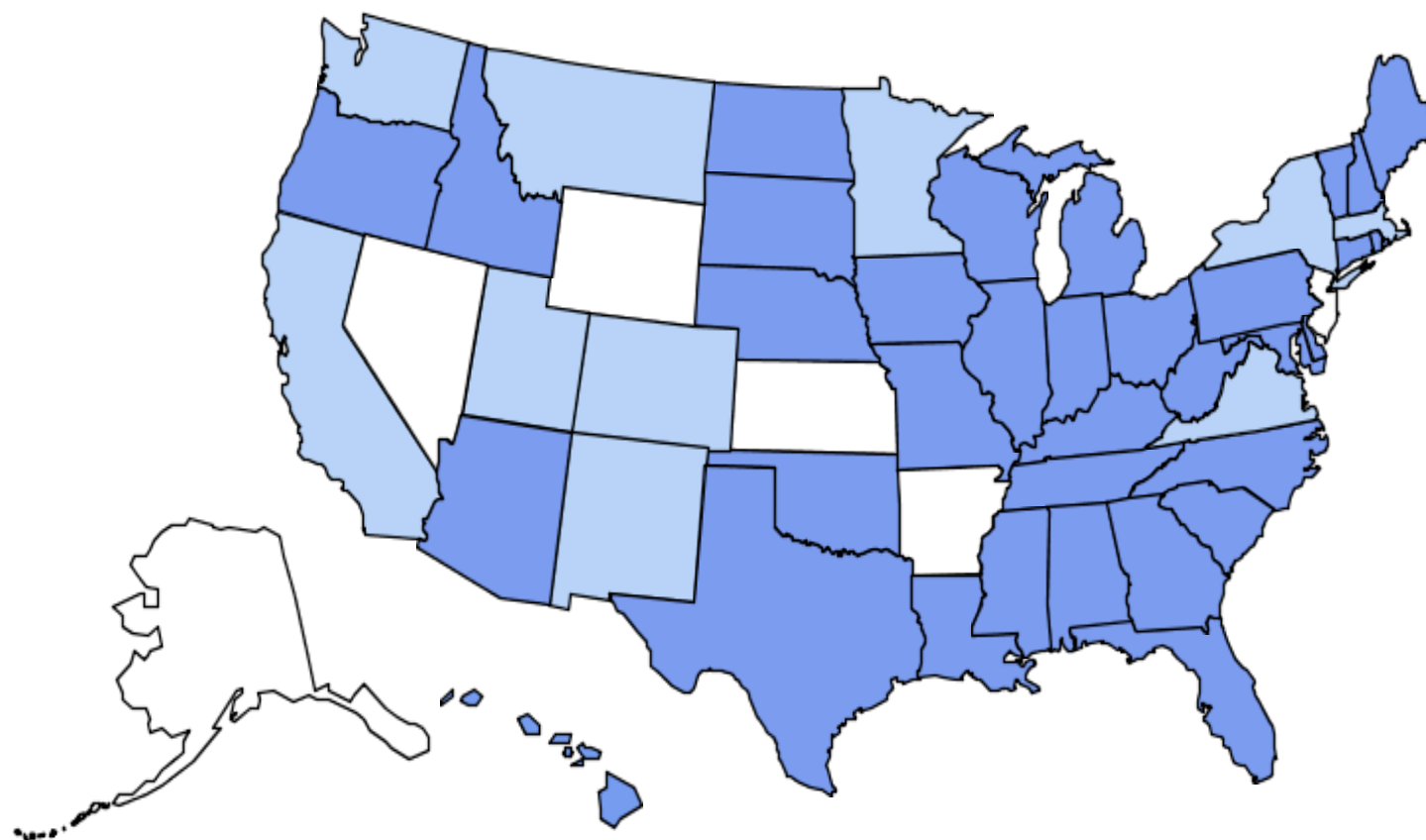


Source: CDC Behavioral Risk Factor Surveillance System.

Obesity Trends* Among U.S. Adults

BRFSS, 1990

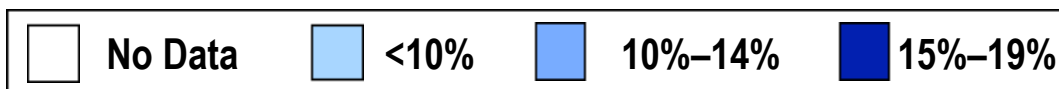
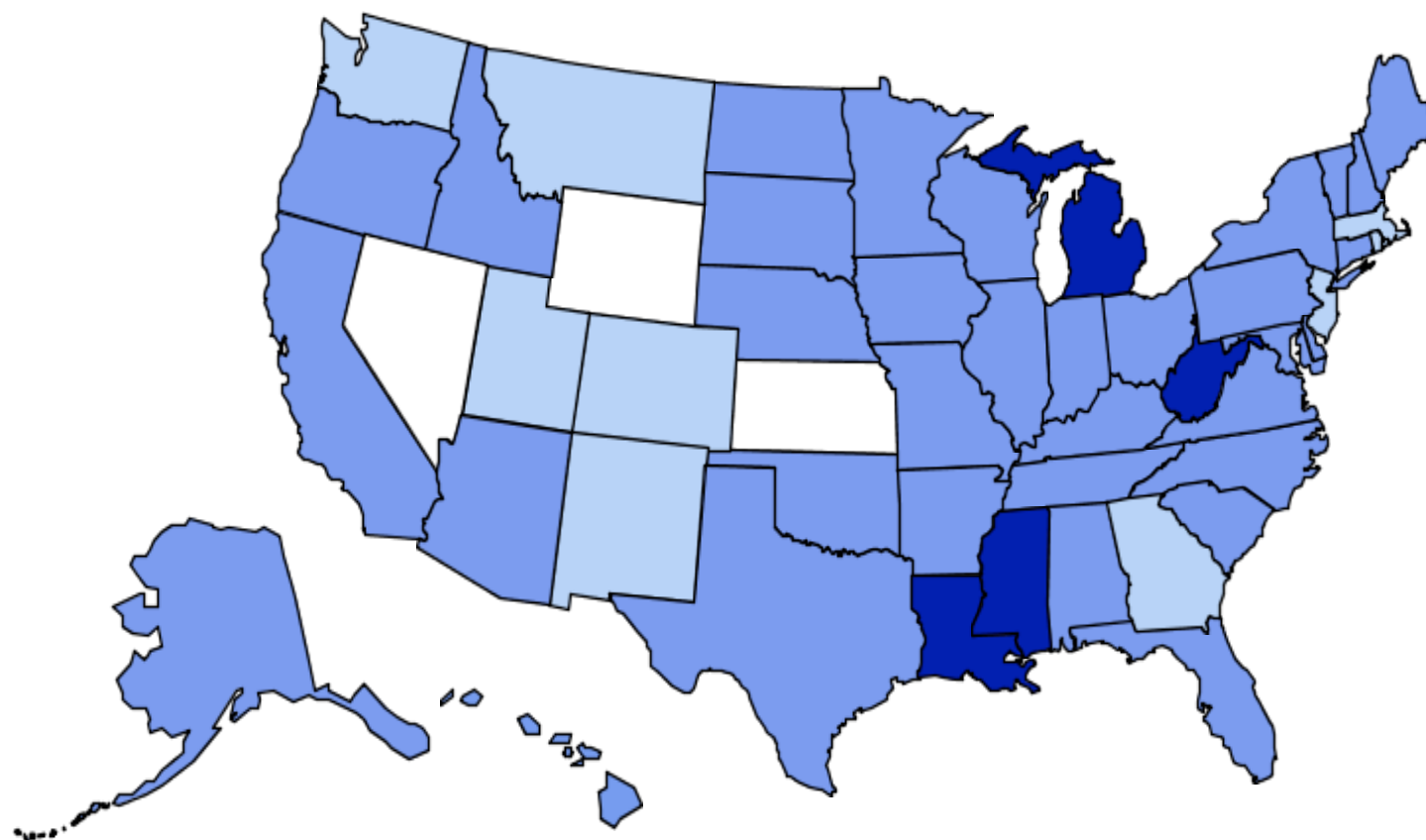
(*BMI ≥ 30 , or ~ 30 lbs. overweight for 5' 4" person)



Obesity Trends* Among U.S. Adults

BRFSS, 1991

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

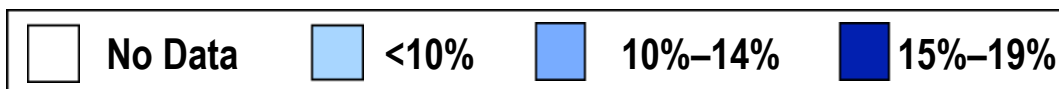
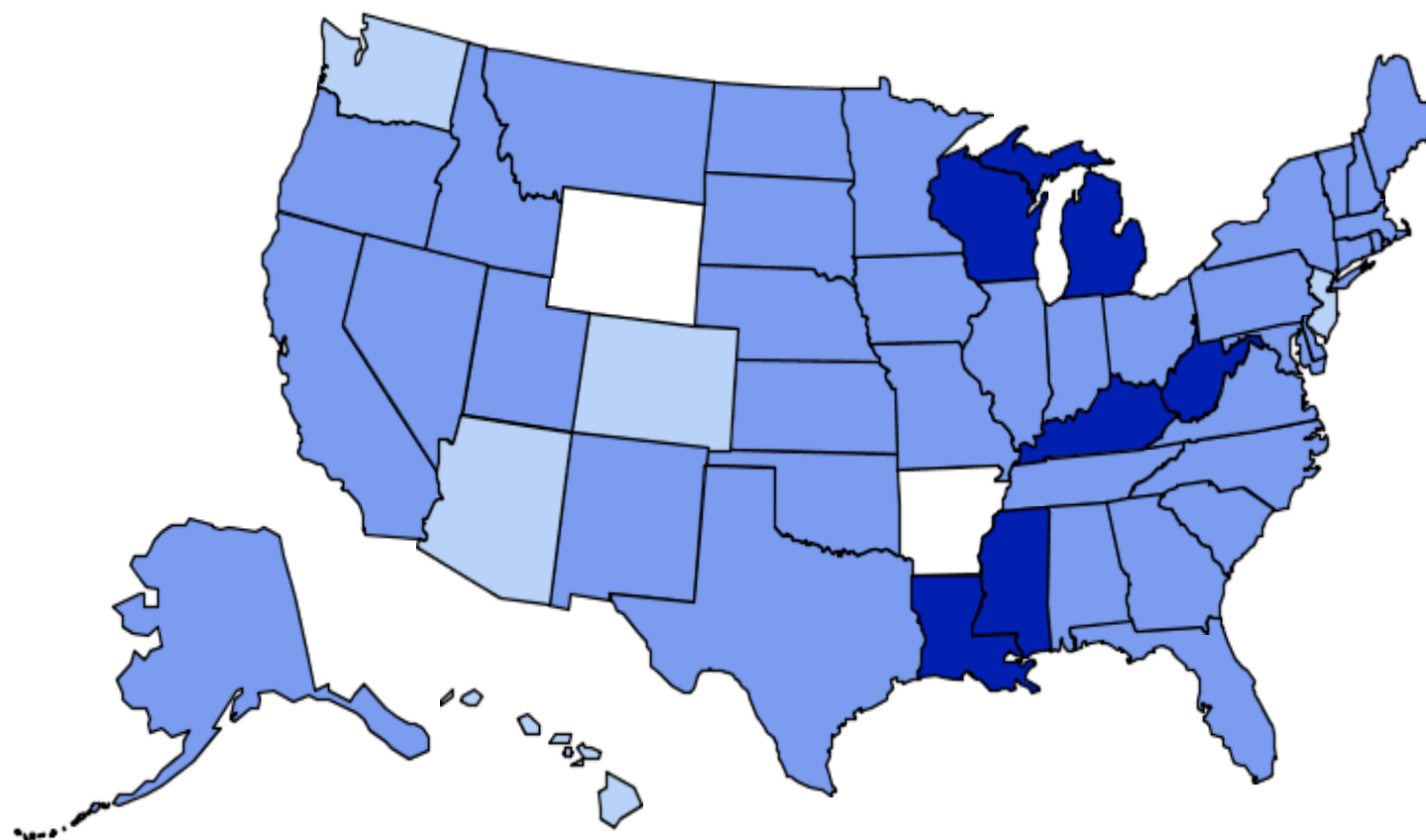


Source: CDC Behavioral Risk Factor Surveillance System.

Obesity Trends* Among U.S. Adults

BRFSS, 1992

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

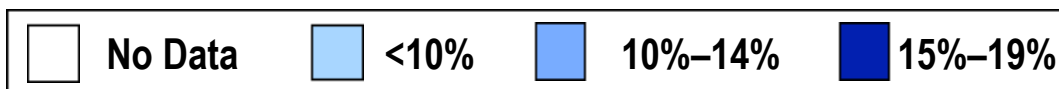
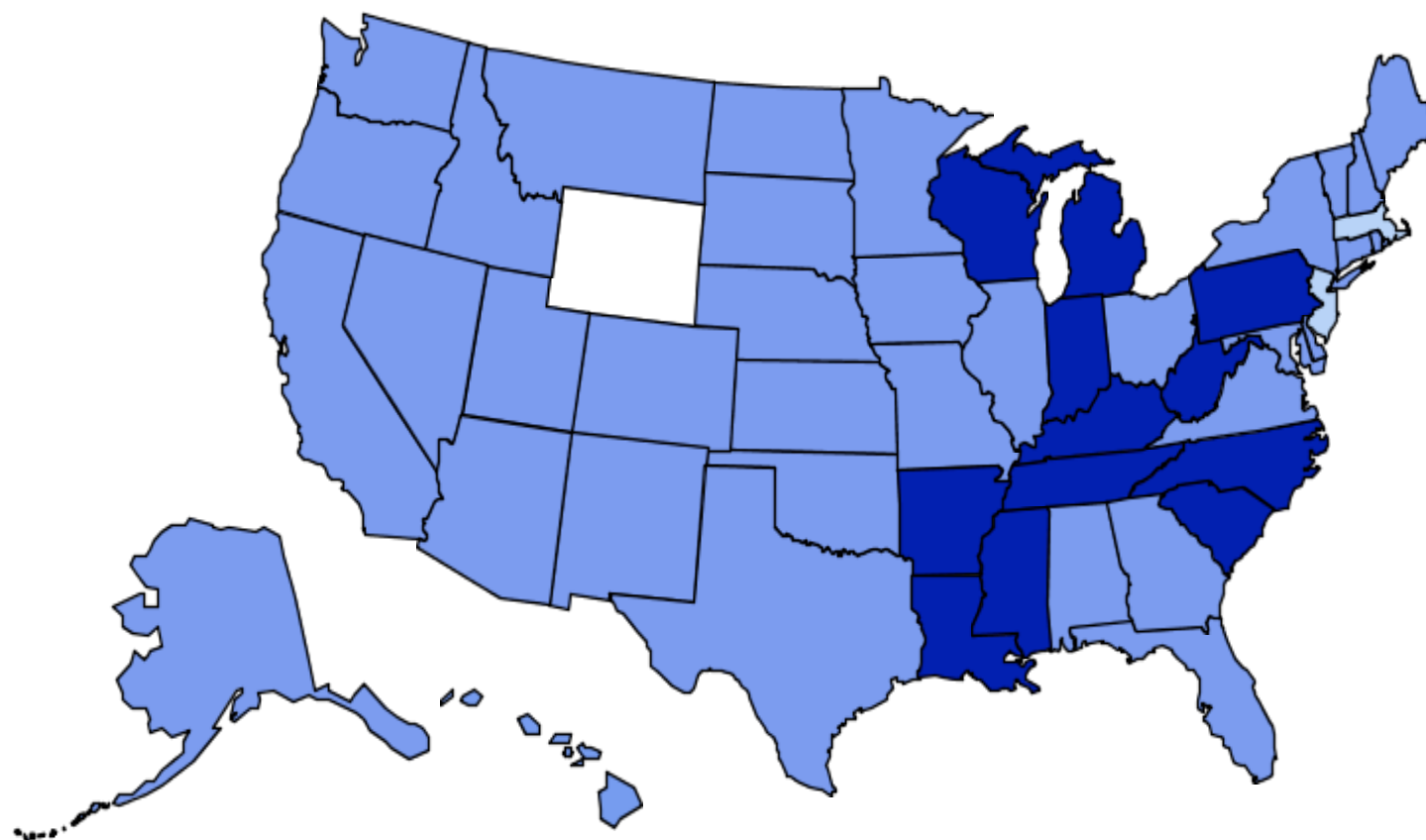


Source: CDC Behavioral Risk Factor Surveillance System.

Obesity Trends* Among U.S. Adults

BRFSS, 1993

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

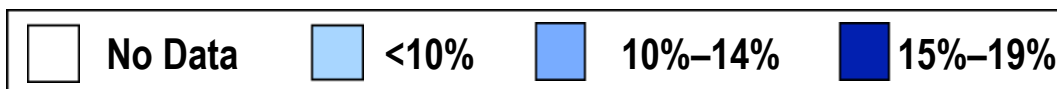
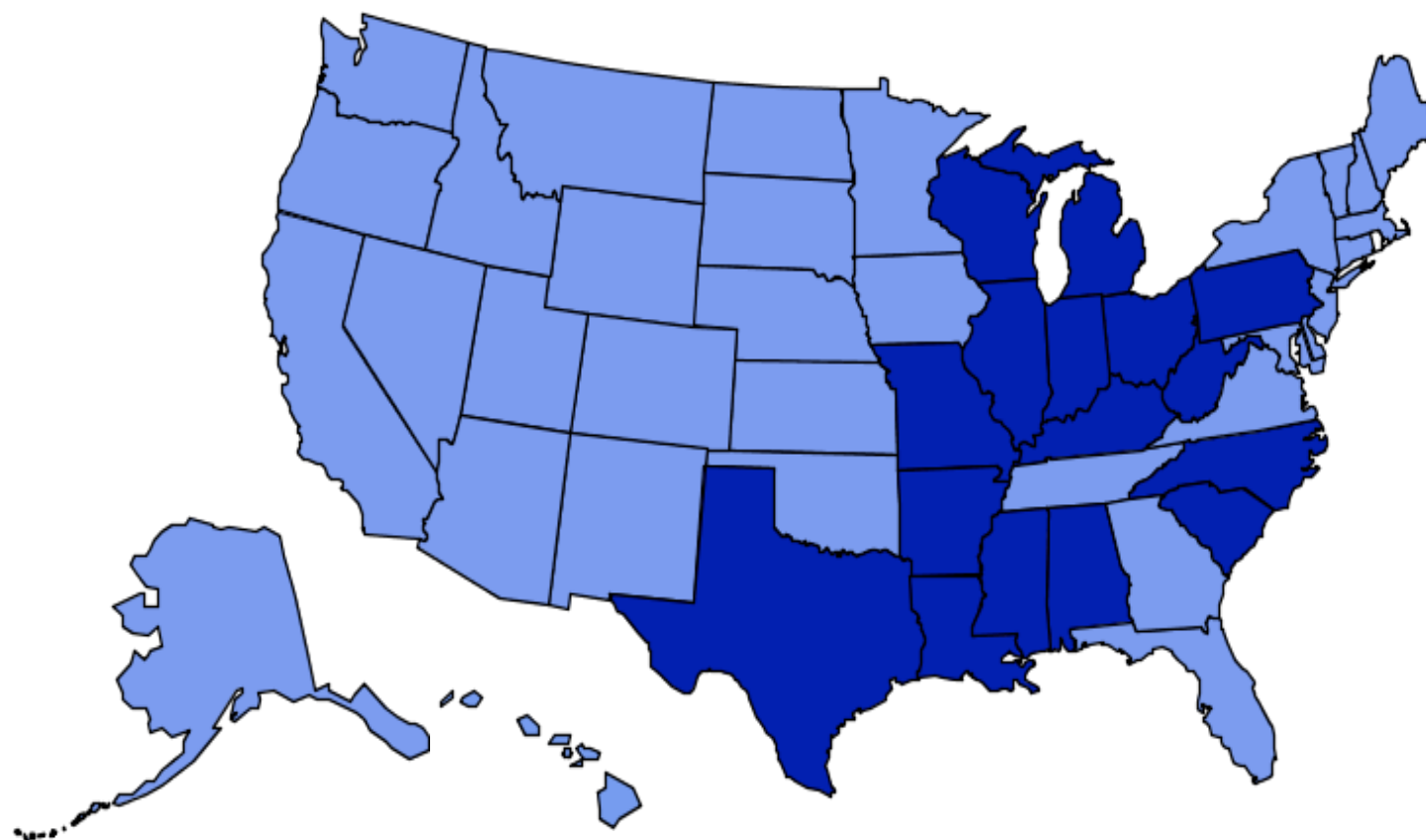


Source: CDC Behavioral Risk Factor Surveillance System.

Obesity Trends* Among U.S. Adults

BRFSS, 1994

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

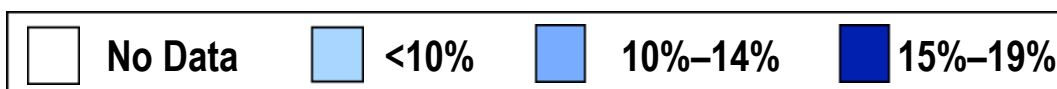
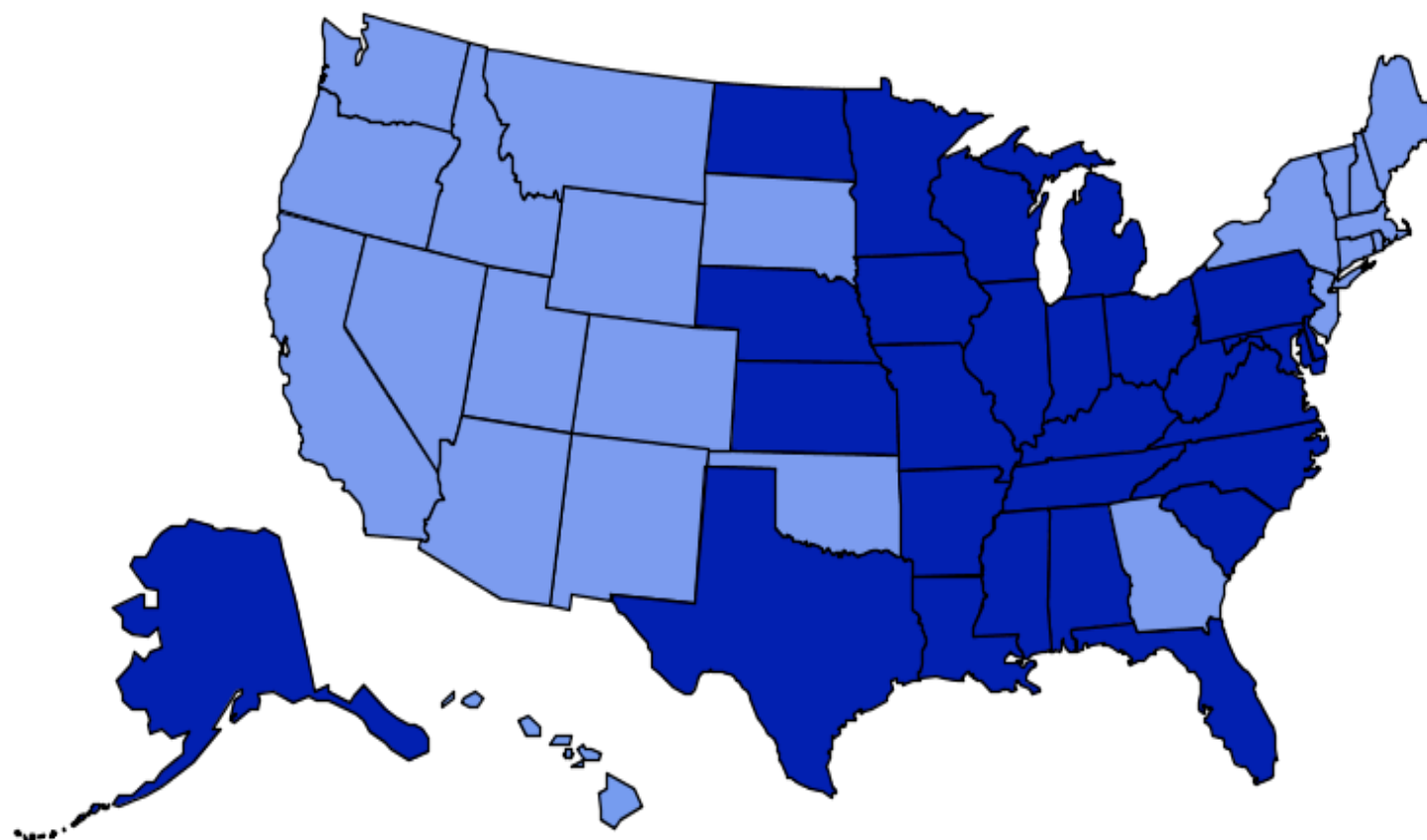


Source: CDC Behavioral Risk Factor Surveillance System.

Obesity Trends* Among U.S. Adults

BRFSS, 1995

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

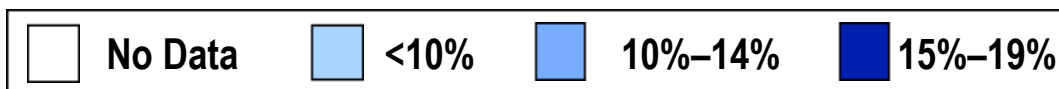
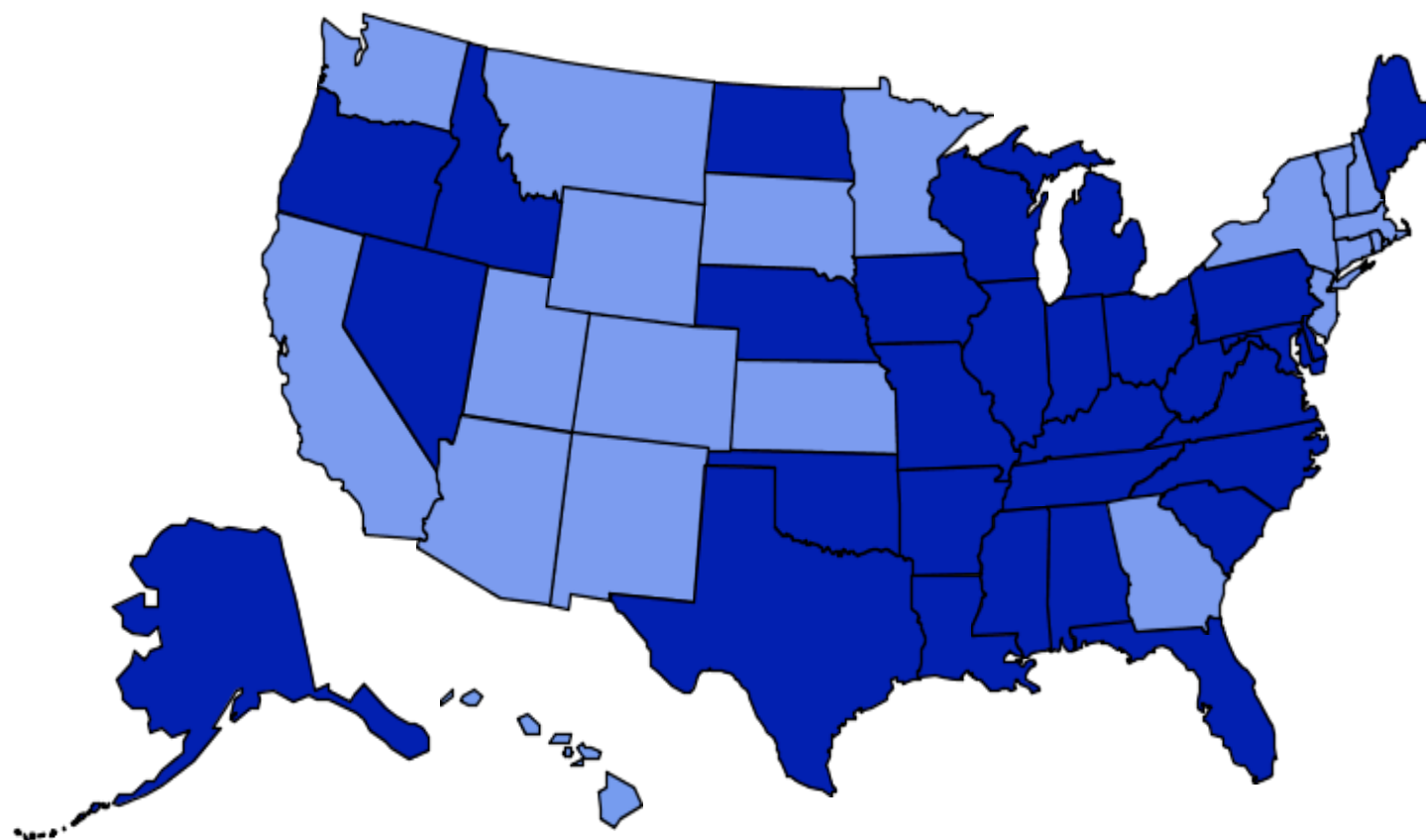


Source: CDC Behavioral Risk Factor Surveillance System.

Obesity Trends* Among U.S. Adults

BRFSS, 1996

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

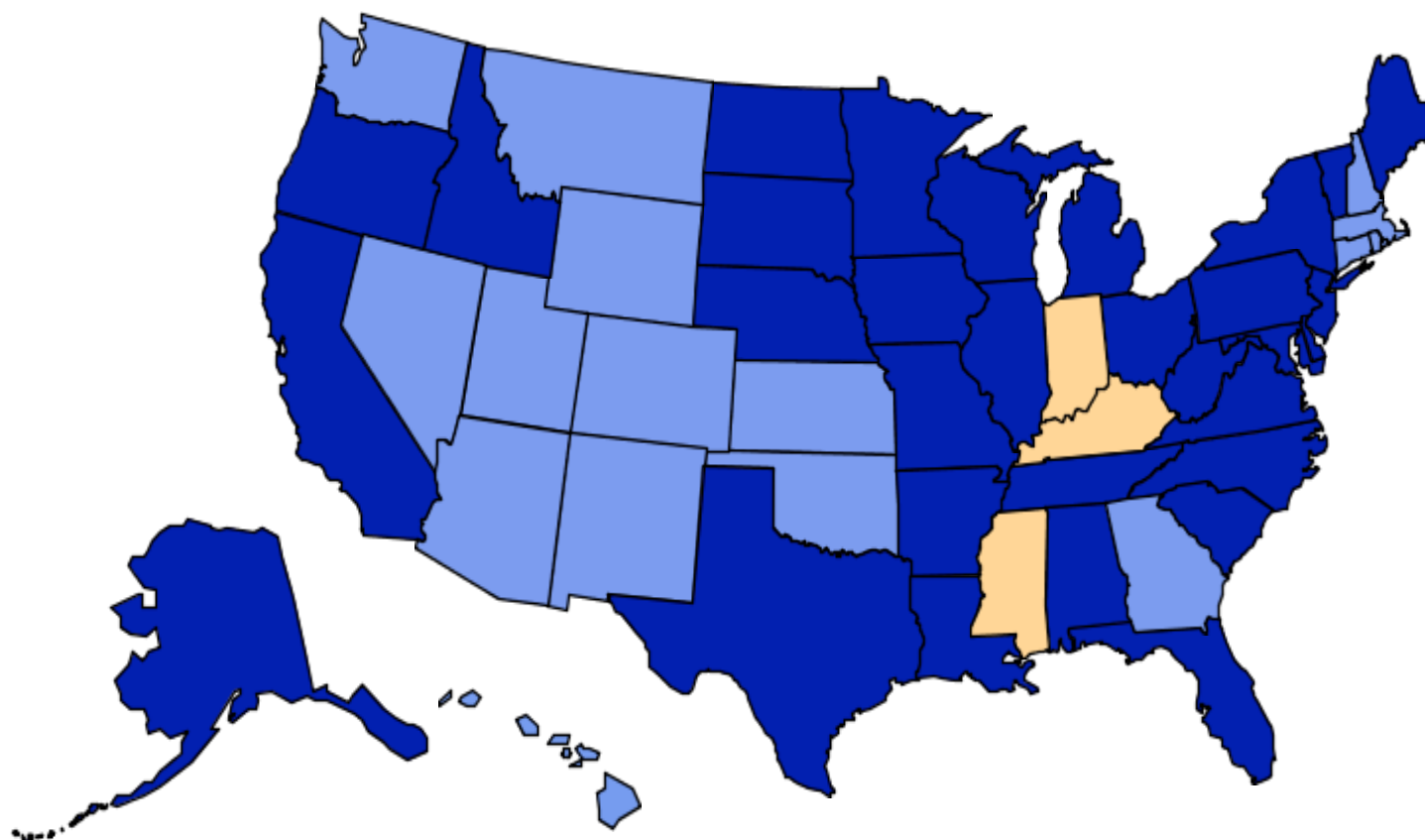


Source: CDC Behavioral Risk Factor Surveillance System.

Obesity Trends* Among U.S. Adults

BRFSS, 1997

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



Legend: No Data, <10%, 10%–14%, 15%–19%, $\geq 20\%$

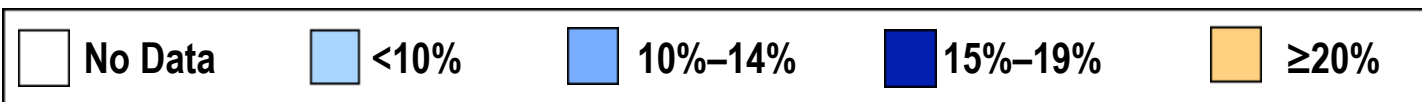
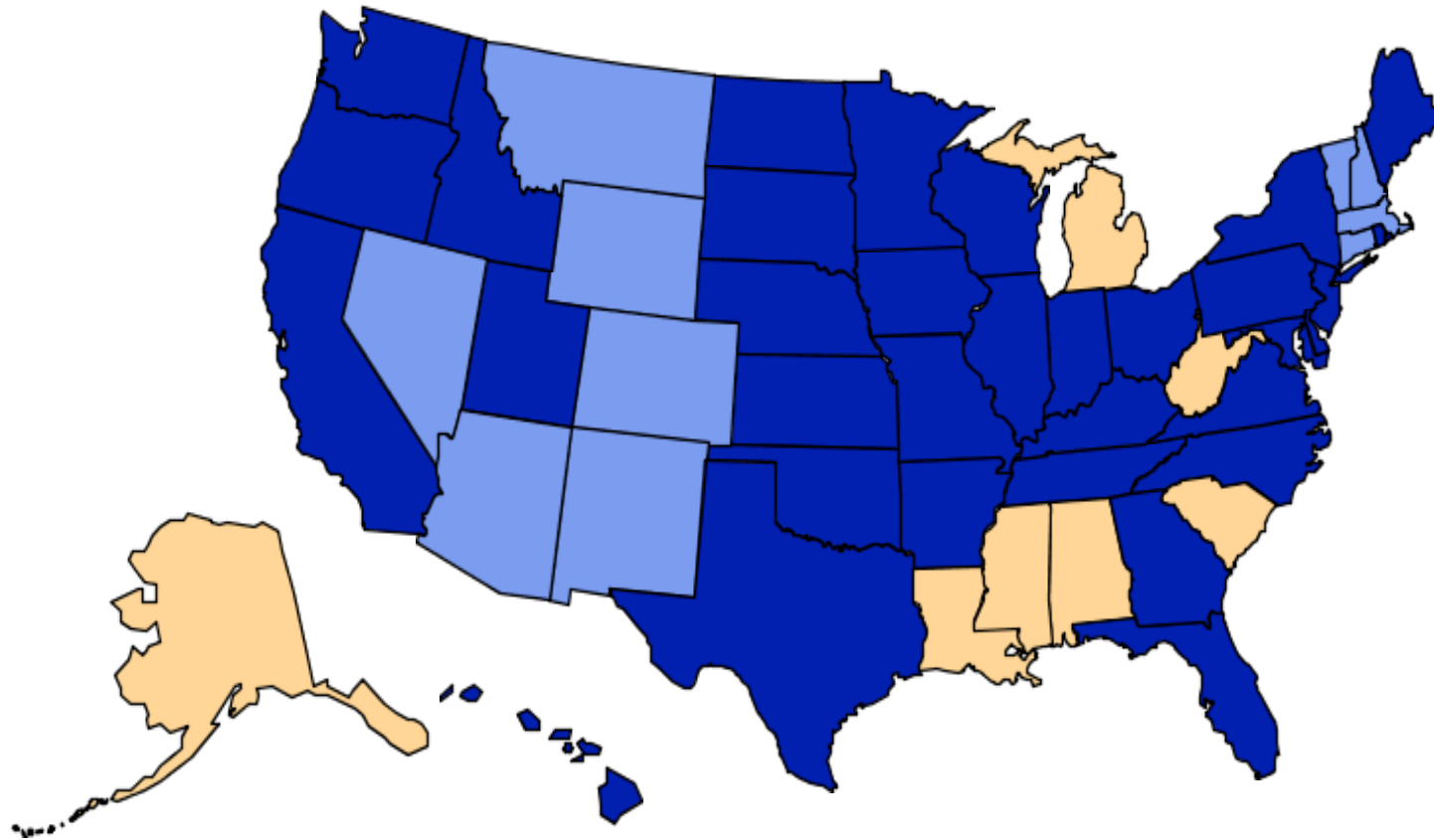


Source: CDC Behavioral Risk Factor Surveillance System.

Obesity Trends* Among U.S. Adults

BRFSS, 1998

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

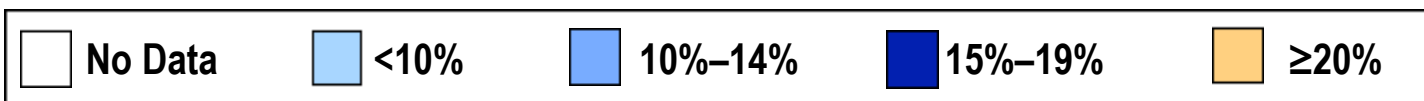
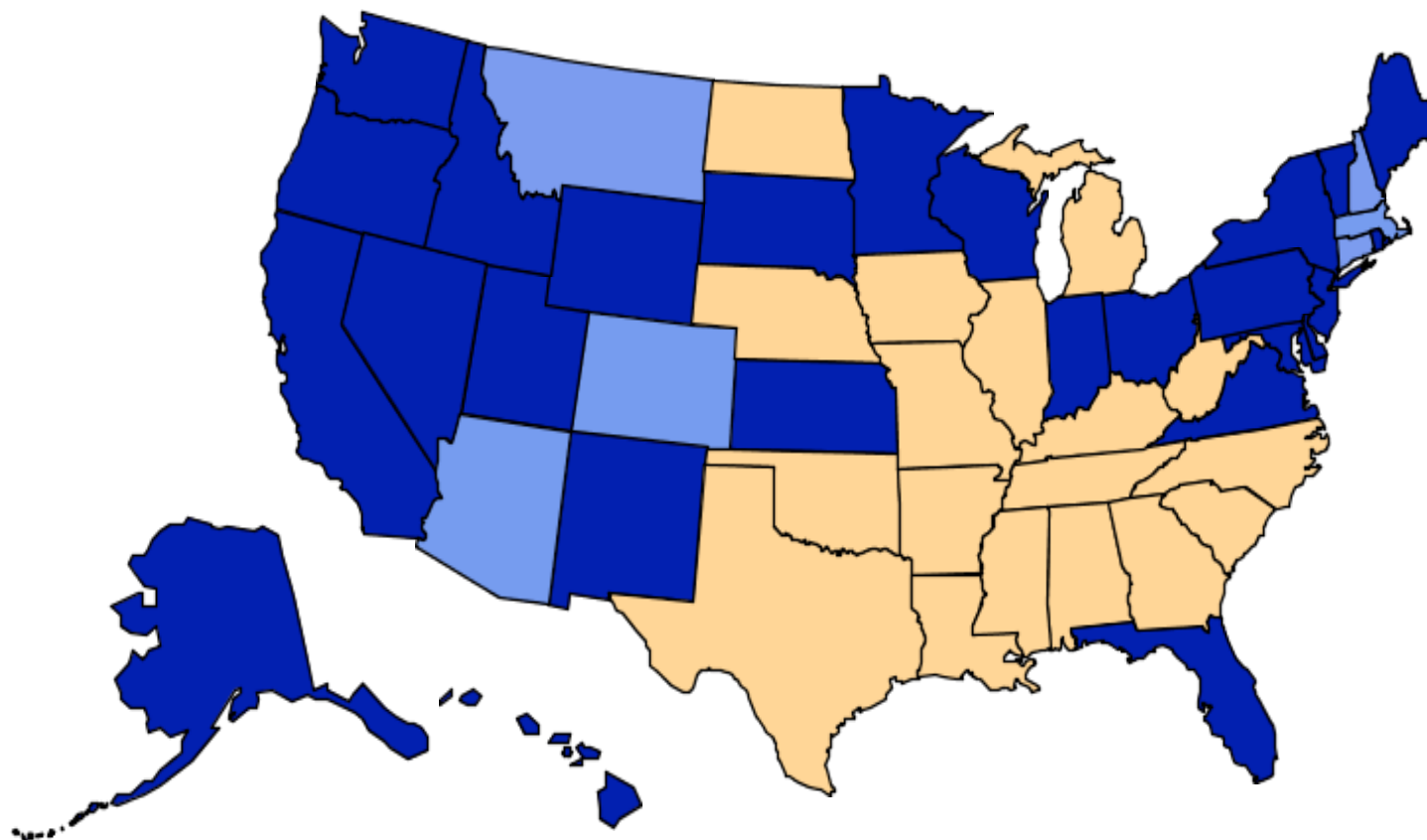


Source: CDC Behavioral Risk Factor Surveillance System.

Obesity Trends* Among U.S. Adults

BRFSS, 1999

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

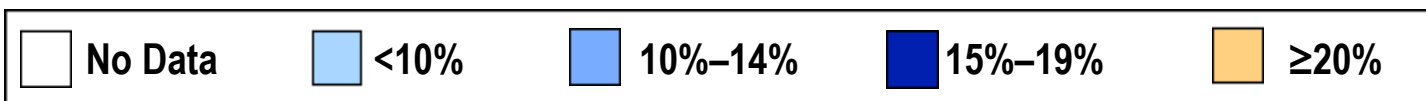
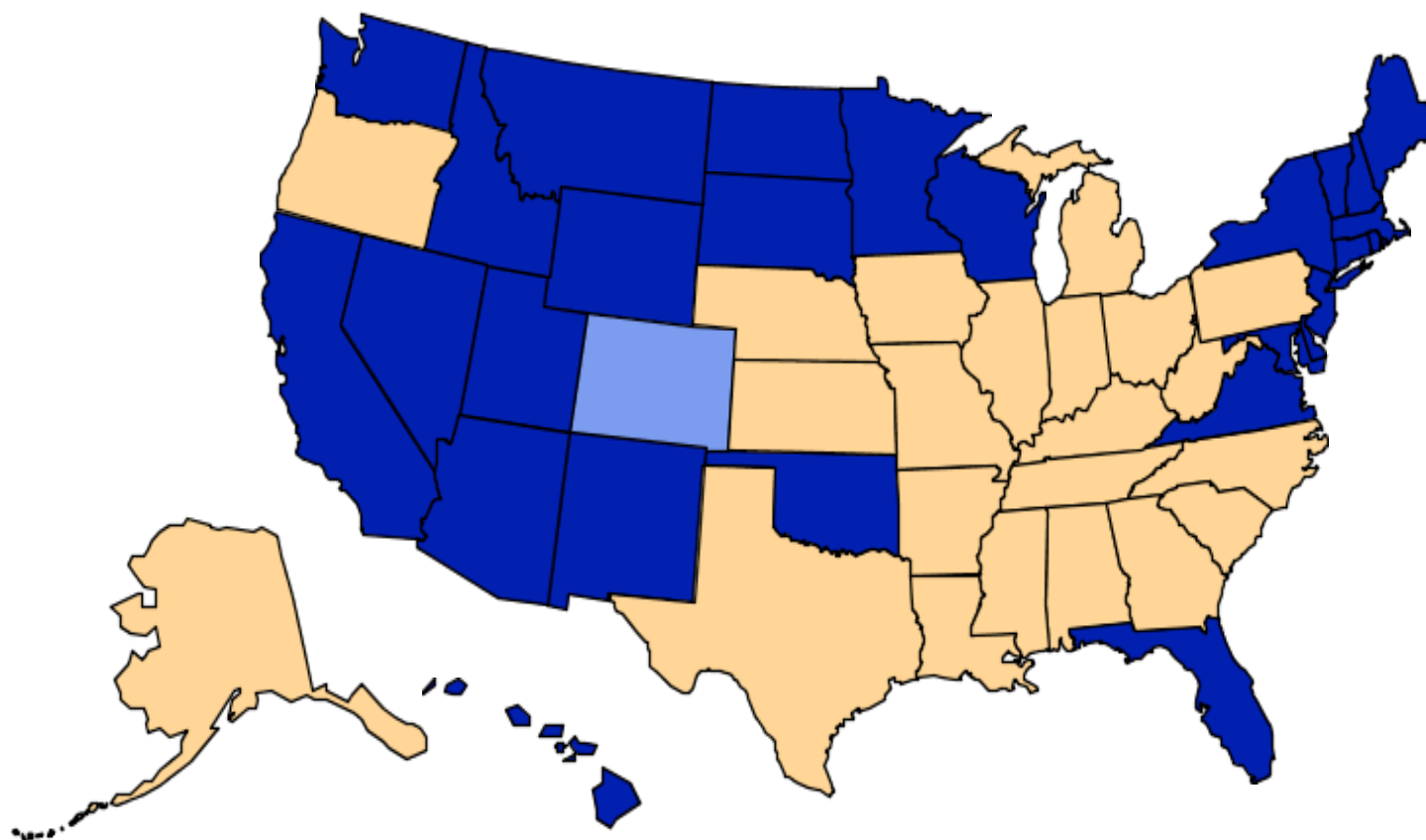


Source: CDC Behavioral Risk Factor Surveillance System.

Obesity Trends* Among U.S. Adults

BRFSS, 2000

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

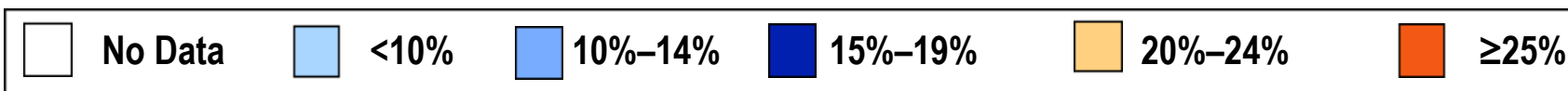
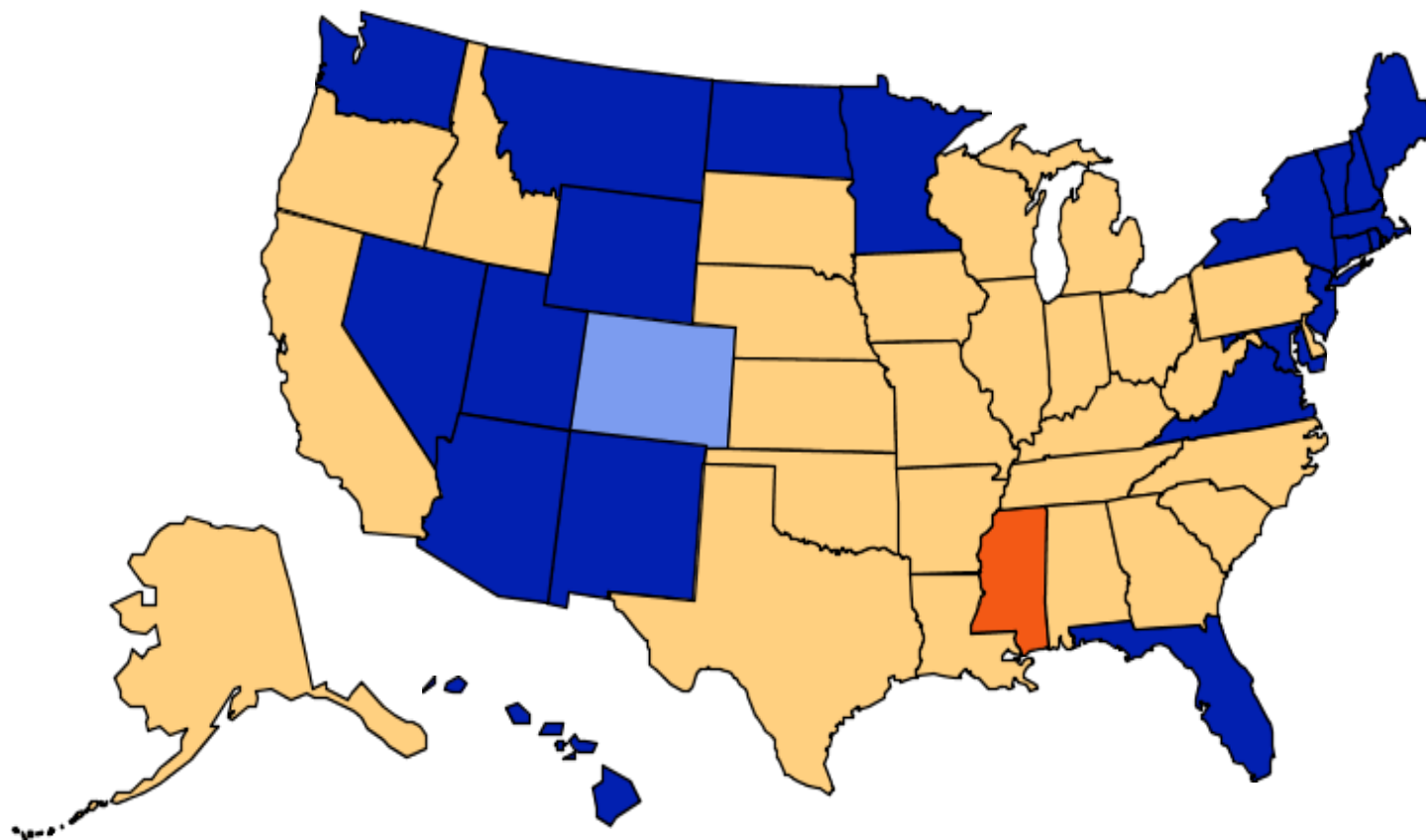


Source: CDC Behavioral Risk Factor Surveillance System.

Obesity Trends* Among U.S. Adults

BRFSS, 2001

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

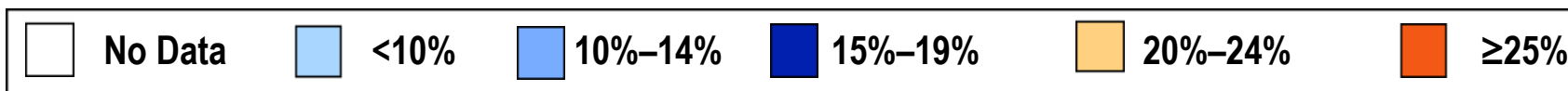
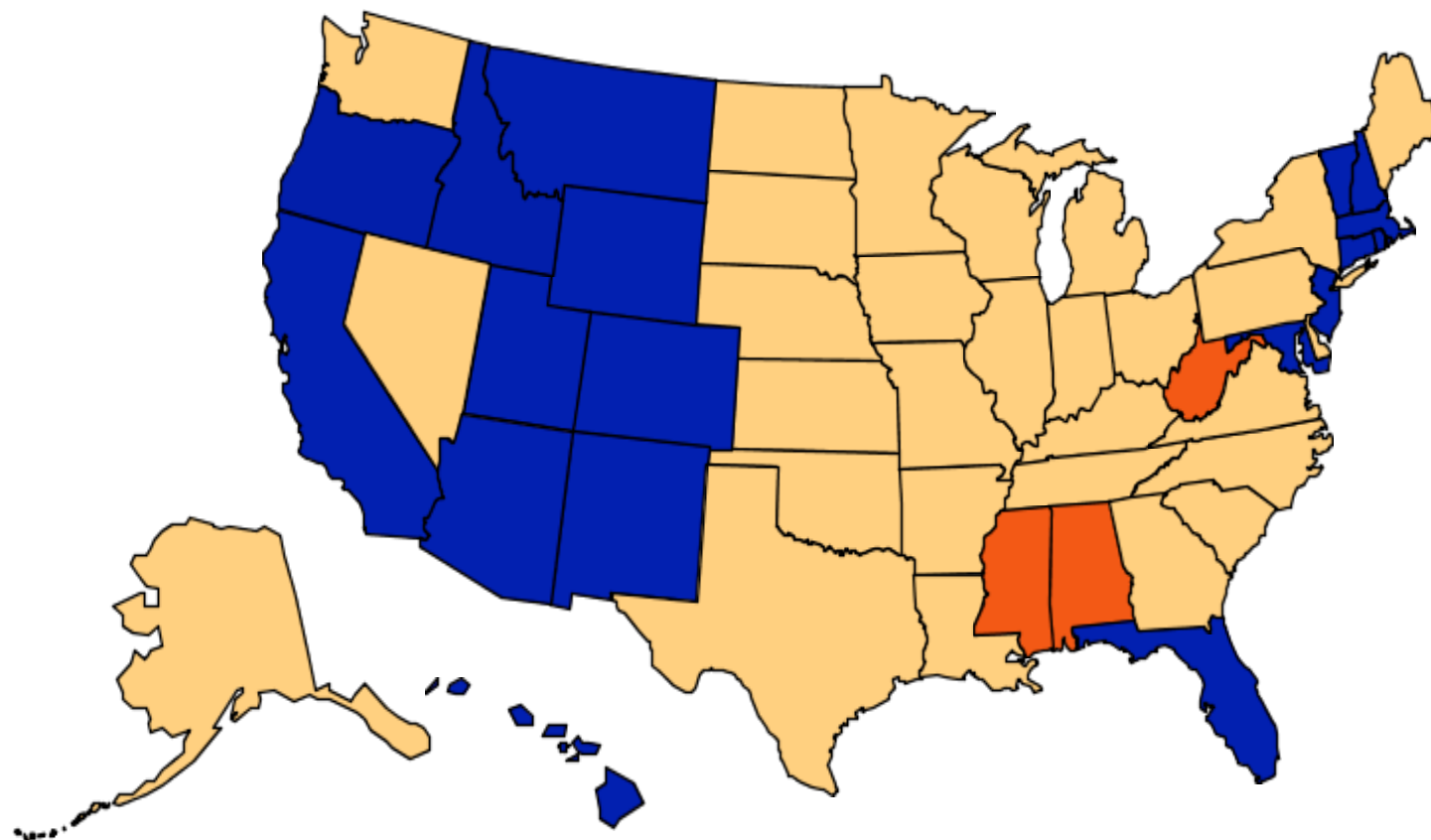


Source: CDC Behavioral Risk Factor Surveillance System.

Obesity Trends* Among U.S. Adults

BRFSS, 2002

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

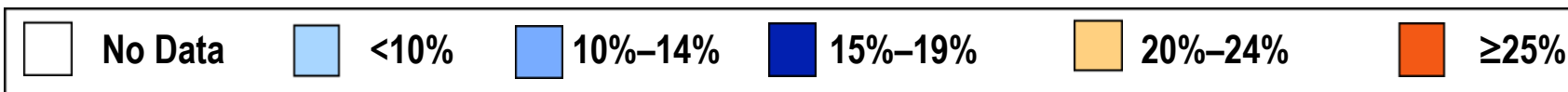
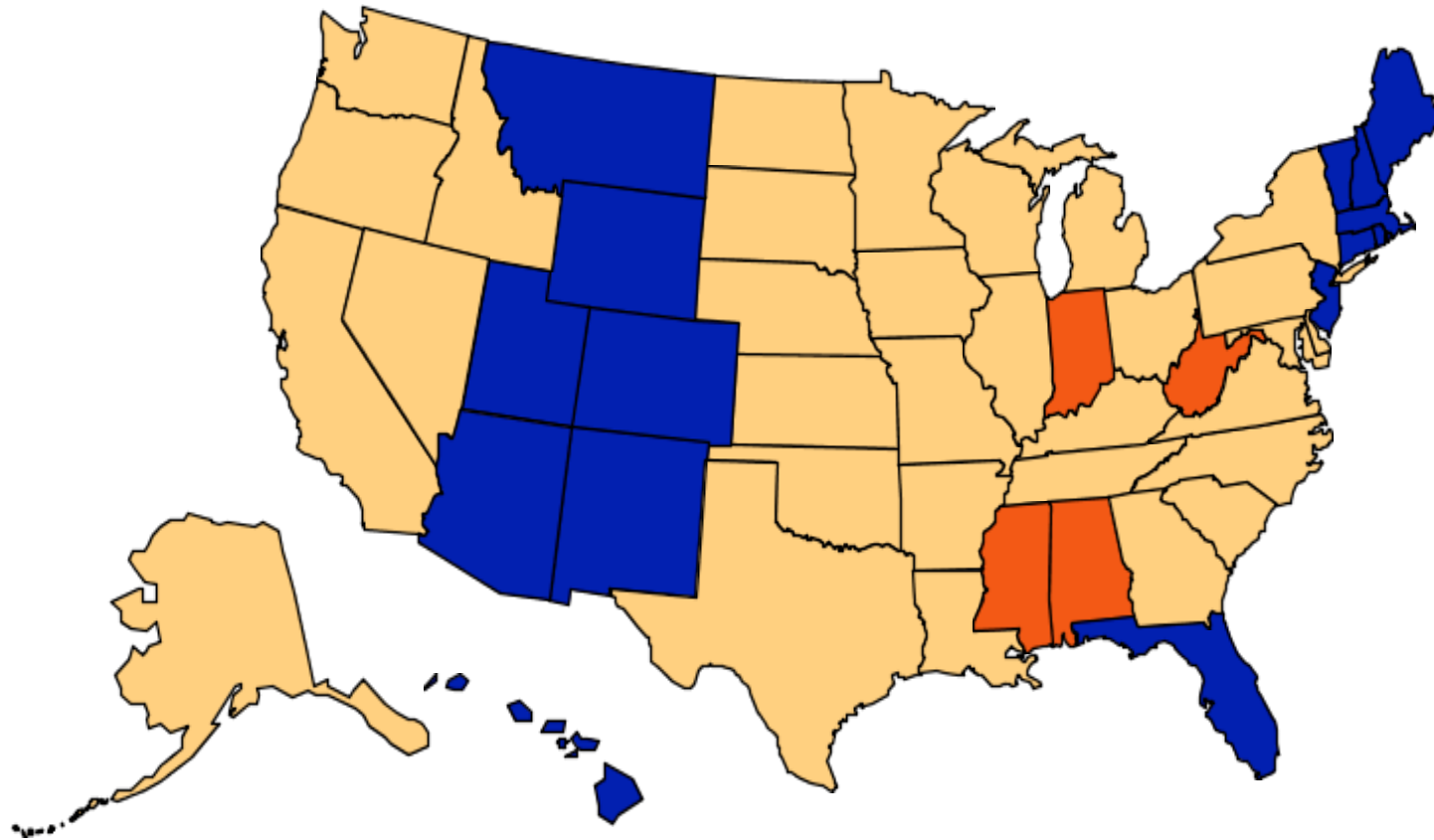


Source: CDC Behavioral Risk Factor Surveillance System.

Obesity Trends* Among U.S. Adults

BRFSS, 2003

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

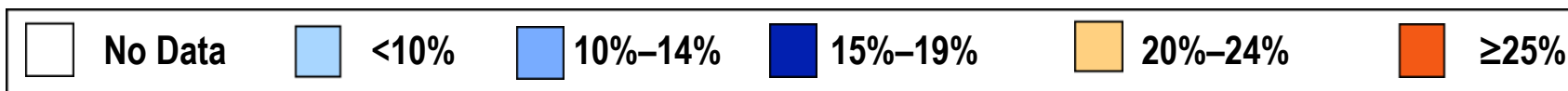
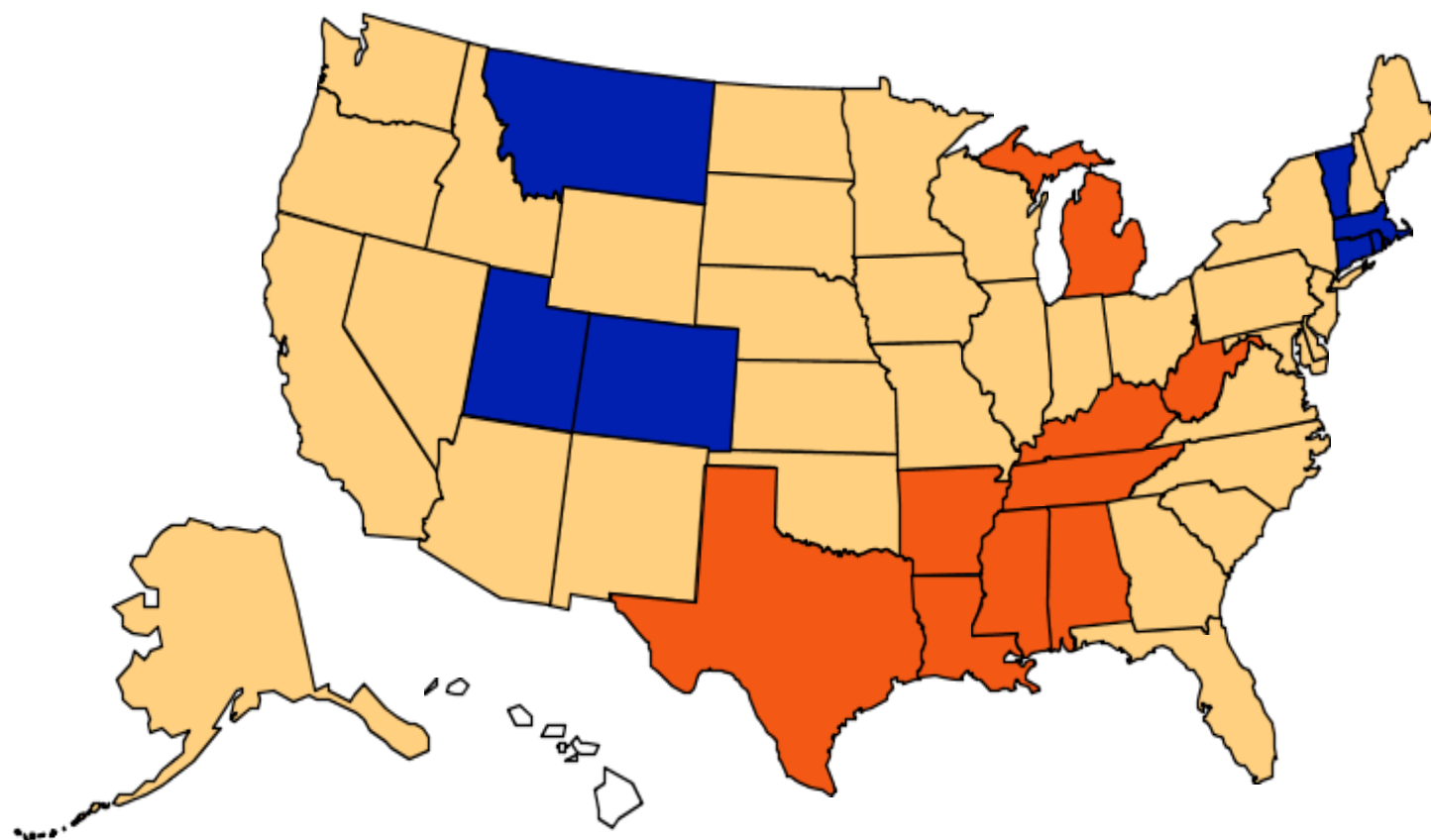


Source: CDC Behavioral Risk Factor Surveillance System.

Obesity Trends* Among U.S. Adults

BRFSS, 2004

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

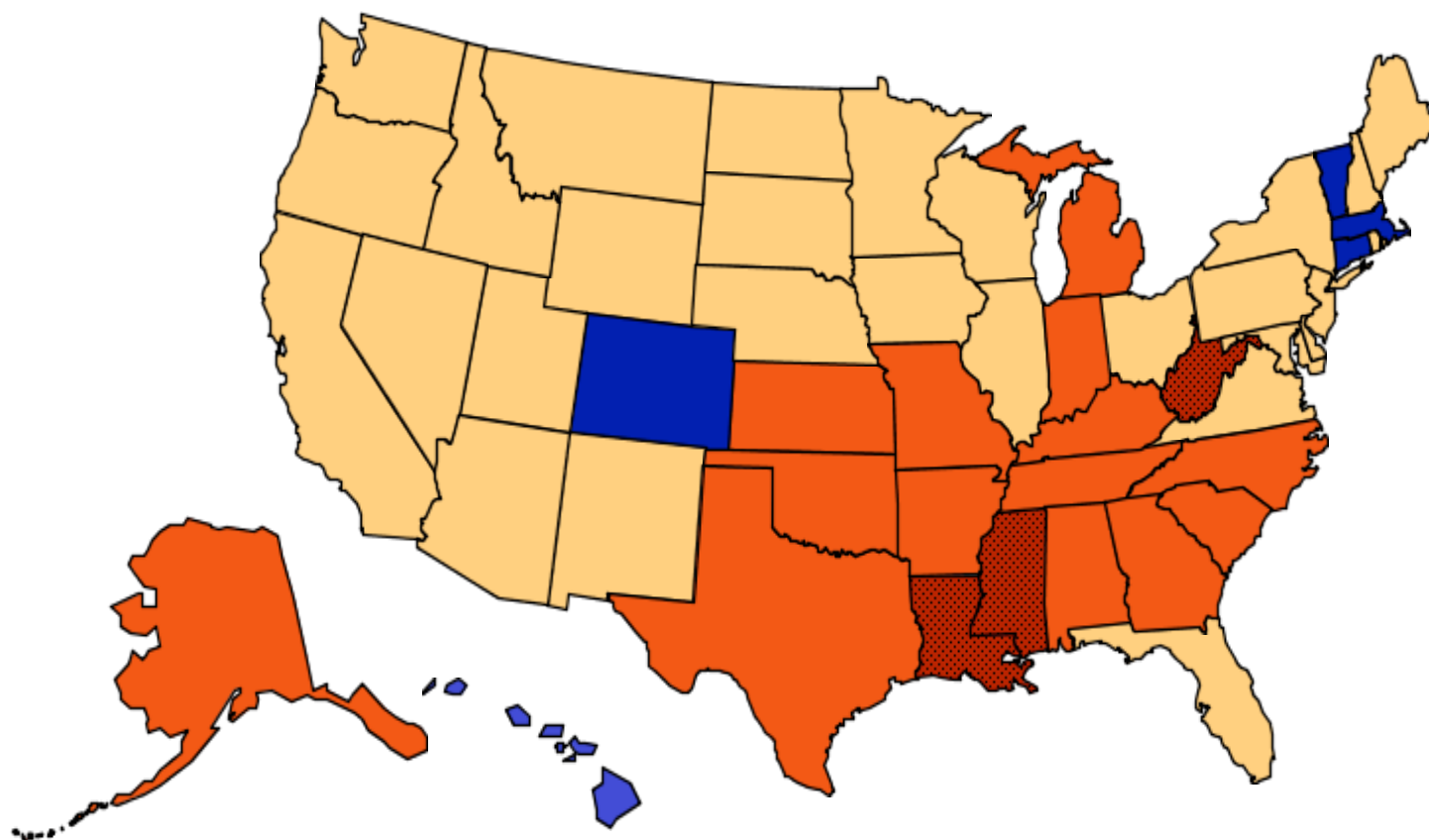


Source: Behavioral Risk Factor Surveillance System, CDC.

Obesity Trends* Among U.S. Adults

BRFSS, 2005

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



Legend: No Data, <10%, 10%–14%, 15%–19%, 20%–24%, 25%–29%, $\geq 30\%$

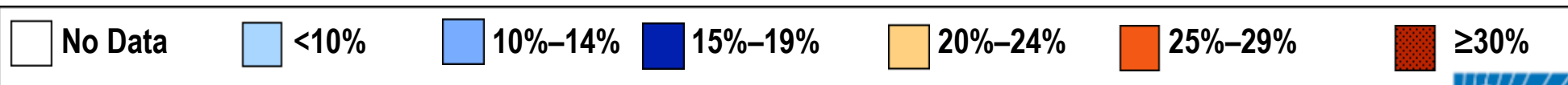
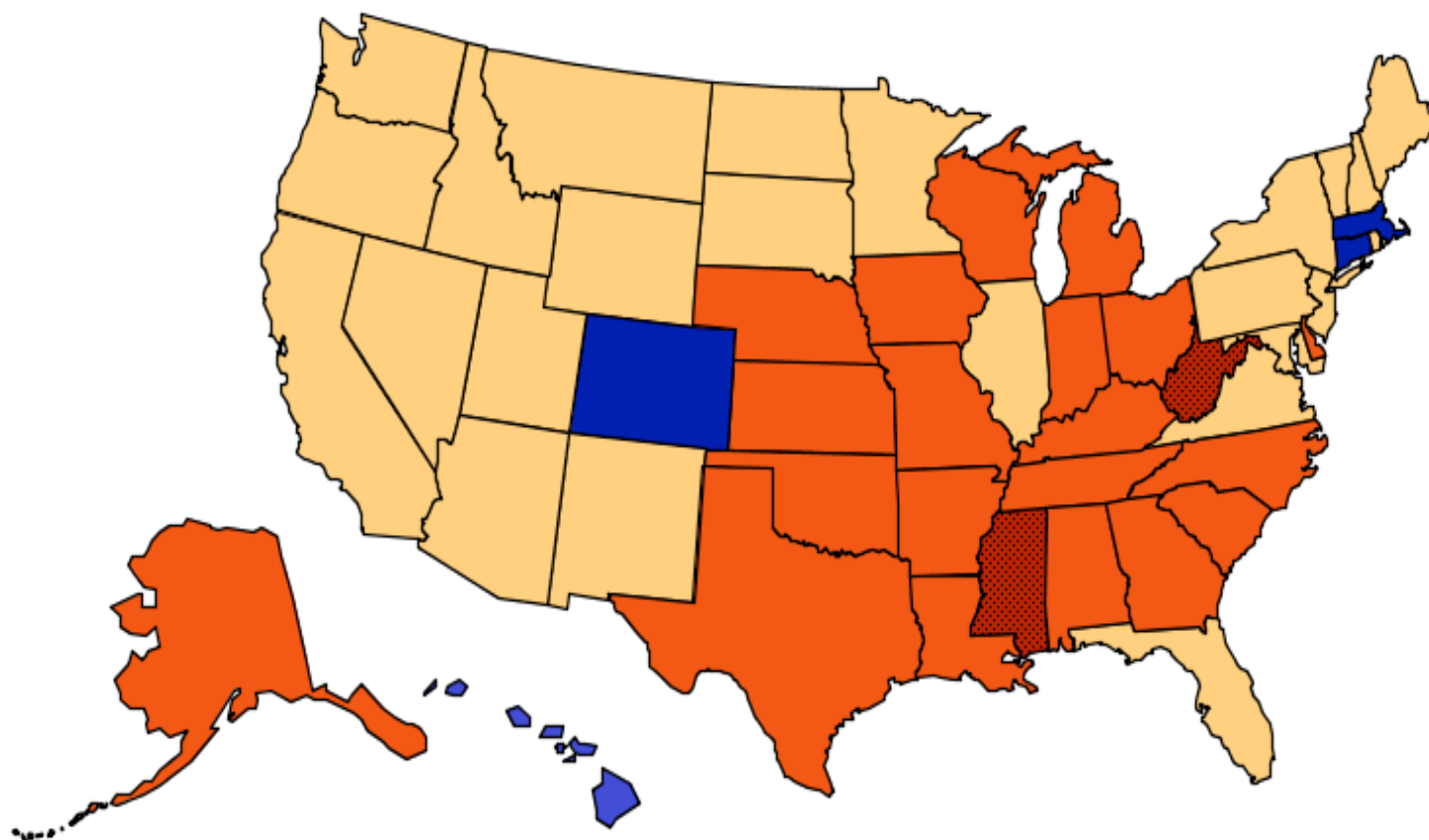


Source: Behavioral Risk Factor Surveillance System, CDC.

Obesity Trends* Among U.S. Adults

BRFSS, 2006

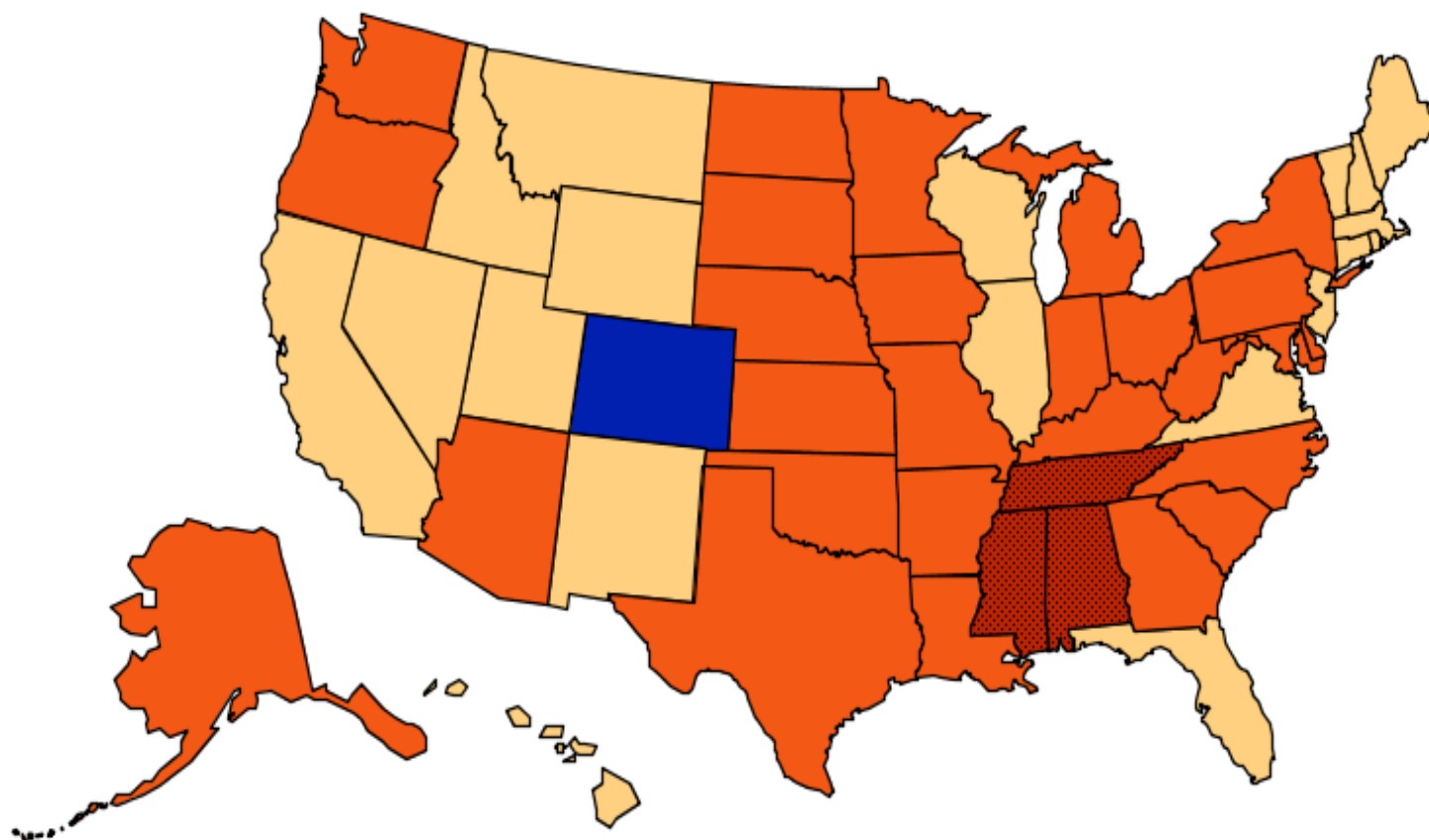
(*BMI ≥ 30 , or ~ 30 lbs. overweight for 5' 4" person)



Obesity Trends* Among U.S. Adults

BRFSS, 2007

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



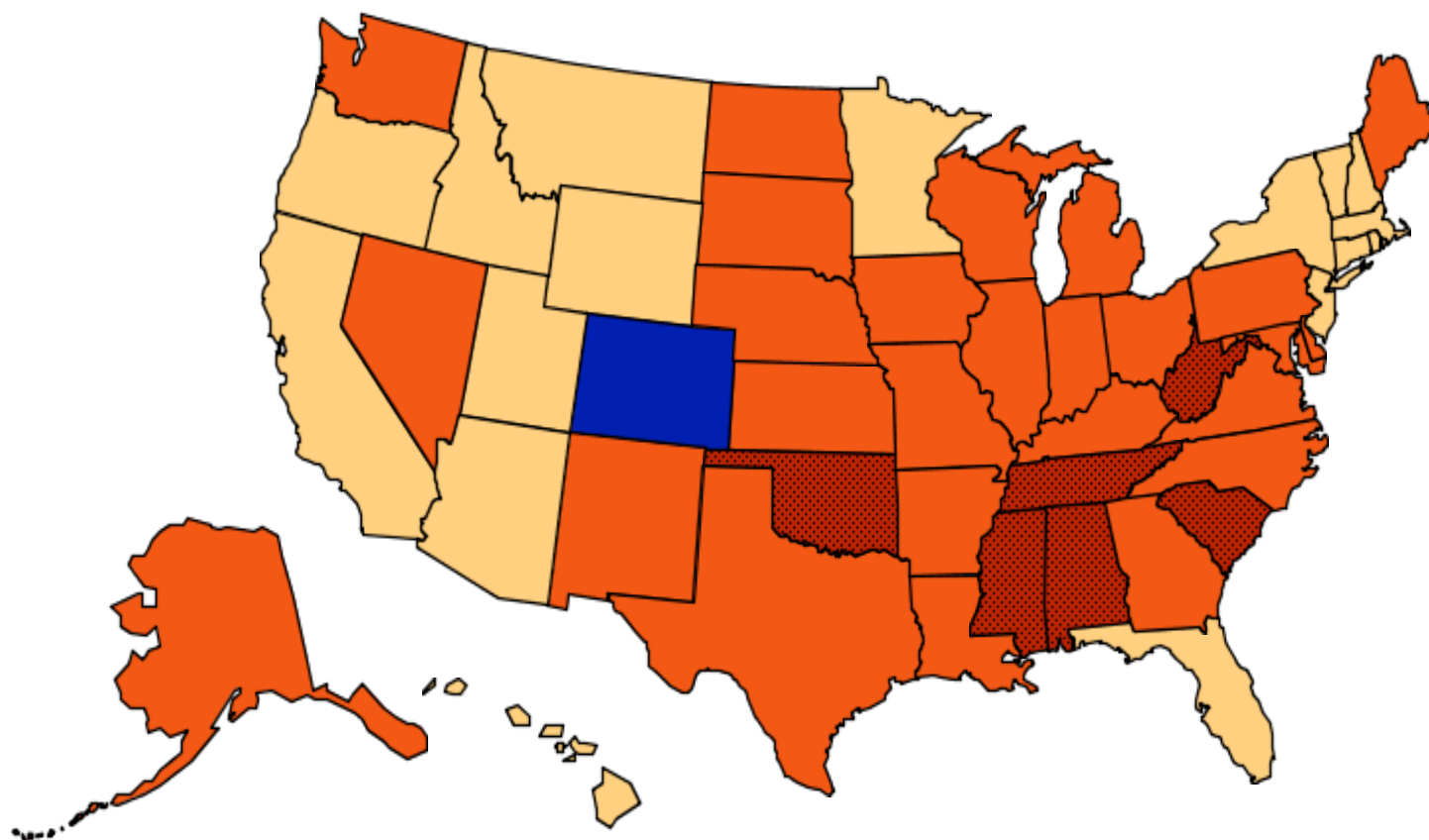
Legend: No Data, <10%, 10%–14%, 15%–19%, 20%–24%, 25%–29%, $\geq 30\%$



Obesity Trends* Among U.S. Adults

BRFSS, 2008

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



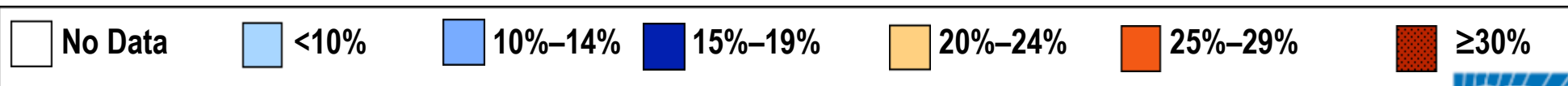
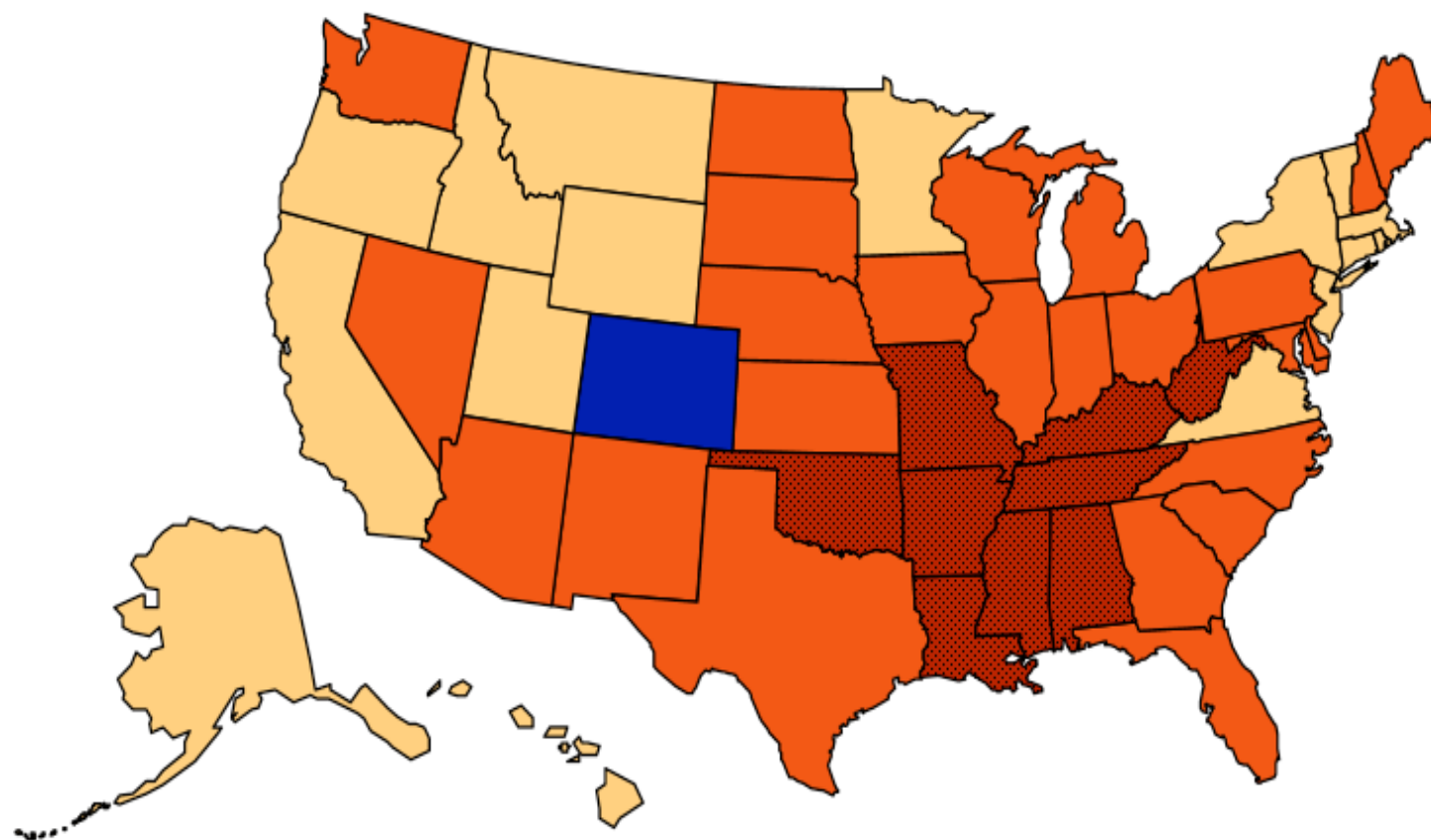
No Data	<10%	10%–14%	15%–19%	20%–24%	25%–29%	≥30%
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Obesity Trends* Among U.S. Adults

BRFSS, 2009

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

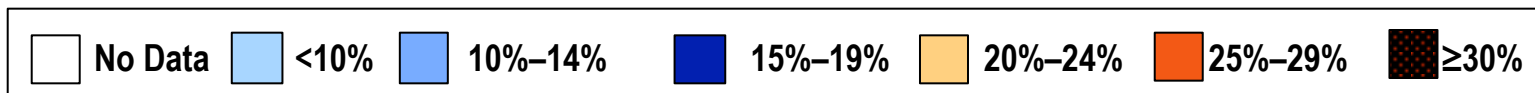
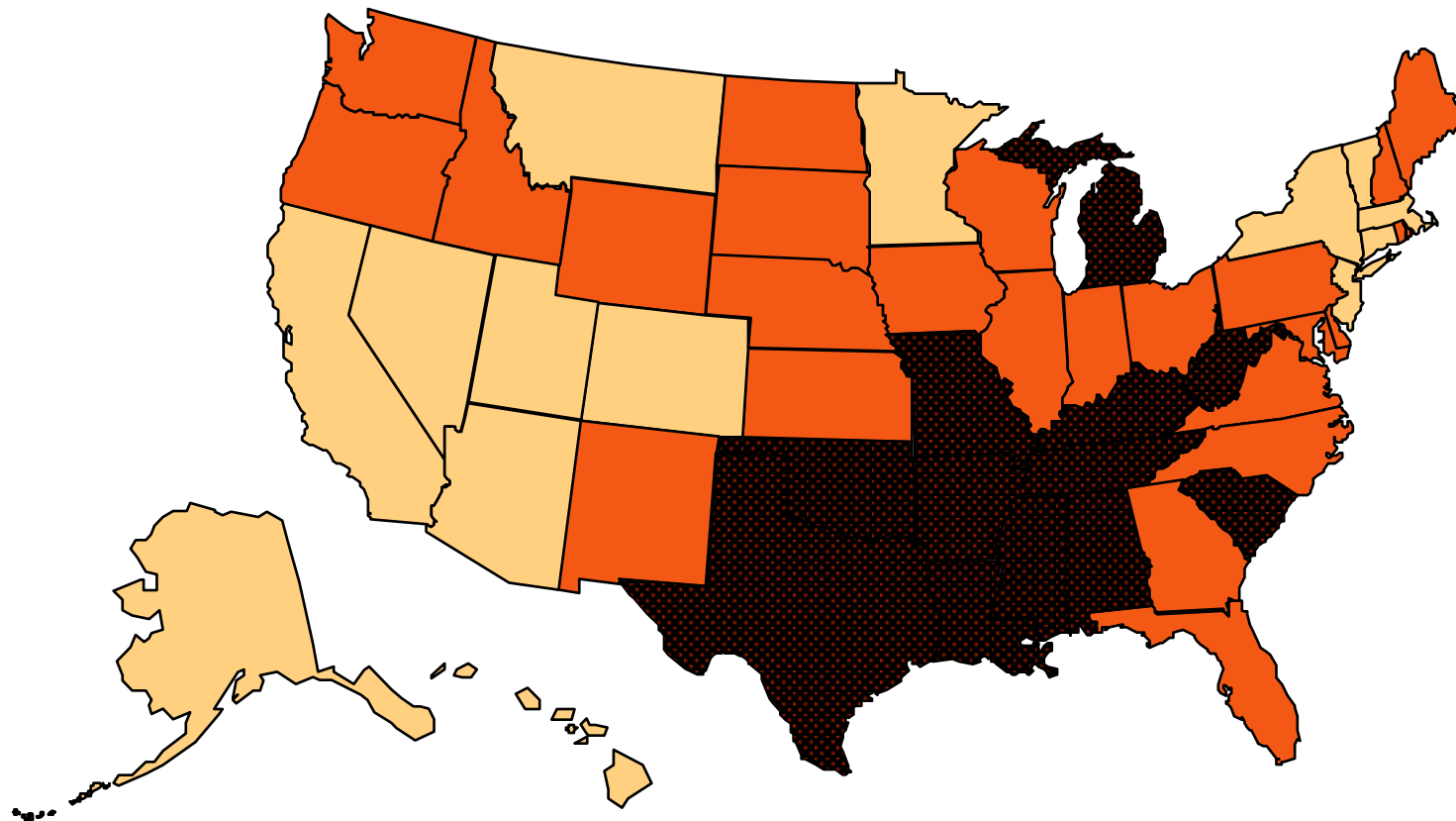


Source: Behavioral Risk Factor Surveillance System, CDC.

Obesity Trends* Among U.S. Adults

BRFSS, 2010

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



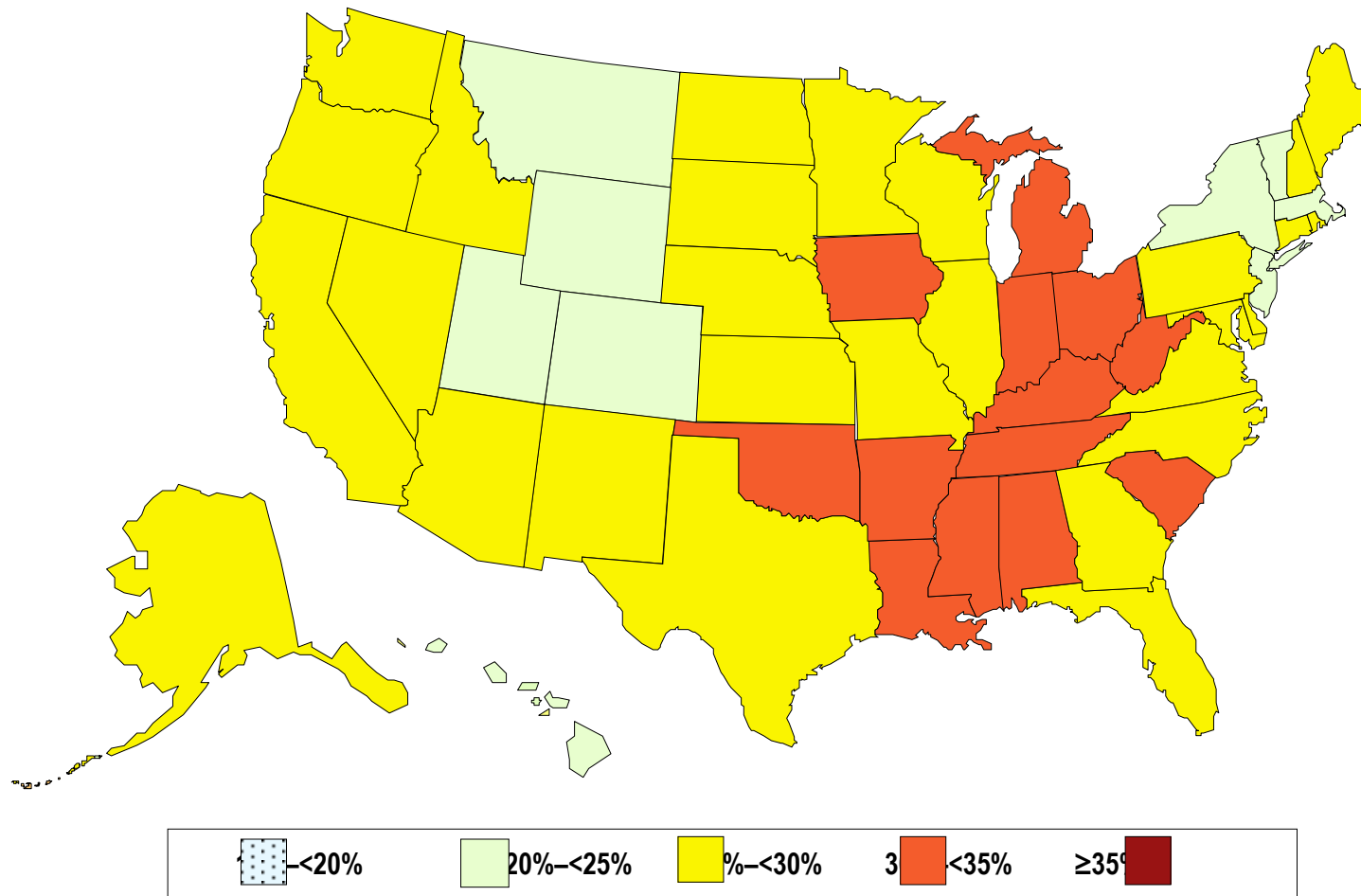
***Prevalence reflects BRFSS methodological changes in 2011, and these estimates should not be compared to previous years.**



Prevalence* of Self-Reported Obesity Among U.S. Adults

BRFSS, 2012

*Prevalence reflects BRFSS methodological changes in 2011, and these estimates should not be compared to those before 2011.



Source: Behavioral Risk Factor Surveillance System, CDC.



People who are overweight or obese
live shorter lives



and
have more medical problems
compared to normal weight individuals



A weight loss of
just 5-10%
can help reduce the chances a patient will
develop diabetes and hypertension.



People lose weight by
eating healthy and staying active
every day.

Access this again at:
<http://keithmurphy.org/talks>