

Systemic Diabetes



Diabetes & Obesity in the United States

In this session:

- That is where we were.
- This is where we are.
- How the in the world did we get here?!
- Now what?

The Threatening Threes

- US obesity rates have tripled since 1980
- 1 in 3 Americans is overweight
- 1 in 3 Americans is obese
- 1 in 3 Americans have metabolic syndrome
- Each day, 1 in 3 US adults patronizes a fast-food restaurant
- Only 1 in 3 US adults receive the recommended weekly physical activity
- Only 1 in 3 US children is physically active every day
- 1 in 3 US children is overweight or obese
- 1 in 3 US high school students play video games for 3 or more hours a day
- 1 in 3 US children born in 2000 or after will develop diabetes

Definitions

- **Diabetes Mellitus:** Disease in which the body's ability to produce or respond to the hormone insulin is impaired, resulting in abnormal metabolism of carbohydrates and elevated levels of glucose in the blood and urine.
- **Prediabetes:** Blood glucose levels that are higher than normal but not yet high enough to be diagnosed as diabetes. Also referred to as *impaired glucose tolerance* (IGT) or *impaired fasting glucose* (IFG), depending on what test was used to detect it. Prediabetes puts a person at a much higher risk for developing type 2 diabetes (50% w/in 5-10 yrs) and cardiovascular disease.
- **Metabolic Syndrome:** A cluster of conditions that occur together, increasing your risk of heart disease, stroke and type 2 diabetes. These conditions include increased blood pressure, high blood sugar, excess body fat around the waist, and abnormal cholesterol or triglyceride levels.
- **Insulin Resistance:** An impaired response of the body to insulin, resulting in elevated levels of glucose in the blood (a key component of type 2 diabetes and metabolic syndrome).
- **Body Mass Index (BMI):** A weight-to-height ratio, calculated by dividing one's weight in kilograms by the square of one's height in meters and used as an indicator of obesity and underweight.
- **Overweight:** BMI greater than 25 but less than 30
- **Obese:** BMI over 30. Obesity is clearly linked to diabetes, heart disease and certain types of cancer.
- **Morbidly Obese:** BMI over 40 (or over 35 and experiencing obesity-related health conditions like high blood pressure or diabetes)

Type 1

The body does not produce insulin. Some people may refer to this type as **insulin-dependent diabetes**, **juvenile diabetes**, or **early-onset diabetes**. People usually develop type 1 diabetes before their 40th year, often in early adulthood or teenage years

Approximately 10% of all diabetes cases are type 1

Patients with type 1 diabetes will need to take insulin injections for the rest of their life. They must also ensure proper blood-glucose levels by carrying out regular blood tests and following a special diet

Type 2

The body does not produce enough insulin for proper function, or the cells in the body do not react to insulin (insulin resistance)

Approximately 90% of all cases of diabetes worldwide are type 2

Some people may be able to control their type 2 diabetes symptoms by losing weight, following a healthy diet, exercise, and monitoring their blood glucose levels.

Overweight and obese people have a much higher risk of developing type 2 diabetes compared to those with a healthy body weight. Being overweight/obese causes the body to release chemicals that can destabilize the body's cardiovascular and metabolic systems.

Type 2

Being overweight, physically inactive and eating the wrong foods all contribute to our risk of developing type 2 diabetes.

Drinking just one can of (non-diet) soda per day can raise our risk of developing type 2 diabetes by 22%, researchers from Imperial College London reported in the journal *Diabetologia*. The scientists believe that the impact of sugary soft drinks on diabetes risk may be a direct one, rather than simply an influence on body weight.

The risk of developing type 2 diabetes is also greater as we get older.

A family history of diabetes is a risk factor.

People of Middle Eastern, African, or South Asian descent also have a higher risk of developing the disease.

Gestational

Diagnosis of gestational diabetes is made during pregnancy.

This type affects females during pregnancy. Some women have very high levels of glucose in their blood, and their bodies are unable to produce enough insulin to transport all the glucose into their cells, resulting in progressively rising levels of glucose.

Most gestational diabetes patients can control their diabetes with exercise and diet. Between 10% to 20% of them will need to take blood-glucose-controlling medications. Undiagnosed or uncontrolled gestational diabetes can raise the risk of complications during childbirth. The baby may be bigger than they should be.

Complications Linked to Poorly Controlled Diabetes

Eye complications - glaucoma, cataracts, diabetic retinopathy

Foot complications - neuropathy, ulcers, and amputations

Skin complications - skin infections and skin disorders

Heart problems - heart disease and cardiac arrest

Hypertension - kidney disease and stroke

Mental health - depression, anxiety and other mental disorders

Hearing loss - hearing problems

Complications Linked to Poorly Controlled Diabetes

Gum disease - gingivitis

Gastroparesis - muscles of the stomach stop working properly

Neuropathy - diabetic neuropathy

Nephropathy - uncontrolled blood pressure can lead to kidney disease

PAD (peripheral arterial disease) - pain in the leg, tingling and sometimes problems walking properly

Stroke - if blood pressure, cholesterol levels, and blood glucose levels are not controlled, the risk of stroke increases significantly

Erectile dysfunction - male impotence

Infections - susceptible to infections

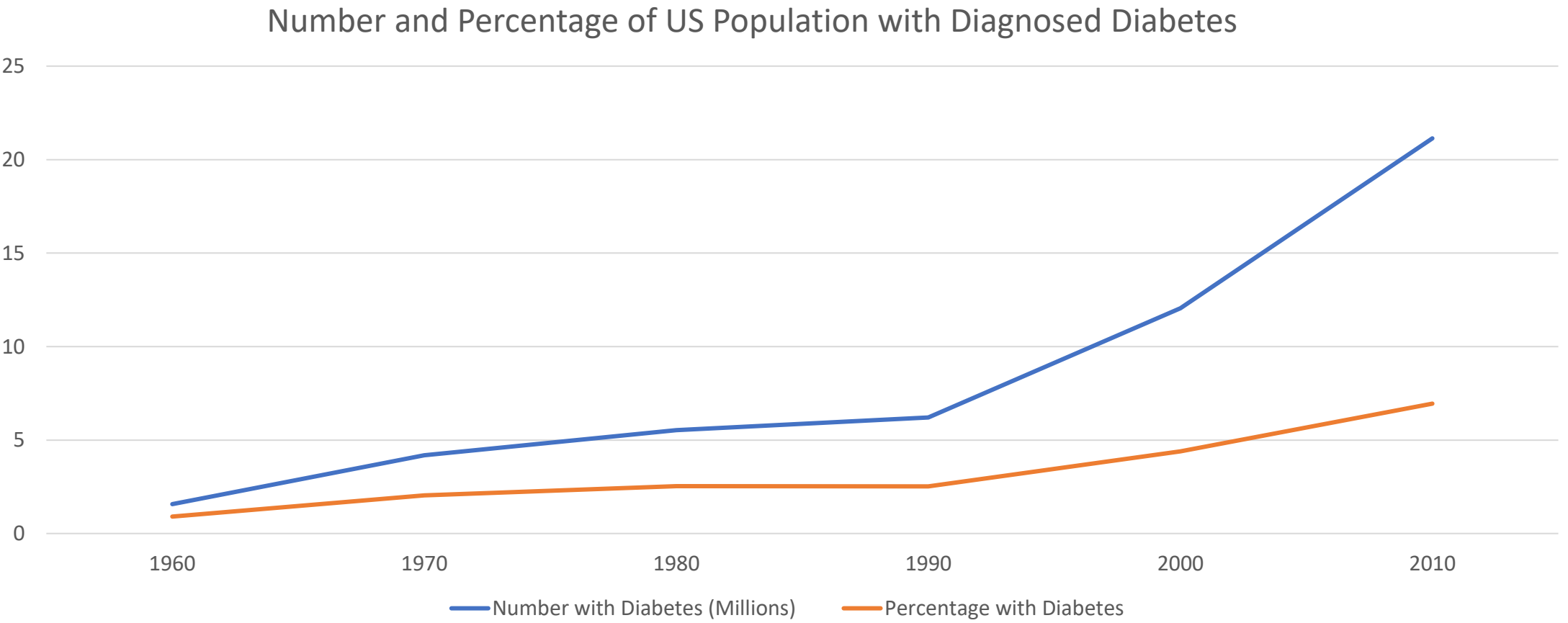
Healing of wounds - cuts and lesions take much longer to heal

The Way We Were...

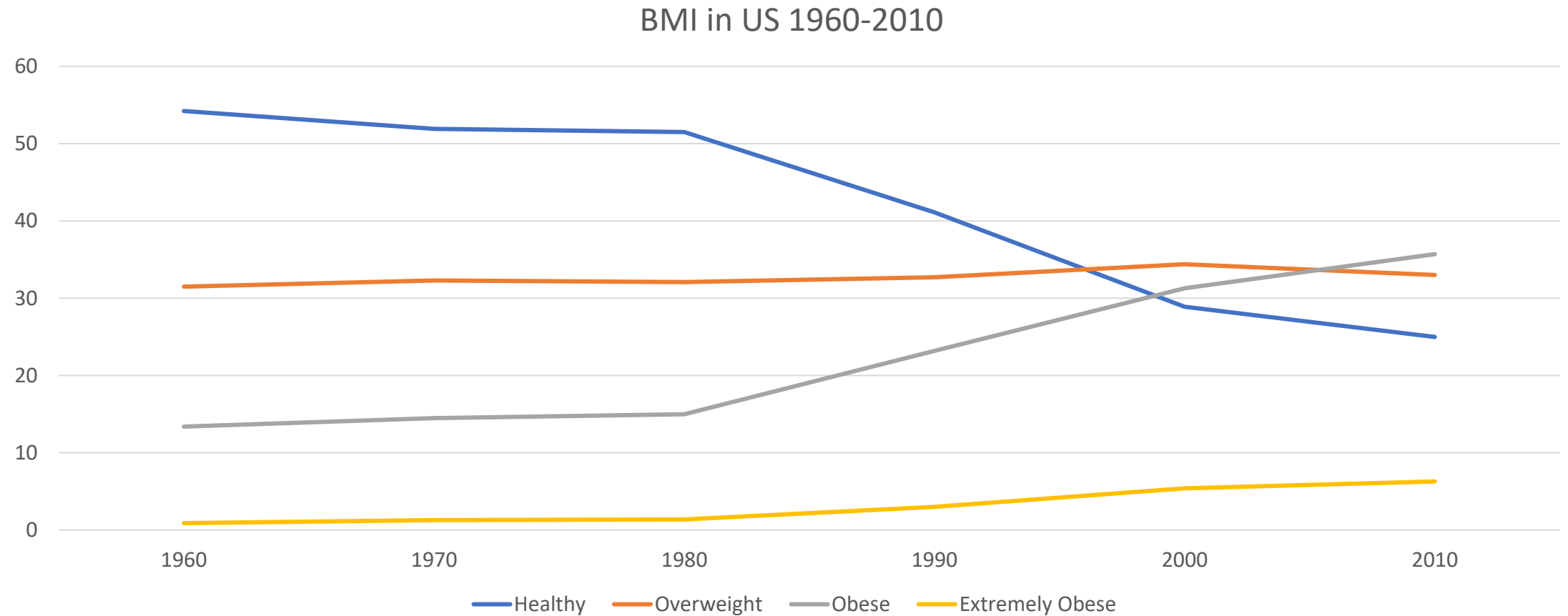
- 1960
 - .9% of US adult population was diagnosed with diabetes (1.59 million)¹
 - 13.3% of US adult population was obese²
 - We used to eat at home.
 - Food was not nearly as accessible, and portions were significantly smaller.
 - We used to be much more physically active.
 - We used to get 7-8 hours of sleep each night.
- 1950's³
 - Per capita daily caloric intake was 800 calories fewer than in 2000.
 - Use and consumption of corn sweeteners was 1/8 what it was in 2000.
 - Per capita annual overall sweetener consumption was 42 lbs less than in 2000.
 - Per capita annual added fats consumption was 30 lbs less than in 2000.
 - Per capita annual cheese consumption was 1/4 what it was in 2000.

1. CDC – Long-term trends in diabetes (2017)
2. CDC – Health, United States (2002)
3. USDA Economic Research Services

The Way We Were



The Way We Were...



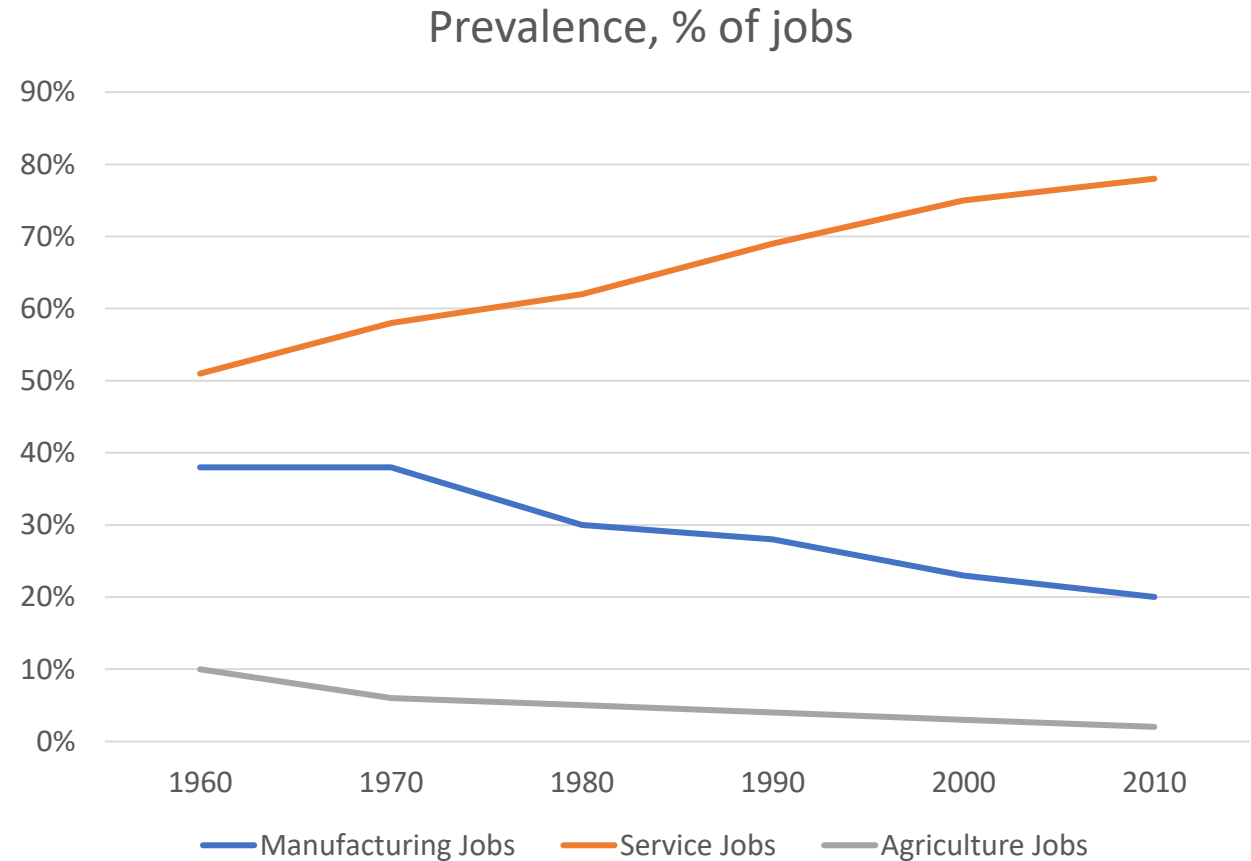
Physical activity is even more important than caloric intake

- 1988-2010, average US adult BMI increased by .37% per year.
- Average waist circumference increased by .37% per year in women and .27% per year in men.
- Average daily caloric intake did not change significantly.
- The proportion of women who reported no leisure-time physical activity increased from 19.1% to 51.7%.
- The proportion of men who reported no leisure-time physical activity increased from 11.4% to 43.5%.



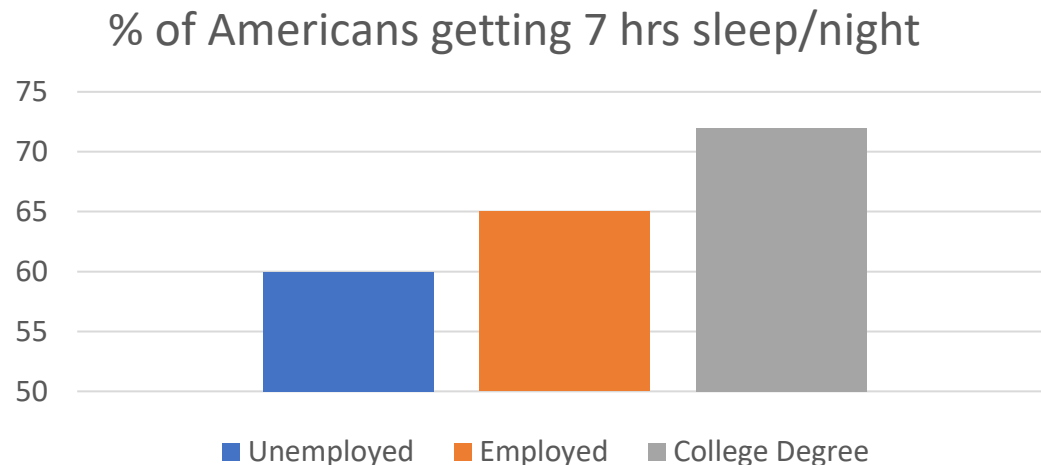
The Way We Were...

- In 1960, over ½ US jobs required moderately intense physical activity.
- Today, less than 20% require that.
- Over the last 50 years, daily job-related energy expenditure has decreased by 142 calories.



The Way We Were...

- According to the CDC (2014):
 - 1 in 3 Americans don't get enough sleep
 - A lower proportion of adults reported getting at least seven hours of sleep per day in SE states and Appalachia. These regions also have the highest prevalence of obesity and other chronic conditions.



Average Hours of Sleep Per Night

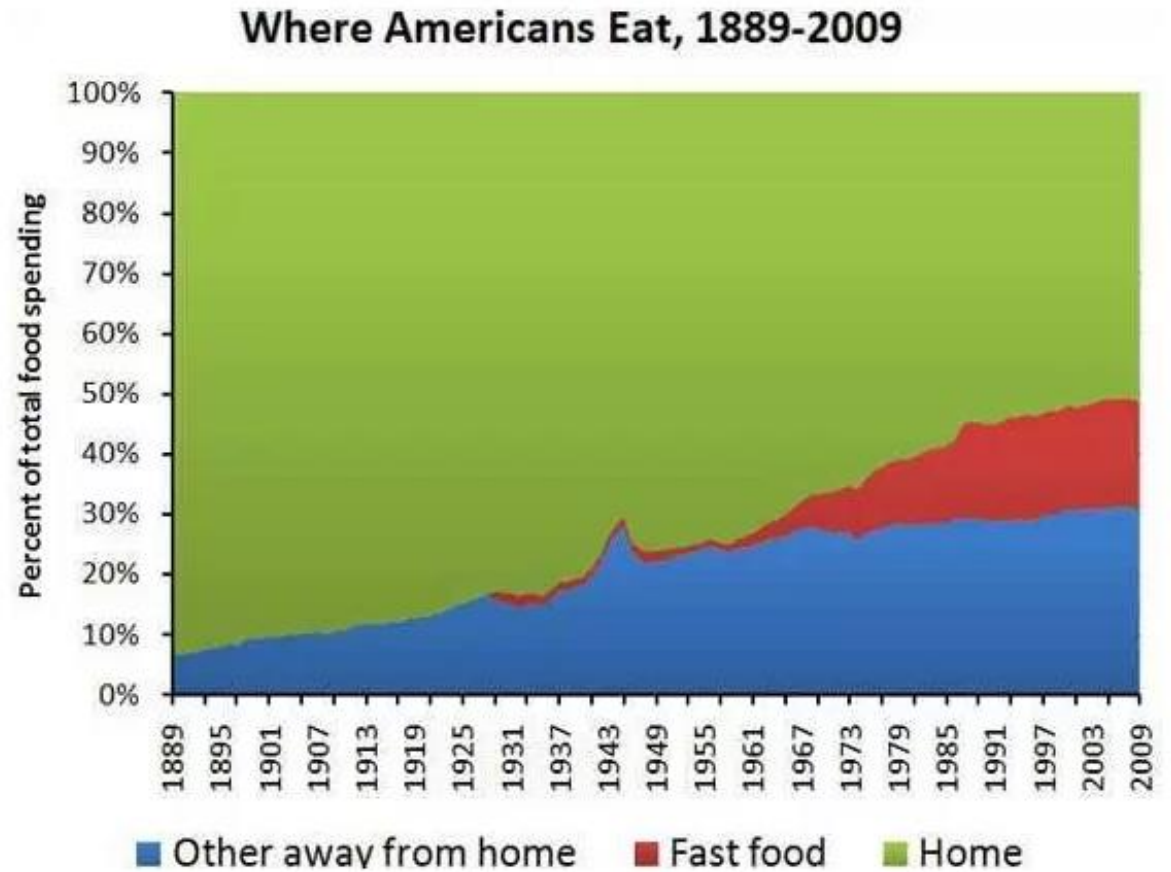


In 1942, Americans had 7.9 hours on average hours per night compared to 6.8 hours in 2013, which is a 13% decrease.

Source: In U.S., 40% Get Less Than Recommended Amount of Sleep, Gallup News Dec 2013

The Way We Were...

- We used to actually cook and eat at home.
- Portions were much smaller.
- Bowls, plates and glasses were smaller.
- Food was not heavily processed heat-n-serve.
- We *sat* and ate as a family.



Source: Dr. Stephan Guyenet. [Fast Food, Weight Gain and Insulin Resistance](#). Whole Health Source.

Where We Are Today...

- **Diabetes 2019 (most recent numbers)**
- 37.3 million people of all ages had diabetes in 2019
- **U.S. Value:** : 11.3%
- **Healthiest State:** Utah: 7.1%
- **Least-healthy State:** Mississippi: 15.4% (West Virginia very close 2nd)
- **Definition:** Percentage of adults who reported being told by a health professional that they have diabetes (excludes prediabetes and gestational diabetes)
 - **Data Source & Year:** CDC, Behavioral Risk Factor Surveillance System, 2017 (via: America's Health Rankings analysis of CDC, Behavioral Risk Factor Surveillance System, United Health Foundation, AmericasHealthRankings.org, Accessed 2019.)

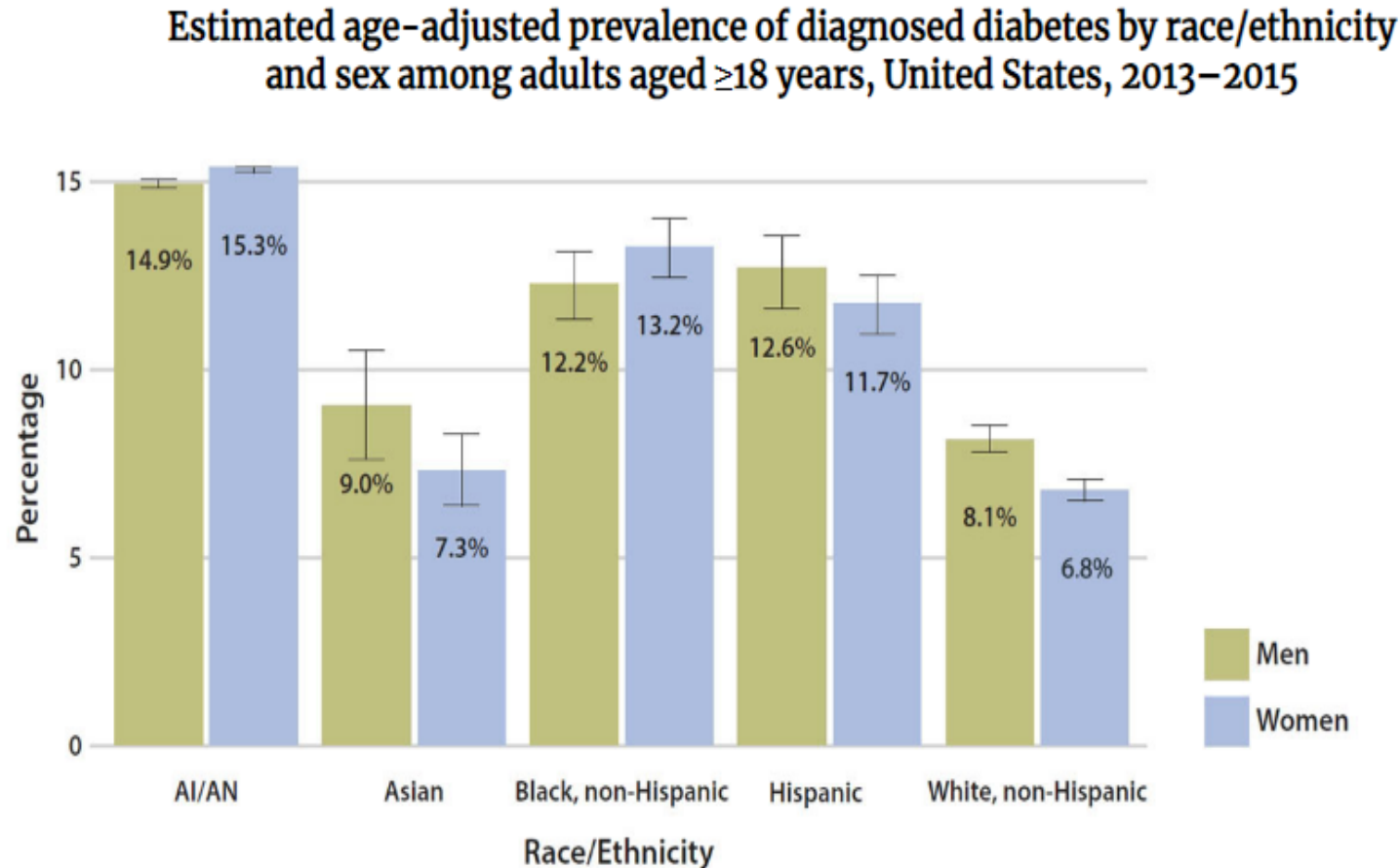
Killers...

- Diabetes is the third-leading cause of death in the United States.¹
 - Researchers reviewed data from 1997-2010 to estimate how frequently diabetes is the primary but overlooked cause of death.
 - 12% of all US deaths, 19% of deaths among obese people.
 - Individuals with diabetes had 90% higher death rates w/in 5-year follow-up.
 - CDC lists it as the seventh-leading cause of death (3.5%)
- Obesity and Diabetes are the leading causes of lost life years due to modifiable behavioral risk factors.²
 - Obesity results in more than 47% lost life years than tobacco.
 - Leading causes (in order): Obesity, DM, tobacco use, HBP, high cholesterol.



1. Stokes A, Preston SH (2017) Deaths Attributable to Diabetes in the United States: Comparison of Data Sources and Estimation Approaches. PLoS ONE 12(1): e0170219.
2. Research presented by Glen Taksler, MD at The Society of General Internal Medicine 2017 Annual Meeting, "Resilience and Grit: Pursuing Organizational Change & Preventing Burnout in GIM" April 19-22, 2017 in Washington, DC.

Where We Are Today...



- 30.3 million people in US with diabetes.¹
- Over 100 million (40% of population) are living with diabetes or prediabetes.¹
- 34.2% of US adult population (112.5 million) has metabolic syndrome.²

1. Centers for Disease Control and Prevention. 2019 National Diabetes Statistics Report

2. Moore JX, Chaudhary N, Akinyemiju T. Metabolic Syndrome Prevalence by Race/Ethnicity and Sex in the United States, National Health and Nutrition Examination Survey, 1988–2012. *Prev Chronic Dis* 2017;14:160287.

Diabetes in the USA

- For US adults, aged 18+, from 1994 through 2018, prevalence of obesity and the prevalence of diagnosed diabetes rose in all states. (source: CDC)
- 1994: 48 states had prevalence of obesity <18% and 0 states >22%.
- 2018: 0 states had <22% and 29 states >30%; 7 states >35%.
- For diagnosed diabetes, in 1994, almost all states had prevalence less than 6%.
- In 2018, all 50 states >7%; 33 were >10%; 9 were over 12%.
- 7 of Top 10 Diabetes states are also Top 10 Obesity states.
- Today, 80%-90% of people diagnosed with Type II DM are also diagnosed with obesity while 30% of obese people have diabetes.



Cost of Diabetes in US

- Total estimated cost of diagnosed diabetes in 2017 is \$327 billion (\$237 billion in direct medical costs, \$90 billion in reduced productivity).
- Top direct medical expenditures:
 - Hospital inpatient care (30% of the total medical cost)
 - Prescription medications to treat complications of diabetes (30%)
 - Anti-diabetic agents and diabetes supplies (15%)
 - Physician office visits (13%).
- Indirect costs include:
 - Increased absenteeism (\$3.3 billion) and reduced productivity while at work (\$26.9 billion) for the employed population
 - Reduced productivity for those not in the labor force (\$2.3 billion)
 - Inability to work as a result of disease-related disability (\$37.5 billion)
 - Lost productive capacity due to early mortality (\$19.9 billion)



Cost of Obesity in US

- Obesity-related healthcare cost estimates range from \$147 billion to \$210 billion per year.¹
- Obese adults spend 42% more on direct healthcare costs than adults who are a healthy weight.²
- Obesity-related job absenteeism - \$4.3 billion per year.³
- Lower productivity while at work, costing employers \$506 per obese worker per year.⁴

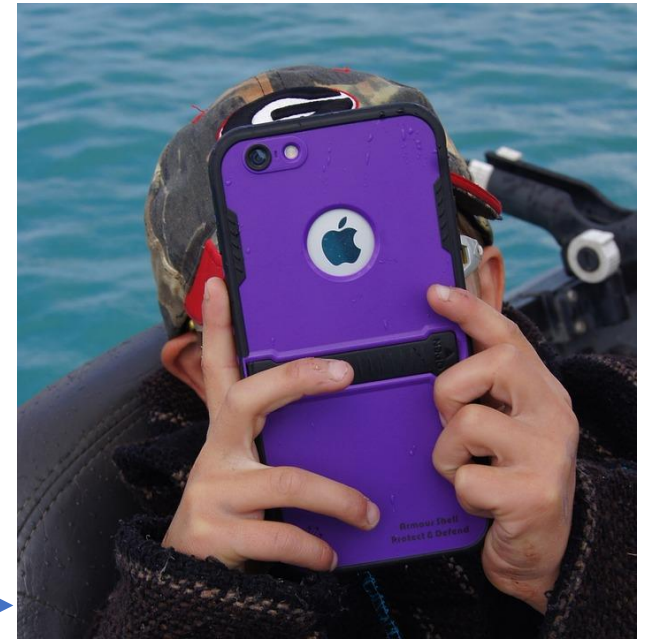


1. Cawley J and Meyerhoefer C. The Medical Care Costs of Obesity: An Instrumental Variables Approach. *Journal of Health Economics*, 31(1): 219-230, 2012; And Finkelstein, Trogdon, Cohen, et al. Annual Medical Spending Attributable to Obesity. *Health Affairs*, 2009.
2. Gates D, Succop P, Brehm B, et al. Obesity and presenteeism: The impact of body mass index on workplace productivity. *J Occ Envir Med*, 50(1):39-45, 2008.
3. The Robert Wood Johnson Foundation, the American Stroke Association, and the American Heart Association. A Nation at Risk: Obesity in the United States, A Statistical Sourcebook. Dallas, TX: American Heart Association, 2005.
4. Cawley J, Rizzo JA, Haas K. Occupation-specific Absenteeism Costs Associated with Obesity and Morbid Obesity. *Journal of Occupational and Environmental Medicine*, 49(12):1317-24, 2007.

Children in the United States



- Only 1 in 3 kids are physically active every day.
- Kids now spend more than 7.5 hrs/day in front of a screen.
- 1/3 of high-schoolers play video games for more than 3 hrs/day.
- From 1972-2008, obesity in kids aged 6-11 quadrupled from 4% to nearly 20%.

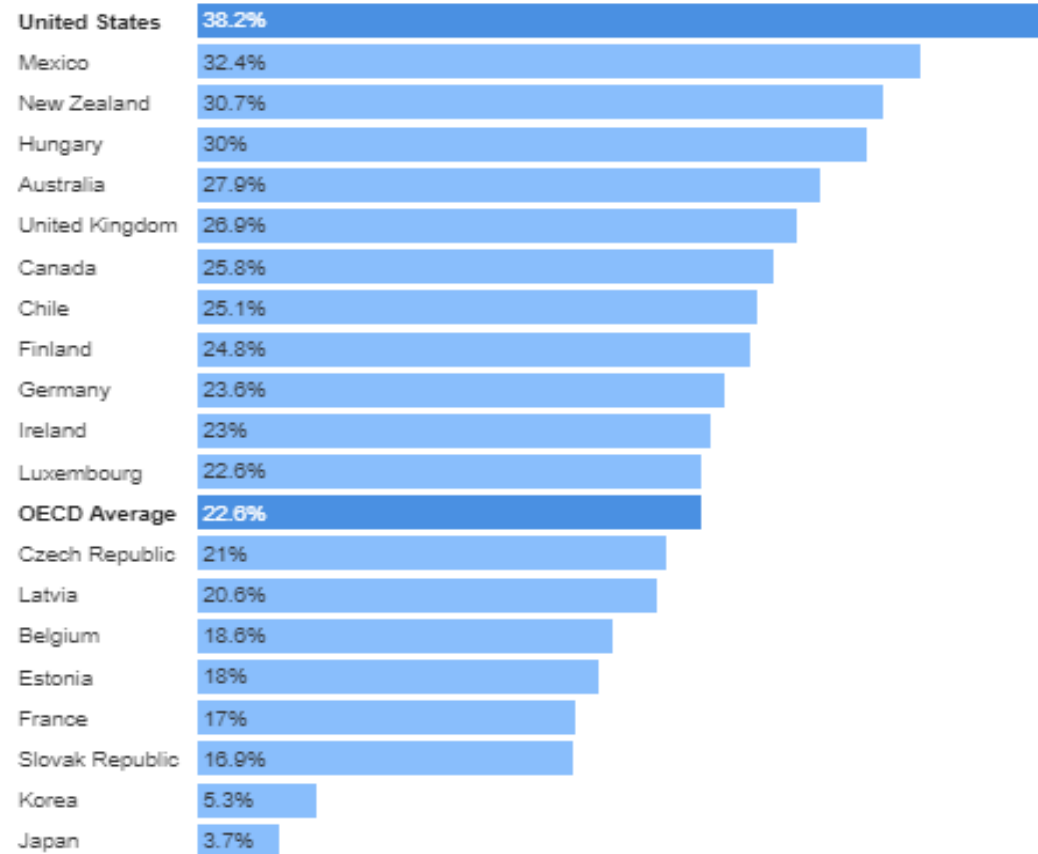


Where We Are Today....



Obesity around the world

The U.S. ranks as the most obese country in the world. In the average country tracked by the OECD, about one-fifth of the population is obese.



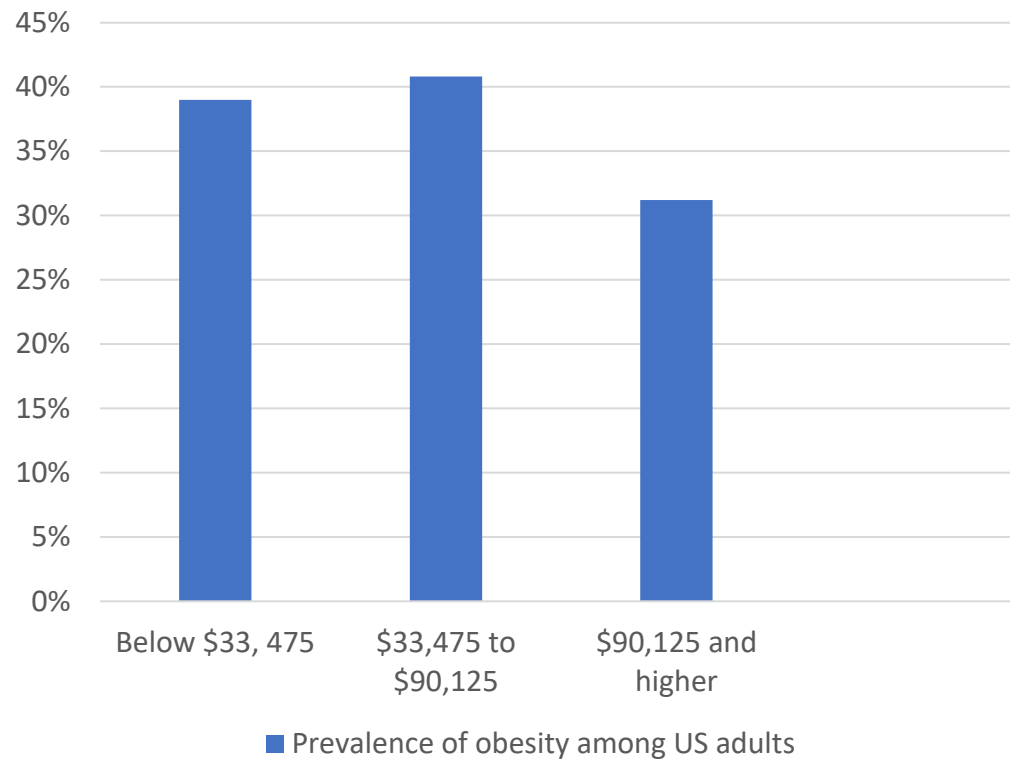
Data are for 2015 or nearest year.

The Conversation, CC-BY-ND

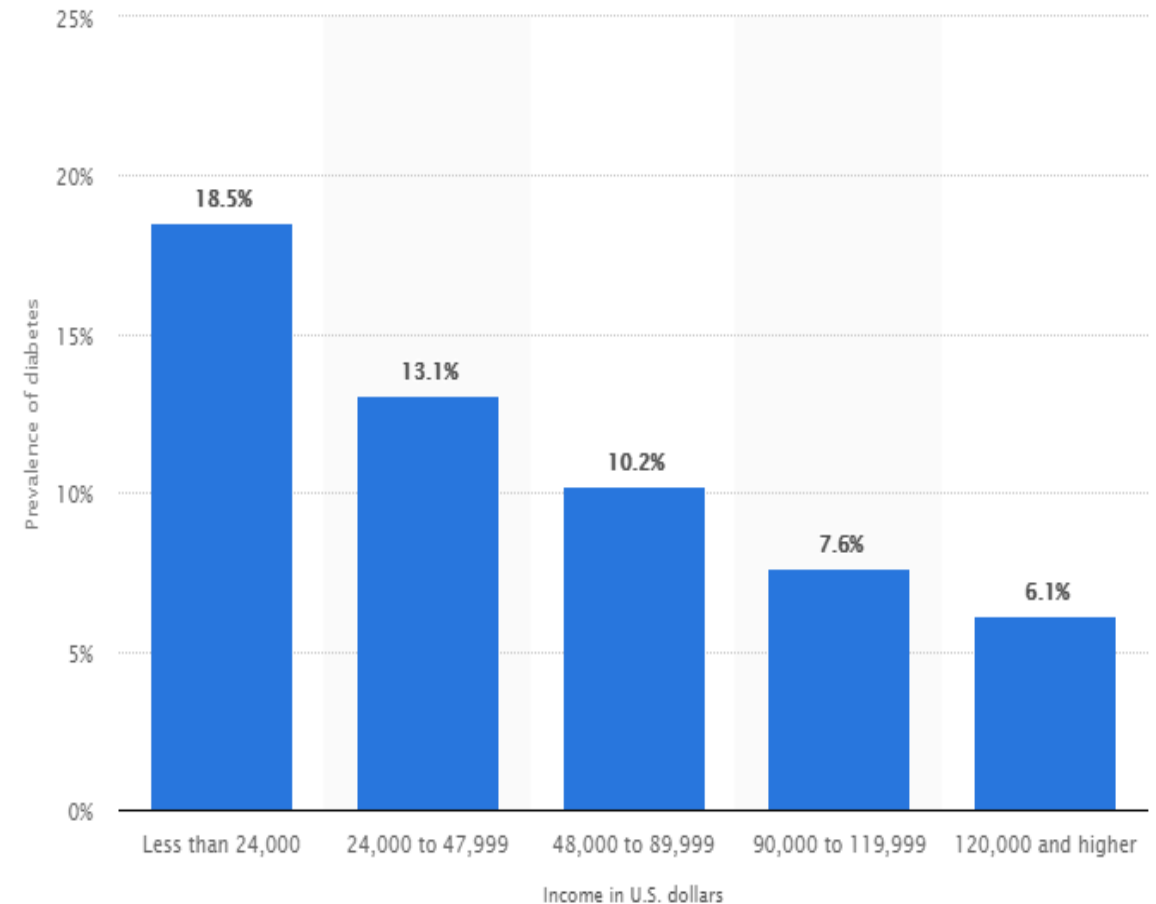
Source: [Organisation for Economic Co-operation and Development](#)

Socioeconomics and Diabetes and Obesity in the United States

Prevalence of obesity among US adults,
by household income



Prevalence of US adults w/ DM, by income



Source: CDC Morbidity and Mortality Weekly Report. Ogden CL, et al.
Prevalence of Obesity Among Adults, by Household Income and Education –
United States, 2011-2014. Dec 22, 1017.

Where We Are Today...

How did we end up
here?



- Effect: An outward sign
 - Mechanism: The fundamental processes involved in or responsible for an action, reaction or other natural phenomenon
 - Cause: Something that brings about an effect or result
- Obesity is an *effect*.
 - Insulin resistance, leptin resistance, lipotoxicity, disruption of the mesolimbic dopamine reward pathway and inflammation of the hypothalamus are *mechanisms*.
 - Excess consumption of carbohydrates, fat, highly palatable food and food toxins (wheat, seed oils, liquid fructose, etc.), exposure to environmental toxins (chemicals), stress, infections, etc. are *causes*.

Historical Caloric Intake...One More Time.

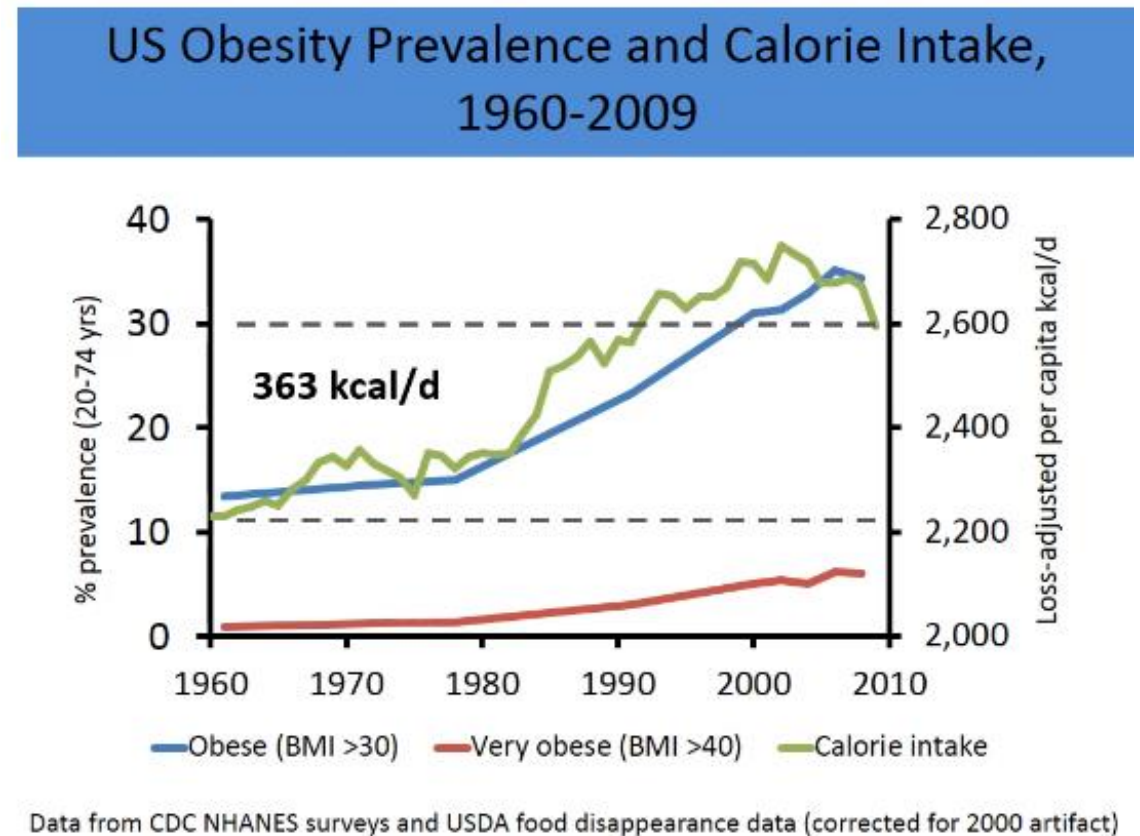
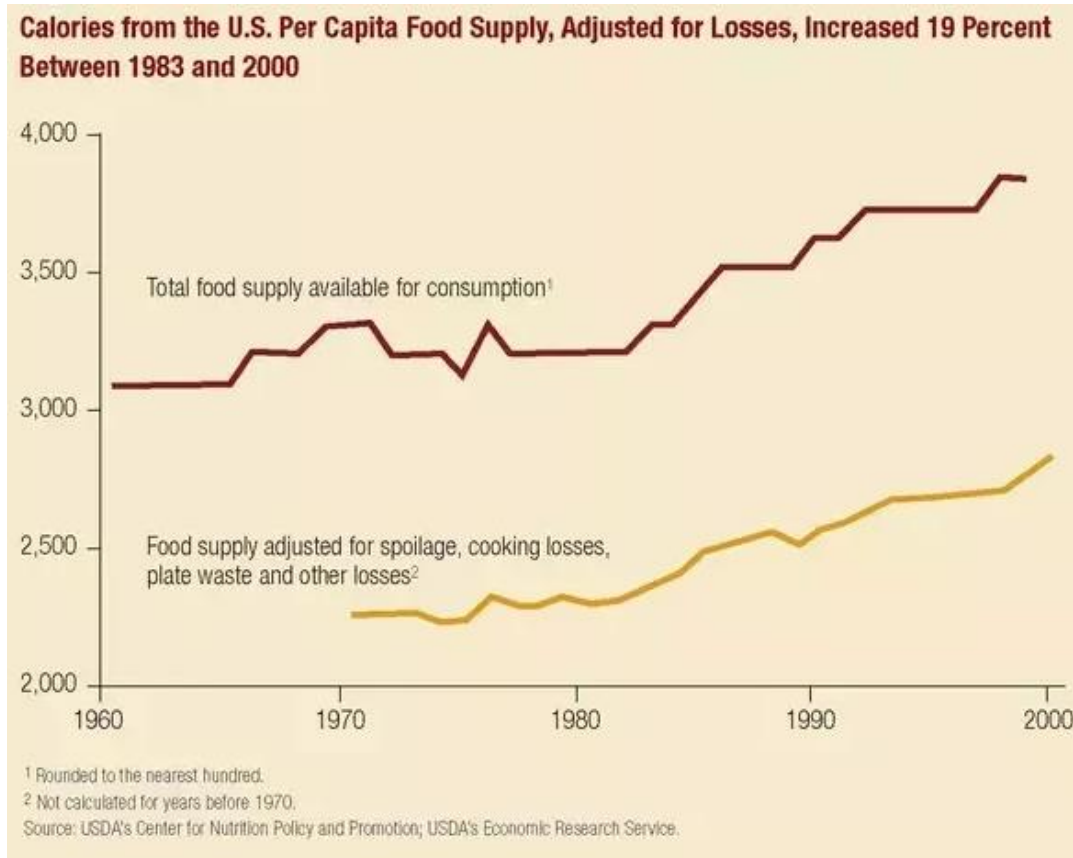


Image sources: Stephan Guyenet, PhD “Why do we overeat? A neurological perspective”.
USDA’s Center for Nutrition Policy and Promotion. USDA’s Economic Research Service

What else has changed?



Food is more accessible than ever before.



Processed foods are cheap, easy, flavorful and packed with calories, fat, sugar and sodium. And they are everywhere!



We eat out more and when we do eat at home, we aren't cooking "from scratch" using raw, unprocessed ingredients. We are often opening a package of premade food.



Portions are larger – at restaurants, at home and at the grocery store.



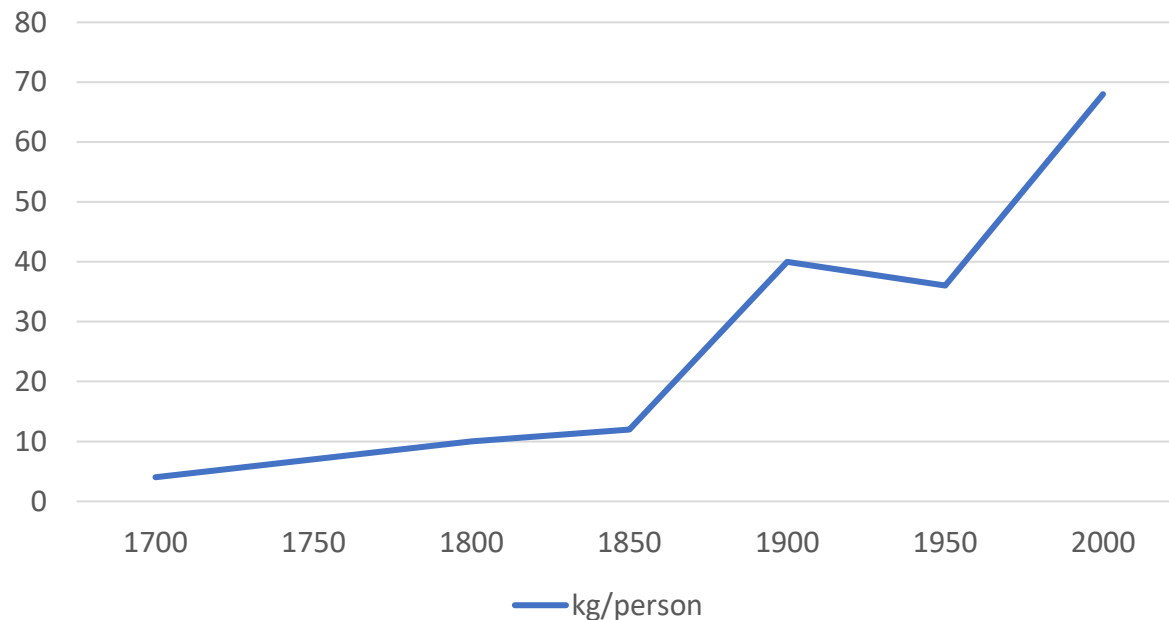
Alcohol consumption has increased significantly.



And we never stop snacking!

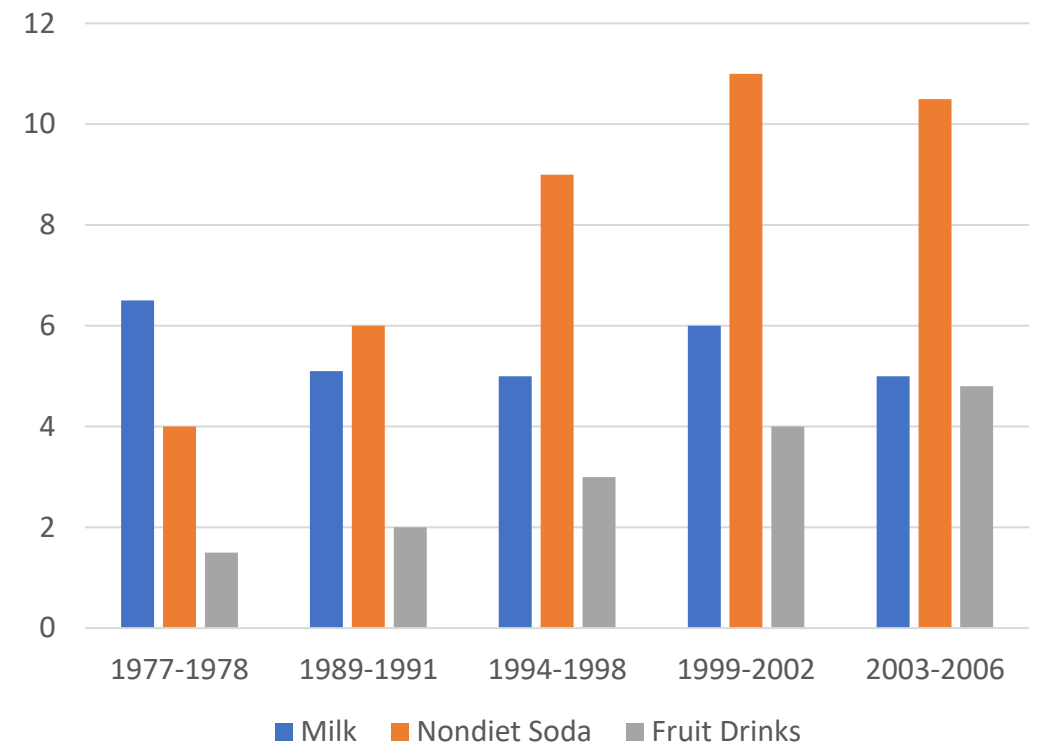
Sugar and Sugary Drink Consumption

Annual US Sugar Consumption



Source: Johnson RJ, et al. [Potential role of sugar \(fructose\) in the epidemic of hypertension, obesity and the metabolic syndrome, diabetes, kidney disease, and cardiovascular disease.](#) The American Journal of Clinical Nutrition, 2007.

US adults, ounces per day

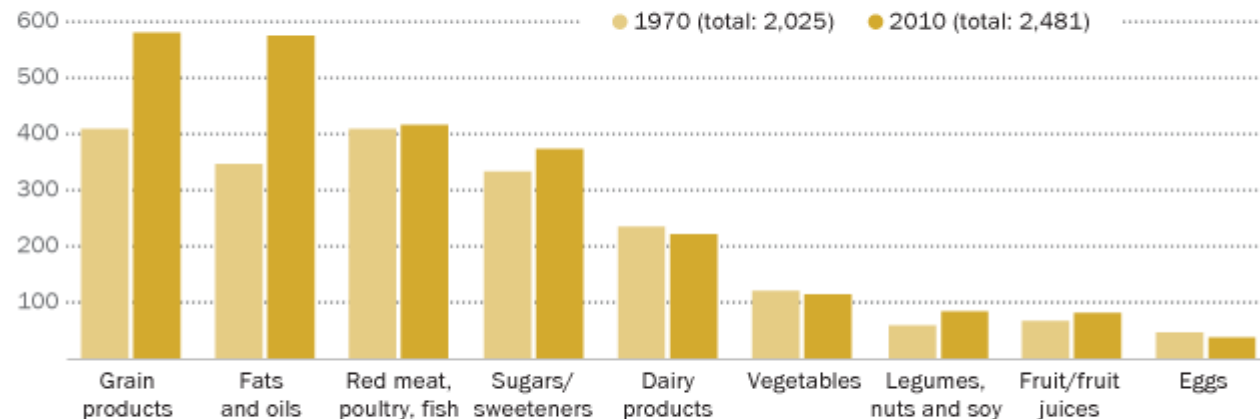


Source: ERS calculations based on USDA's 1977-78 Nationwide Food Consumption Survey (NFCS) data, 1989-91 and 1994-98 Continuing Survey of Food Intakes by Individuals (CSFII), and the Centers for Disease Control and Prevention's (CDC) National Center for Health Statistics 1999-2006 National Health and Nutrition Examination Survey (NHANES).

The Modern American Diet Has Gotten Bigger.

Modern American diet has gotten bigger, heavier on grains and fat

Average daily per capita calories



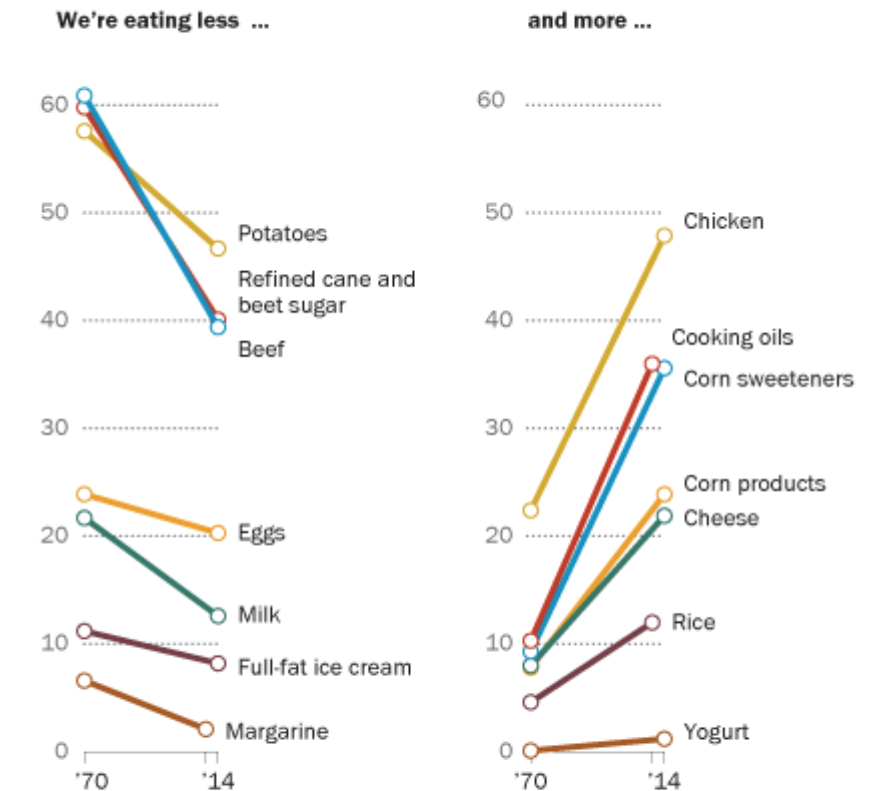
Note: "Fats and oils" includes butter, cream and other dairy fats. Figures adjusted for spoilage and other losses.

Source: USDA Economic Research Service; Pew Research Center analysis

PEW RESEARCH CENTER

How the American diet has changed since 1970

Average annual per capita availability, in pounds



Note: Figures adjusted for spoilage and other losses. Milk and yogurt are measured in gallons. Most recent available year for "cooking oils", "rice" and "margarine" is 2010. "Potatoes" includes fresh, frozen, dehydrated, canned, shoestring and chips.

Source: USDA Economic Research Service; Pew Research Center analysis

PEW RESEARCH CENTER

How often do you see a commercial for healthy food?

- Today's children (8-18) spend 44.5 hours/week in front of a screen.
- Most children under 6 can't distinguish between advertising and programming. Children under 8 do not understand the persuasive intent of commercials.
- Food ads make up 50% of all ads during children's programming.
 - 34% are the food ads are for candy and snacks
 - 28% are for cereal
 - 10% are for fast food
- Children between 8-12 receive the highest ad exposure (7,609 ads/year)
- For every 1-hour increase in TV viewing per day, the intake of sugar-sweetened beverages, processed meat, fast food and overall calories (48.7 cal/day) increases.



Trust(?) the Process.

- What is processed food?
- By definition, a processed food is a food item that has had a series of mechanical or chemical operations performed on it to change or preserve it.
- Processed foods are those that typically come in a box or bag and contain more than one item on the list of ingredients.
- Often packed with sugar, sodium and fat.
- Processed food have been proven to be physically and psychologically addicting.¹
- 61% of all US grocery store purchases are highly processed foods. 77% are either moderately or highly processed foods.²

1. Schulte EM, Avena NM, Gearhardt AN (2015) Which Foods May Be Addictive? The Roles of Processing, Fat Content, and Glycemic Load. PLoS ONE 10(2): e0117959.

2. Federation of American Societies for Experimental Biology (FASEB). "Highly processed foods dominate U. S. grocery purchases." ScienceDaily. ScienceDaily, 29 March 2015.

Table 3. Study Two: Average food ratings based on 7-point Likert scale (1 = not problematic at all, 7 = extremely problematic).¹

Rank	Food	Mean Rating	Processed?	GL	Fat (grams)	Sodium (milligrams)
1	Pizza	4.01	Y	22	10	551
2	Chocolate	3.73	Y	14	13	35
2	Chips	3.73	Y	12	10	160
4	Cookie	3.71	Y	7	4	63
5	Ice Cream	3.68	Y	14	15	98
6	French Fries	3.60	Y	21	18	266
7	Cheeseburger	3.51	Y	17	28	885
8	Soda (Not Diet)	3.29	Y	16	0	15
9	Cake	3.26	Y	24	10	260
10	Cheese	3.22	N	0	9	174
11	Bacon	3.03	N	0	12	647
12	Fried Chicken	2.97	Y	7	26	441
13	Rolls (Plain)	2.73	Y	15	1	450
14	Popcorn (Buttered)	2.64	Y	26	30	771
15	Breakfast Cereal	2.59	Y	22	6	270
16	Gummy Candy	2.57	Y	22	0	15
17	Steak	2.54	N	0	24	38
18	Muffin	2.50	Y	29	19	380
19	Nuts	2.47	N	3	13	179
20	Eggs	2.18	N	0	7	94
21	Chicken Breast	2.16	N	0	5	104
22	Pretzels	2.13	Y	15	1	380
23	Crackers (Plain)	2.07	Y	11	6	223
24	Water	1.94	N	0	0	0
25	Granola Bar	1.93	Y	10	6	160
26	Strawberries	1.88	N	1	0	2
27	Corn (No Butter or Salt)	1.87	N	8	1	6
28	Salmon	1.84	N	0	22	109
29	Banana	1.77	N	12	0	1
30	Broccoli	1.74	N	0	0	30
30	Brown Rice (Plain, No Sauce)	1.74	N	20	2	2
32	Apple	1.66	N	4	0	2
33	Beans (No Sauce)	1.63	N	7	1	2
34	Carrots	1.60	N	2	0	66
35	Cucumber (No Dip)	1.53	N	0	0	1

1. Information in parentheses was explicitly stated to participants. This decision was made because the addition of these ingredients would change the processing categorization and nutrition information of that food item.

doi:10.1371/journal.pone.0117959.t003

Schulte EM, Avena NM, Gearhardt AN (2015) Which Foods May Be Addictive? The Roles of Processing, Fat Content, and Glycemic Load. PLOS ONE 10(2): e0117959. <https://doi.org/10.1371/journal.pone.0117959>
<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0117959>

This is your brain on processed food...

- Highly processed food high in sugar and fats has the same effects on the brain as hard drugs.¹
- Obese people have a lower number of dopamine receptors which means they are more likely to crave foods that boost dopamine (carbs, sugars, fats).²
- Food addiction is as real as drug addiction or alcoholism.³
- Our bodies are biologically wired to desire foods that are dense, caloric and provide lots of energy, but eating too much of these can make our brain go haywire and lead to addiction.

1. Volkow ND, Wang GJ, et al. "Nonhedonic" food motivation in humans involves dopamine the the dorsal striatum and methylphenidate amplifies this effect. *Synapse*. 2002 Jun 1;44(3):175-80.

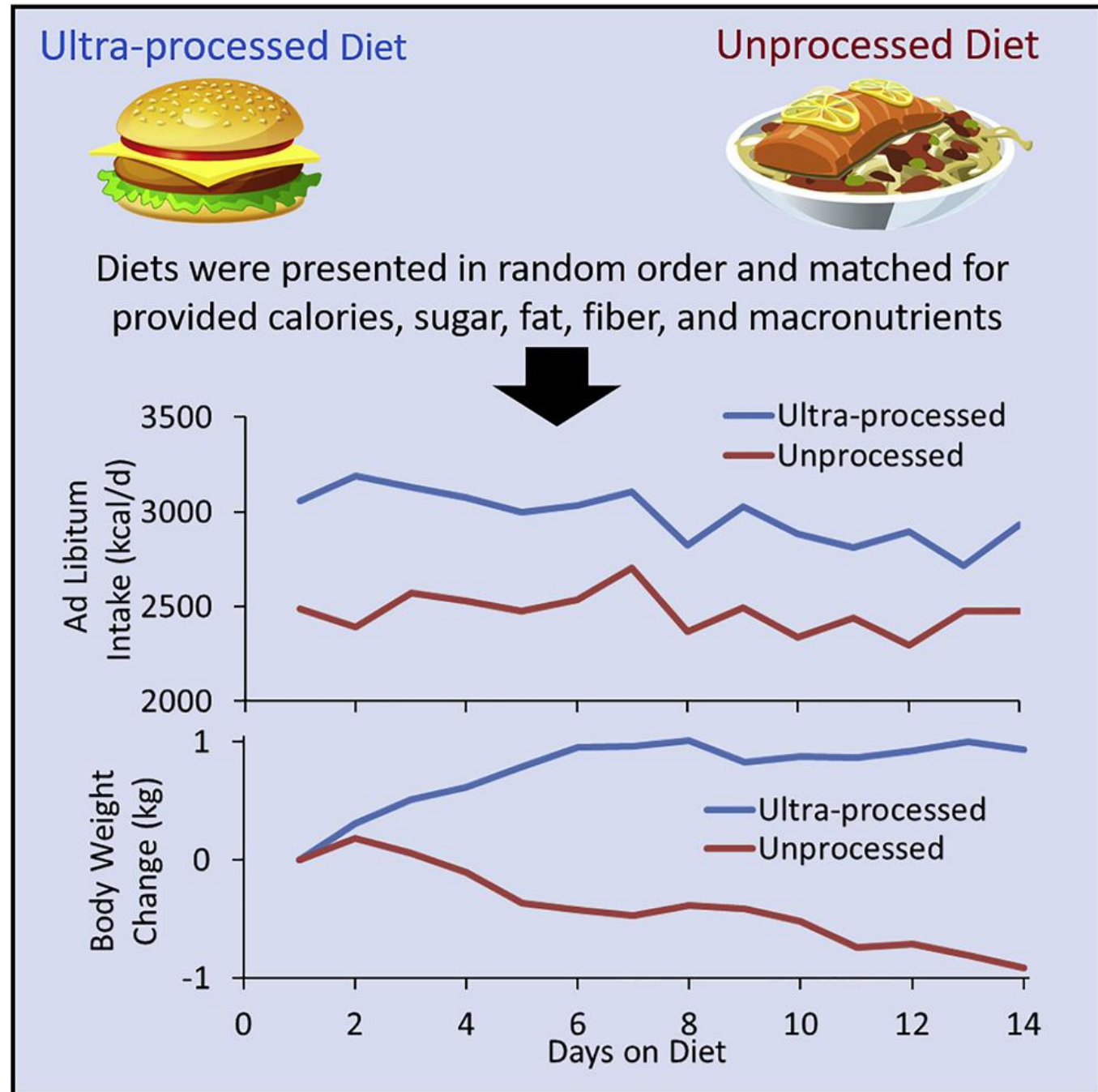
2. Mahapatra A. Overeating, obesity, and dopamine receptors. *ACS Chem Neurosci*. ;1(5):346–347. doi:10.1021/cn100044y

3. Schulte EM, Avena NM, Gearhardt AN (2015) Which Foods May Be Addictive? The Roles of Processing, Fat Content, and Glycemic Load. *PLoS ONE* 10(2): e0117959.

Modern Ultra-processed Food Make Us Eat More and Make Us Fat

- 20 healthy volunteers (10 male, 10 female)
- 2 weeks on unprocessed meals, 2 weeks on ultra-processed meals
- Meals had same amount of calories, sugars, fiber, fat and carbohydrates.
- Participants could eat as little or as much as they desired.
- When on ultra-processed diet, participants ate 500 cal/day more. They also ate faster and gained weight (1 lb/week)
- When on unprocessed diet, participants ate less and lost weight (1 lb/week)

Source: Hall KD, et al. Ultra-processed diets cause excess calorie intake and weight gain: A one-month inpatient randomized controlled trial ad libitum food intake. *Cell Metabolism*. May 16, 2019.



Lunch in 2019?

Double Quarter Pounder w/ Cheese	780 cal
Large Fries	510 cal
<u>Large Coke</u>	<u>290 cal</u>
Total	1580 cal



Fast Food and Insulin Resistance

- Isganaitis E, Lustig RH (December 2005). "Fast food, central nervous system insulin resistance, and obesity". *Arteriosclerosis, Thrombosis, and Vascular Biology*. **25** (12): 2451–62.
 - Fast food meals combined with sugary drinks possess several characteristics, all of which have independently been linked to IR:
 - They are sugar rich, palatable, and cheap - increasing risk of overeating and leptin resistance
 - They are high in dietary fat and fructose, and low in omega-3 and fiber
 - They usually have high glycemic indices.
 - Overconsumption of cheap sugar-rich meals and beverages have been proposed as a fundamental factor behind the metabolic syndrome epidemic and all its constituents.

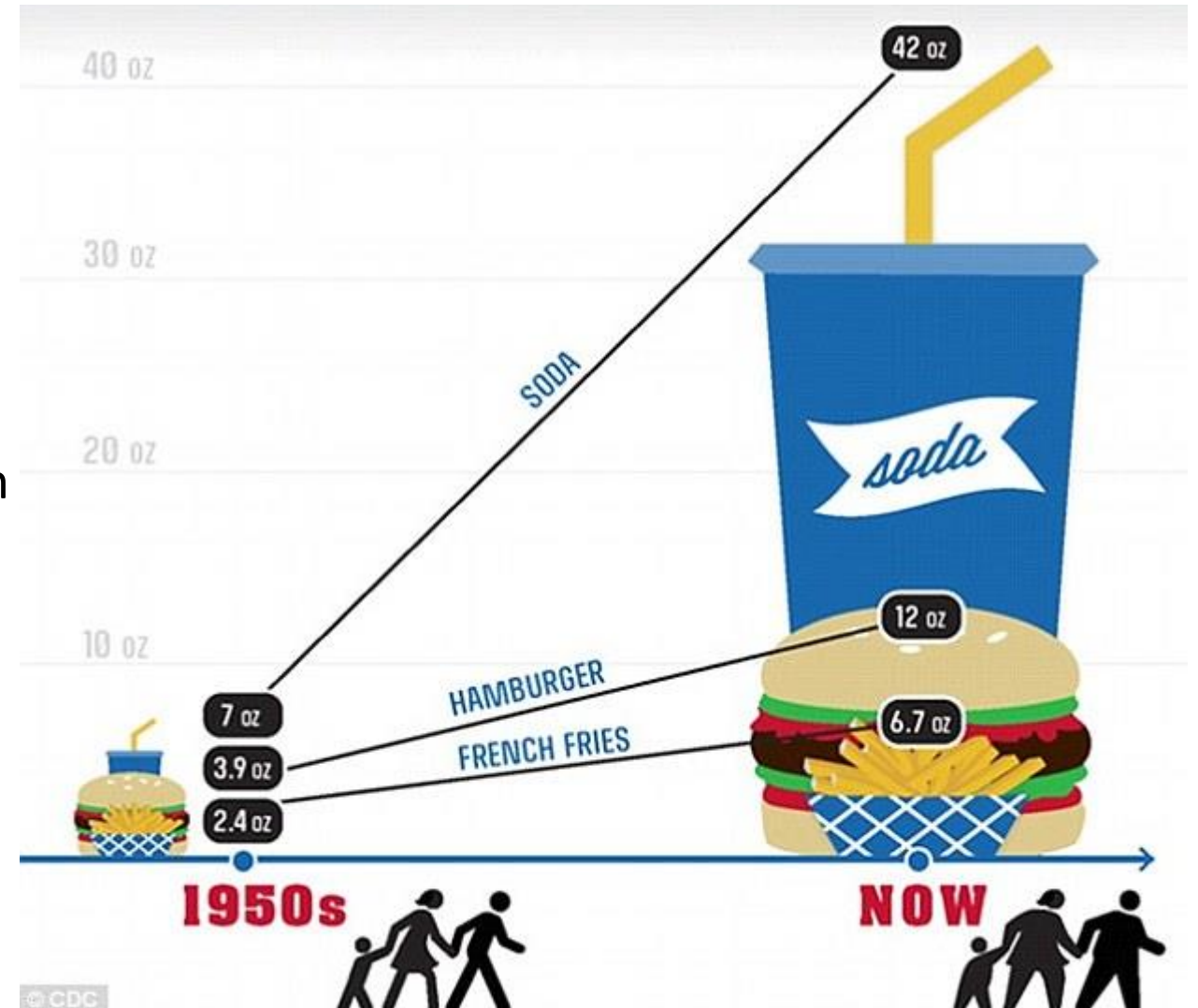
It's not just fast food...

- According to the American Heart Association, today's restaurant portions in general are a full 4 times larger than they were in the 1950's.



Larger portions: When did bigger become better?

- **PORTION SIZES BY NUMBERS**
- **1,233** Percentage increase of size of a chocolate bar since early 1900s
- **223** Percentage increase of size of a burger since the 1950s
- **500** Percentage increase of size of a fountain soda since the 1950s
- **4.56** Increase in size of restaurant portion compared to the 1950s
- **28** Increase in number of pounds of average weight of a man since the 1960s
- **24.5** Increase in number of pounds of average weight of a woman since the 1960s



Larger portions: When did bigger become better?

- Somewhere in the 1970's, we decided bigger was better.
- Since the 1970s, the food service industry has grown larger, and people have been eating out more; marketing has become more concentrated, and larger numbers of new products have been introduced.
- Widespread price competition has induced manufacturers to introduce larger items in order to retain and expand market share; profits for most food items rise consistently when manufacturers increase product size.
- From a marketing standpoint, oversized packages draw attention to a new product, as research has shown for beer, soft drinks, and fast food.
- Concern about value also drives the food service industry to offer larger products; many restaurant owners report that customers want more food for their money, and consumers increasingly choose restaurants because of the sizes of food portions.
- Large portions often seem like a bargain: 7-Eleven's 16-oz Gulp costs just under 5 cents/oz, but a 32-oz Big Gulp is 2.7 cents/oz

Source: Young LR, Nestle M. The contribution of expanding portion sizes to the US obesity epidemic. *Am J Public Health*. 2002;92(2):246–249.
doi:10.2105/ajph.92.2.246

Supersize Me.

- Luckily, McDonald's phased out the Supersize menu in 2004, but it is still worth examining as overall fast food portions continue to grow.
- In the mid-1950s, McDonald's offered only 1 size of french fries; that size is now considered "Small" and is one third the weight of the largest size available in 2001.
- Today's "Large" weighs the same as the 1998 "Supersize," and the 2001 "Supersize" weighs nearly an ounce more.
- Since 1999, a McDonald's "Supersize" soda is nearly one third larger than the "Large."
- Notably, the sizes of chain fast-food portions in Europe are smaller than those in the United States.
- McDonald's "Extra Large" soda portions in London, Rome, and Dublin weigh the same as the US "Large." In 1998–1999, the largest order of french fries in the United States contained 610 calories



Source: Young LR, Nestle M. The contribution of expanding portion sizes to the US obesity epidemic. *Am J Public Health*. 2002;92(2):246–249. doi:10.2105/ajph.92.2.246

Fish Tacos or a Salad? Both healthy, right?

- On The Border® – Dos Equis® Fish Tacos w/ Rice and Black Beans
- 1,980 calories, 103g fat
- 4,700mg sodium



- Chik-Fil-A® – Cobb Salad w/ Avacado-lime Dressing
- 820 calories, 59g fat
- 1,880mg sodium
- The dressing has as many calories as the Grilled Chicken Sandwich!



Bet you didn't know it was *this* bad!

- Uno Pizzeria® - Deep Dish *Individual* Chicago Fire Pizza
- 2,400 calories, 168g fat
- 3,880mg sodium
- Sonic® – Large Oreo® Shake
- 1430 calories, 73g fat
- 1090mg sodium

EST. 1943
UNO
PIZZERIA & GRILL

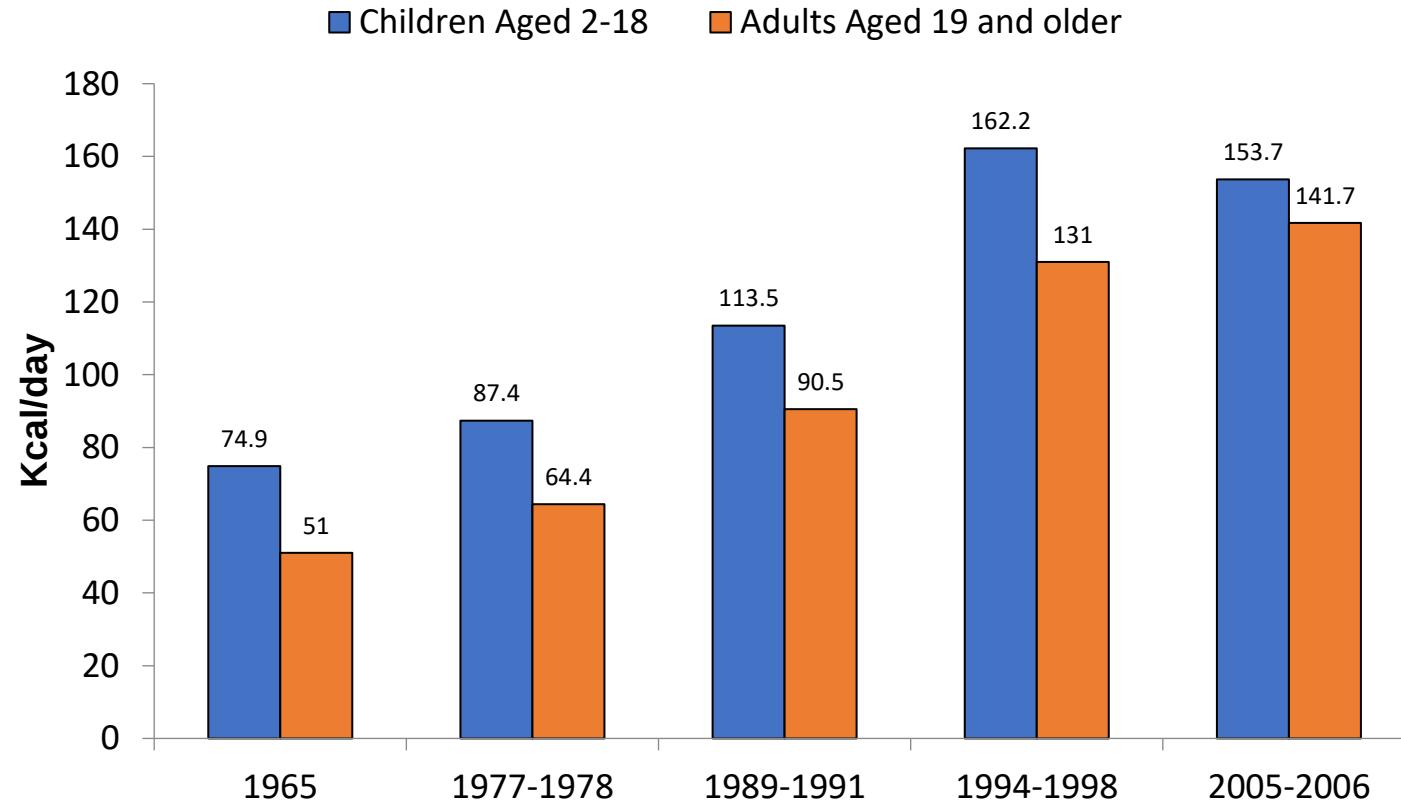


(Don't) Do the Dew!

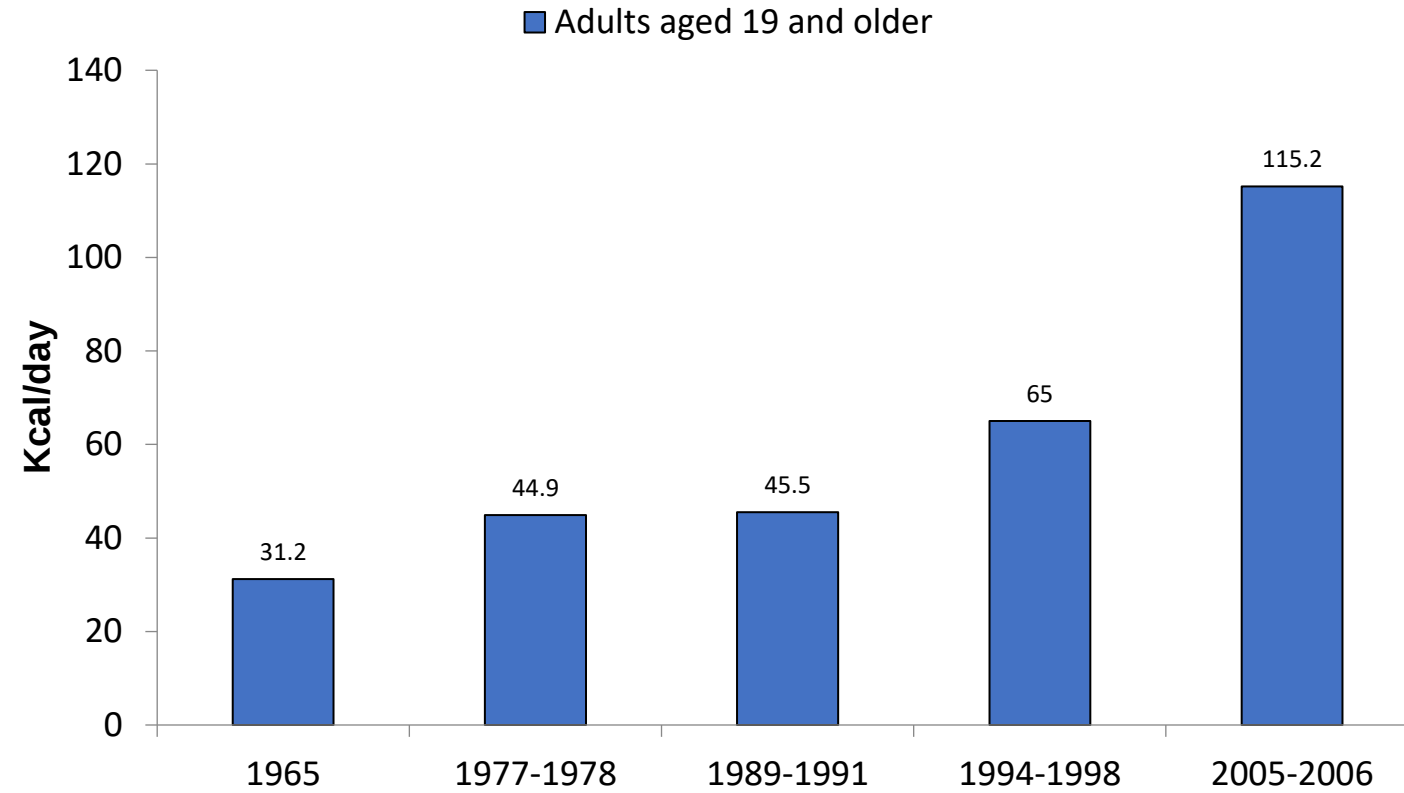
- Mountain Dew® 20oz (590mL)
 - Sugar: 77g
 - Calories: 290
 - Calories from sugar: 290
- US Dietary Guidelines (health.gov) recommends total sugars of no more than 50g/day.
- American Heart Association recommends *added sugar* of no more than 37.5g/day for men and 25g/day for women.
 - (4g of sugar = 1 teaspoon)



Sugar-sweetened beverage Consumption Trends (Soda/Fruit Drinks) (kcal/day), Nationally Representative

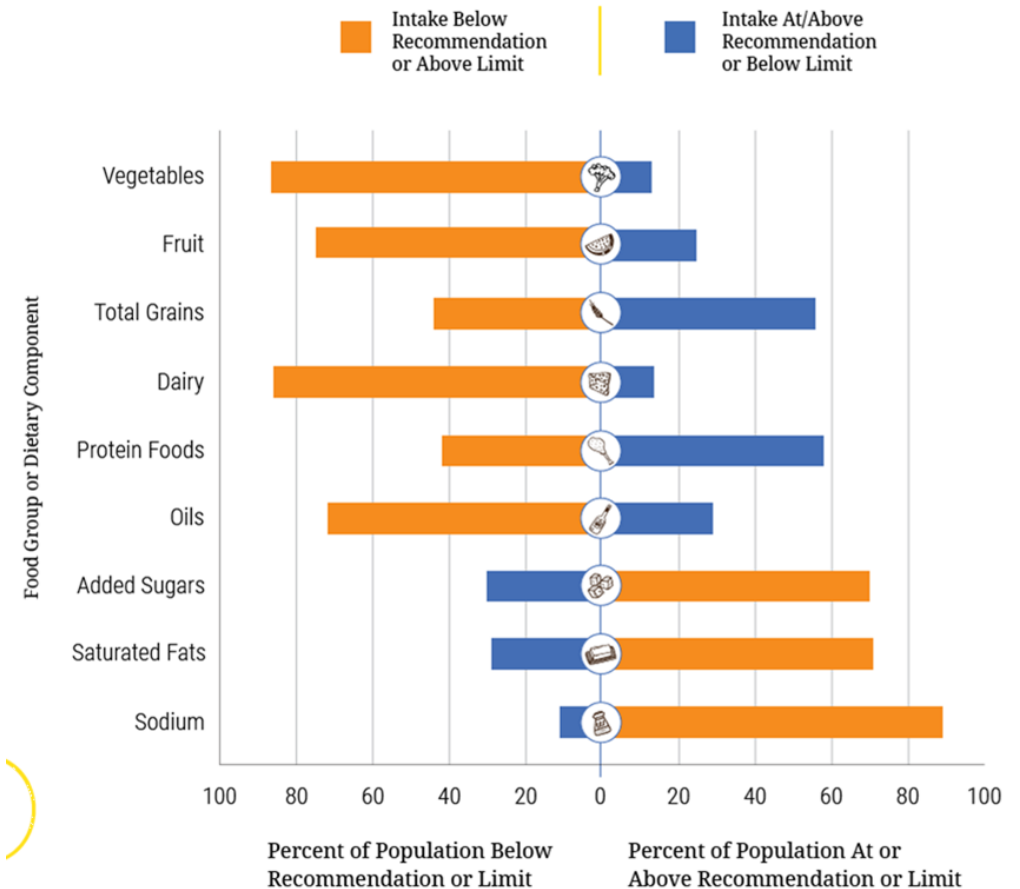


Alcohol Consumption Trends(kcal/day), Nationally Representative



Dietary Intakes Compared to Recommendations. Percent of the U.S. Population Ages 1 Year and Older Who Are Below, At, or Above Each Dietary Goal or Limit

- Vegetables: 87% have intakes below the goal
 - Fruit: 75% have intakes below the goal
 - Total Grains: 44% have intakes below the goal
 - Dairy: 86% have intakes below the goal
 - Protein Foods: 42% have intakes below the goal
 - Oils: 72% have intakes below the goal
 - Added sugars: 70% have intakes above the limit
 - Saturated fats: 71% have intakes above the limit
 - Sodium: 89% have intakes above the limit.
- Sources: What We Eat in America, NHANES 2007-2010 for average intakes by age-sex group. Healthy U.S.-Style Food Patterns, which vary based on age, sex, and activity level, for recommended intakes and limits.



Toxic Vs. Healthy Food Environments

- **Family meals.** Families eating meals together has been linked with higher intake of fruits and vegetables.¹
- **Work.** Worksites often provide easy access to unhealthy foods in vending machines.²
- **School.** While most meal program foods trend away from junk food, most schools sell soda and junk food in the cafeteria and vending machines. At least 40% of students purchase these items one a given day.^{3,4}
- **Neighborhoods.** Millions of people in low-income, urban neighborhoods have no access to supermarkets.⁵
- **Fast Food.** Fast-food restaurants are more likely to locate near schools, and close proximity of fast-food restaurants to schools has been linked to increased risk of obesity in schoolchildren.^{6,7}

1. Larson NI, Neumark-Sztainer D, Jannan PJ, Story M. Family meals during adolescence are associated with higher diet quality and healthful meal patterns during young adulthood. *J Am Diet Assoc.* 2007; 107:1502-10.
2. Shimotsu ST, French SA, Gerlach AF, Hannah PJ. Worksite environment physical activity and healthy food choices: measurement of the worksite food and physical activity environment at four metropolitan bus garages. *Int J Behav Nutr Phys Act.* 2007; 4:17.
3. Fox MK, Gordon A, Nogales R, Wilson A. Availability and consumption of competitive foods in US public schools. *J Am Diet Assoc.* 2009; 109:S57-66.
4. Larson N, Story M. Are 'competitive foods' sold at school making our children fat? *Health Aff (Millwood)*, 2010. 29(3):430-5.
5. Powell LM, Slater S, Mirtcheva D, Bao Y, Chaloupka FJ. Food store availability and neighborhood characteristics in the United States. *Prev Med.* 2007; 44:189-95.
6. Austin SB, Melly SJ, Sanchez BN, Patel A, Buka S, Gortmaker SL. Clustering of fast-food restaurants around schools: a novel application of spatial statistics to the study of food environments. *Am J Public Health.* 2005; 95:1575-1.
7. Davis B, Carpenter C. Proximity of fast-food restaurants to schools and adolescent obesity. *Am J Public Health.* 2009; 99:505-10.

Why are we so overweight?

- Experts debate society's role, but there are societal triggers:
 - Increased availability of a variety of palatable and affordable foods;
 - Decreased physical demands of many jobs;
 - Increased "screen time" – television, computers and smart phones;
 - “Nutritional programming” -- overweight and obese mothers who may be increasing their unborn child's risk of obesity;
 - Changes in sleep patterns and stress;
 - Possible changes in the bacteria in the digestive track;
 - The temperature of our houses and workplaces.

Source: American Heart Association

Why are we so overweight?

- Recent studies show that obese individuals have less ability to resist food cues.
- Stress, mildly low blood sugar and other factors also play a role.
- Adding to the challenge, trying to eat less magnifies the body's appetite regulating signals; when you start to lose weight, appetite is amplified and satiety is decreased. This is why losing weight is so incredibly difficult!



Source: American Heart Association

The Positive Body Image Movement

- Is the Body-Positive movement really a good thing?
- What feeds the soul, may endanger the body.
- The proportion of individuals with overweight and obesity misperceiving their weight status increased over time between 1997 and 2015 (37% to 40% in men; 17% to 19% in women).¹
- Those underestimating their overweight and obesity status were 85% less likely to try to lose weight compared with people who accurately identified their weight status.¹

1. Muttarak M. Normalization of Plus Size and the Danger of Unseen Overweight and Obesity in England *Obesity* (2018) 26, 1125–1129. doi:10.1002/oby.22204

Where do we go from
here?

Where are we going?

- >1 in 10 U.S. adults has diabetes now.
- 1 in 3 US kids will develop diabetes.¹
- According to CDC projections²
 - DM prevalence is expected to triple by the year 2050 due to:
 - Aging population more likely to develop DM II
 - Increases in high risk minority groups
 - People with diabetes living longer

1. American Diabetes Association 63rd Scientific Sessions, New Orleans, June 13-17, 2003; K.M. Venkat Narayan, MD, Chief of Diabetes Epidemiology Section, CDC; Judith Franklin, MD, Director of Diabetes, Endocrinology and Metabolic Diseases, NIDDK.
2. Boyle JP, et al. Projection of the year 2050 burden of diabetes in the US adult population: dynamic modeling of incidence, mortality, and prediabetes prevalence. *Population Health Metrics* . 2010, 8: p29.

A woman with dark hair is lying down, her head resting on her hand. She has a weary or sad expression. In the foreground, a large burger with a sesame seed bun, cheese, tomato, and a meat patty is visible. A semi-transparent circular overlay contains text.

“Jeez...just lose weight already.”

- *Much* easier said than done; it isn't simply a matter of will power/self control.
- The drivers behind obesity are both physical and psychological. Addiction is a disease and it impacts the psyche and emotions just as it does physically.

Just *trying* to lose weight helps!

- *Weight* and *health* are not synonyms.
- Many people in the body positivity movement believe that the desire to lose weight is never legitimate, because it is an expression of the psychological toll of fat shaming.
- Overweight diabetic adults trying to lose weight have a reduced risk of all-cause mortality, independent of whether they lose weight. Actual weight loss is associated with increased mortality only if the weight loss is unintentional.¹

1. Gregg EW, Gerzoff RB, et al. Trying to Lose Weight, Losing Weight, and 9-Year Mortality in Overweight U.S. Adults With Diabetes. Diabetes Care 2004 Mar; 27(3): 657-662.

Certified Diabetes Educators

1. Mississippi^{1,4}

- 371,662 residents with DM (15.4%)
- 810,000 residents with pre-diabetes (37.5%)
- 149 Certified Diabetes Educators

2. West Virginia^{2,4}

- 255,695 residents with DM (15.3%)
- 518,000 residents with pre-diabetes (35.9%)
- 111 Certified Diabetes Educators

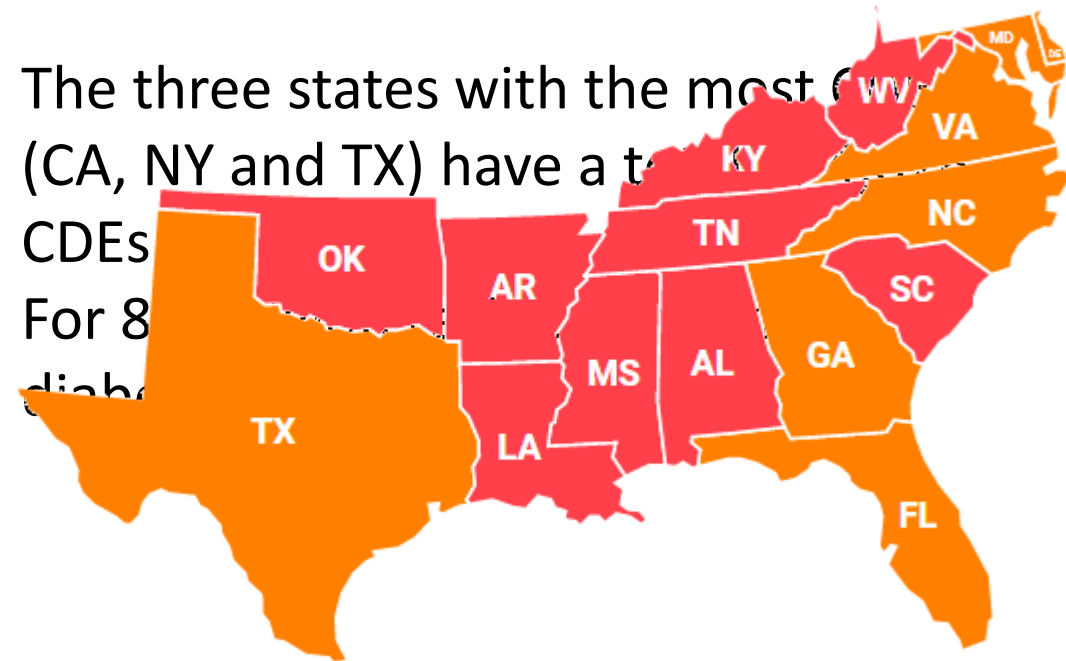
3. Alabama^{3,4}

- 610,458 residents with DM (15.2%)
- 1.3 million residents with pre-diabetes (37%)
- 198 Certified Diabetes Educators

- Only 19,283 CDE in US⁴

Percent of adults with diabetes

■ 0 - 3.9% ■ 4 - 7.9% ■ 8 - 11.9% ■ 12 - 15.9% ■ 16%+



- The three states with the most CDEs (CA, NY and TX) have a total of 1,100 CDEs
- For 8 states with the highest percent of adults with diabetes

Sources:

1. ADA – The Burden of Diabetes in West Virginia (2017)
2. ADA – The Burden of Diabetes in Mississippi (2017)
3. ADA – The Burden of Diabetes in Alabama (2017)
4. National Certification Board for Diabetes Educators – 2016 Count of DCEs by state and other statistics

Healthcare and Insurance Coverage

- Although evidence-based treatments, such as obesity medications, bariatric surgery, and medical weight management programs, are both cost- and clinically effective in treating obesity and reducing comorbidities, they are not considered essential health benefits in many states under the Patient Protection and Affordable Care Act (ACA)
- The ACA requires coverage for obesity screenings and counseling but allows states discretion in covering nonessential benefits. Indeed, minimal coverage for evidence-based obesity treatments and general exclusions for obesity care have persisted despite the obesity epidemic's increasing magnitude and societal costs.
- More than half of U.S. states do not provide health insurance coverage for bariatric surgery or weight loss programs, and only four states cover both treatments. Of particular concern is that many states that do not require coverage of bariatric surgery are also the ones with the highest obesity rates within the United States, such as Louisiana and Texas.
- Many insurers give employers breaks on premiums if they provide wellness programs. However, there is virtually no evidence that wellness programs have any effect of obesity.

Source: Wilson ER, Kyle TK, Nadglowski JF Jr, Stanford FC. Obesity coverage gap: Consumers perceive low coverage for obesity treatments even when workplace wellness programs target BMI. *Obesity (Silver Spring)*. 2017;25(2):370–377. doi:10.1002/oby.21746

Healthcare and Insurance Coverage

- Wilson ER, Kyle TK, Nadglowski JF Jr, Stanford FC. Obesity coverage gap: Consumers perceive low coverage for obesity treatments even when workplace wellness programs target BMI. *Obesity (Silver Spring)*. 2017;25(2):370–377.
- Surveyed 17,565 U.S. adults
 - Coverage for bariatric surgery: 22%
 - Coverage for obesity medications: 19%
 - Coverage for dietician/nutritionist: 29%
 - Coverage for medical weight management programs: 23%

Equality



Equity



Your Impact

- Teach your children well.
- Start small – your family, your friends, your patients
- Go forth and educate!



The End

