



The Six Pillars of Lifestyle Medicine and a Deeper Dive into Plant-based Eating

Bonnie S. Coyle, MD, MS

Epidemic

- Healthcare in US costs \$3.3 trillion annually
- 90% of these costs are attributed to the treatment of chronic conditions = Pills and Procedures
- Lifestyle Medicine addresses the **root cause** to both improve health & reduce costs

Chronic Disease in U.S.

Problem



6 in 10 Americans have a **Chronic Disease**



4 in 10 Americans have **2 or more** Chronic Diseases



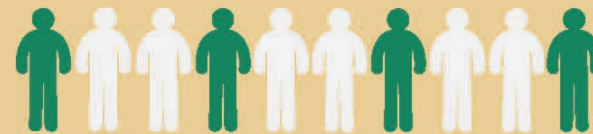
38% of Americans will be diagnosed with **Cancer** during their lifetimes



Half of all Americans have **Cardiovascular Disease**



Chronic diseases - heart disease, cancer, diabetes, stroke, & Alzheimer's are the leading causes of disability and death



1 in 3 Americans have Pre-Diabetes

88 Million
34 Million

Americans have Pre-Diabetes | 90% do NOT know it

people live with Type 2 Diabetes

72% of Americans with Overweight or Obesity

36 million men and 29 million women with overweight

32 million men and 36 million women with obesity





This didn't use to be a “Thing.”

- Obesity/Gastric Bypass Surgery
- Overweight/Obese children
- Teens/young adults with prediabetes or diabetes Type 2
- Fatty Liver disease due to diet
- Overdoses
- Esophageal CA due to acid reflux



Six Pillars of Lifestyle Medicine

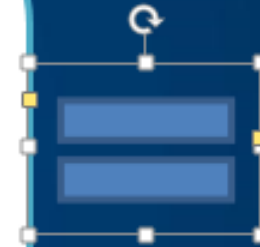


Blue Zones



Does this describe you:

1. Non-smoker
2. Healthy weight
3. Five Fruits & Veggies/day
4. Exercise 30 min/day five times/wk



80% reduction
in chronic
diseases

Less Than 3 Percent of Americans Live a 'Healthy Lifestyle'

Statistics from a Mayo Clinic study

Mayo Clinic researchers looked at data from a representative sample of 4,745 people who participated in the National Health and Nutrition Examination Survey.

They found that less than 3 percent of Americans live a "Healthy Lifestyle" defined by four qualifications:

1. Moderate or vigorous exercise for at least 150 minutes a week
2. A diet score in the top 40 percent on the Healthy Eating Index
3. A body fat percentage under 20 percent (for men) or 30 percent (for women)
4. Not smoking



Pillar 1 - Healthful Eating of Whole, Plant-based Food

What is a whole foods, plant-based (WFPB) diet?

- **Whole foods:** Single ingredient foods, unprocessed or minimally processed, as they exist in nature
- **Plant-based:** In its broadest sense, >95% of calories coming from fruits, vegetables, whole grains, and legumes



Fact: More than 80 percent of Americans fail to eat the recommended amounts of fruits and vegetables.

75 Percent of Americans Say They Eat Healthy — Despite Evidence To The Contrary

NPR poll conducted with Truven Health Analytics, which surveyed a nationally representative sample of 3,000 U.S. adults in May. 2016.

One question they asked: How healthy would you consider your eating habits to be? About 75 percent of respondents ranked their diets as good, very good or excellent.

Pillar 2 - Increase Physical Activity

- **Types of Exercise**
 - Aerobic (cardiovascular)
 - Strength
 - Flexibility
 - Balance
- Activities of daily living - Not sitting!



Physical Activity

- Physical Activity Guidelines for Americans and Exercise is Medicine guidelines from American College of Sports Medicine are good resources
- Recommendations for adults 18-64 years old: at least 150-300 minutes of moderate intensity, or 75-150 minutes of vigorous activity weekly along with two or more days weekly of strength training
- Only 24% of Americans achieve
- 25.4% of Americans are inactive





Pillar 3 - Improve Your Sleep

Performance is typically best with 7-8 hr/night. Factors to consider:

- Stress
- Substance use (caffeine, alcohol)
- Timing of meals
- Medication side effects
- Sleep environment





Sleep

- National Sleep Foundation recommends 7-9 hours of sleep a day for most adults
- 1 in 3 adults do not get enough sleep
- Suspect sleep deprivation in any adult with a clinical complaint of daytime hypersomnolence who reports consistently getting less than 7 hours of sleep per night
- Nurses and other essential workers who get < 7 hours sleep/night have increased risk of burnout
- Sleeping < 6-8 hours a night increases risk of early death by ~12 percent





Pillar 4 - Manage Stress

Stress Management

- Meditation
- Releasing
- Replacing

Nature Therapy

- Sunshine
- Fresh air

Rest & Renewal

- Each moment
- Daily
- Weekly
- Annually





Stress Management

- Stress defined as “any demand for change.”
- Stress response is a cascade of physiological events that can lead to improved health and productivity or to anxiety, depression, obesity, immune dysfunction and poor health outcomes
- Assisting patients to recognize maladaptive stress responses and transform them into responses that improve health and well-being is an essential part of LM practice at all levels.



Pillar 5 - Form and Maintain Relationships

Social Support

- Family
- Friends
- Groups & networks

Spiritual Support

- Prayer
- Presence
- Community





Social Connection

- Humans are social beings - need for social connection is a basic survival urge hardwired into our nervous systems
- Social relationships are as important to health as diet, exercise and smoking habits. In fact, the quality of our relationships may determine whether or not we choose to engage in healthy lifestyle behaviors – [the Rosetto effect](#)

Unhealthy social relationships, isolation and loneliness are associated with increased mortality and morbidity especially among individuals with established lifestyle-related diseases



Pillar 6 - Avoid Tobacco and Other Exposures

Dangerous exposures may include:

- Tobacco
- Alcohol
- Illicit drugs
- Pollutants
- Chemicals & preservative





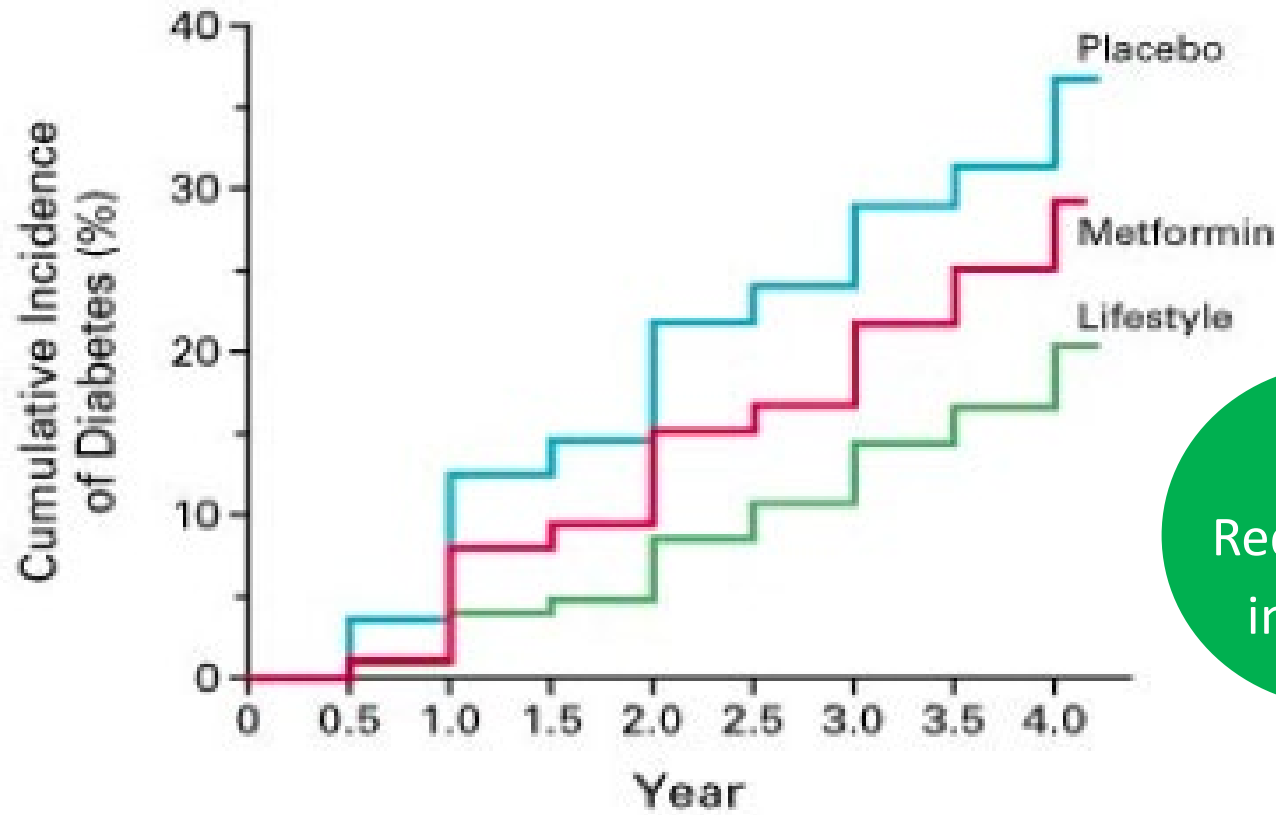
Substance Use

- Addiction is a chronic disease characterized by compulsive, or uncontrollable use of a substance or behavior despite harmful consequences
- Over 40 million Americans meet clinical criteria for addiction to nicotine, alcohol or other drugs
- Another 80 million may not be addicted but are risky users - more than number of people with cancer, diabetes or hypertension
- Presence of an addiction or risky use doubles risk of overdose, motor vehicle crashes, traumatic injuries and chronic conditions, such as arthritis, chronic pain, hypertension, heart disease, stroke, diabetes, and asthma



Lifestyle change has the power to prevent disease

Diabetes Prevention Program



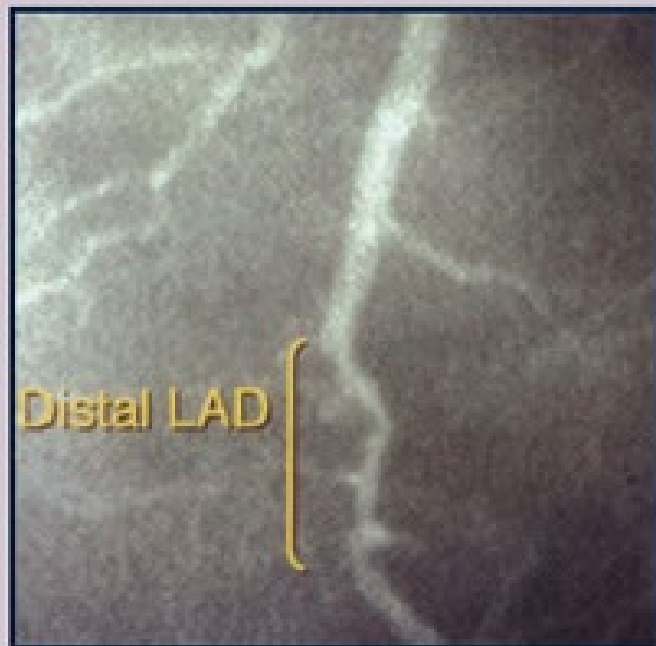
58%
Reduction in
incidence

***Real Life Example
of Lifestyle
Medicine***

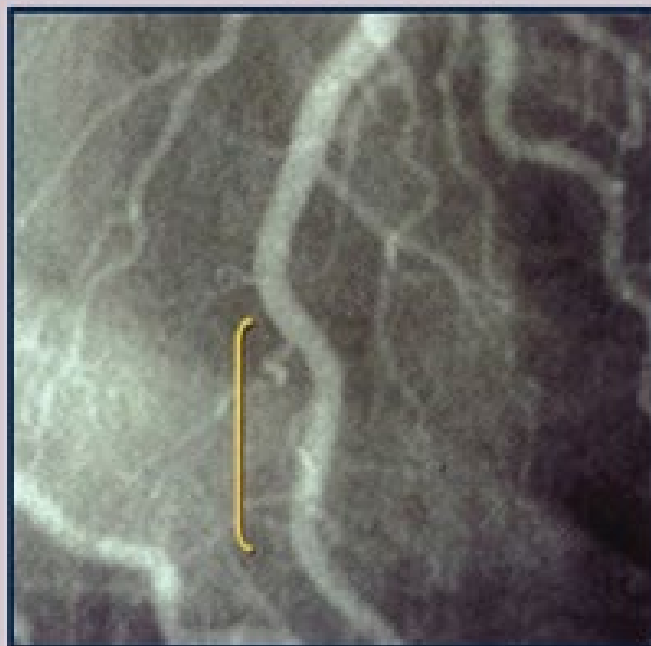


Reversal of Coronary Disease Achieved with Plant-Based Diet

1996



1999



**Lifestyle change has
the power to reverse
disease**

Coronary angiograms of the distal left anterior descending artery before (left bracket) and after (right bracket) 32 months of a plant-based diet without cholesterol-lowering medication, showing profound improvement. Used with permission from Dr. Caldwell B. Esselstyn, Jr. (Source: *Prevent and Reverse Heart Disease* by Dr. Esselstyn.)



A Deeper Dive into Plant-based Nutrition



Food and health

- It is estimated that nearly one half of all death due to heart disease, stroke, and type-2 diabetes in the United States are linked to diet and poor nutrition
 - JAMA March 2017
- This makes diet the largest risk factor (root-cause), overtaking other causes such as tobacco, for driving chronic disease rates and death in the U.S.

Food as medicine

- Goes **beyond healthy eating** for preventing disease and promoting general wellness
- It is food used along with (or in some cases without medicines or surgery) as a **prescribed intervention**, for the treatment and cure of many diseases, thereby placing it within an accepted standard of care.

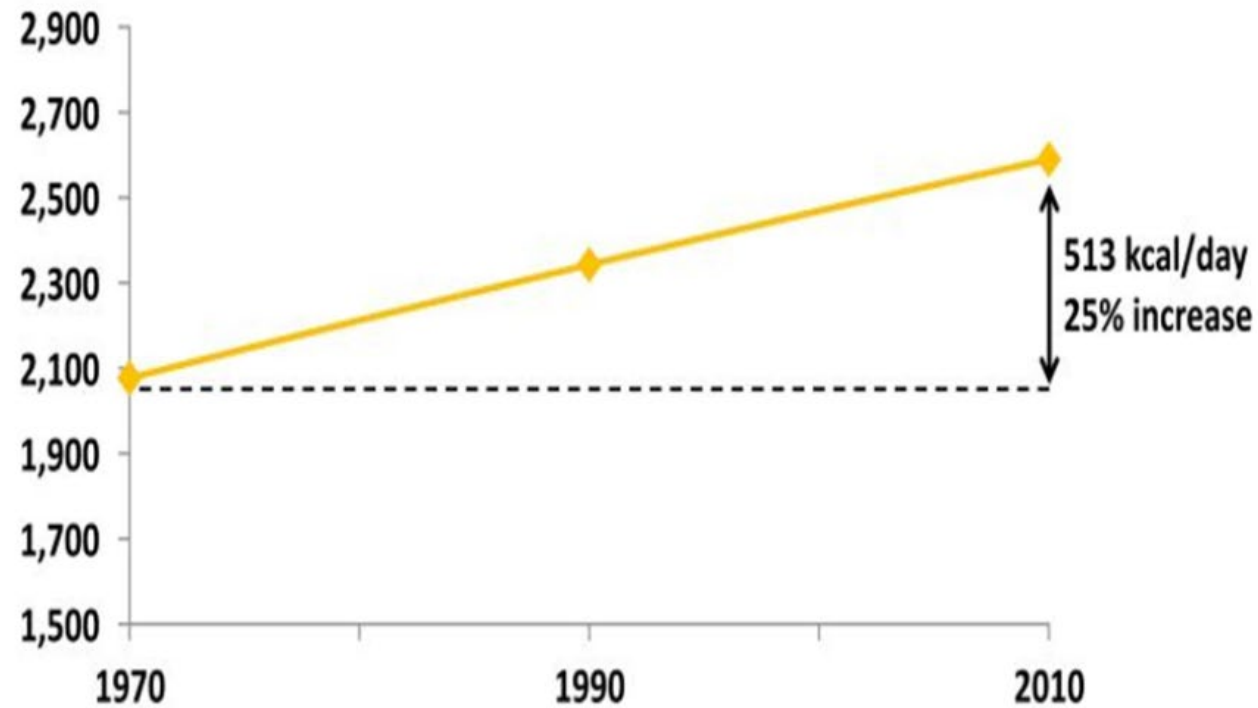
If a poor diet *caused* the problem...



A healthy diet can *correct* the problem

US Food Trends

25% Increase in Calories Since 1970 Average U.S. Daily Calorie Intake

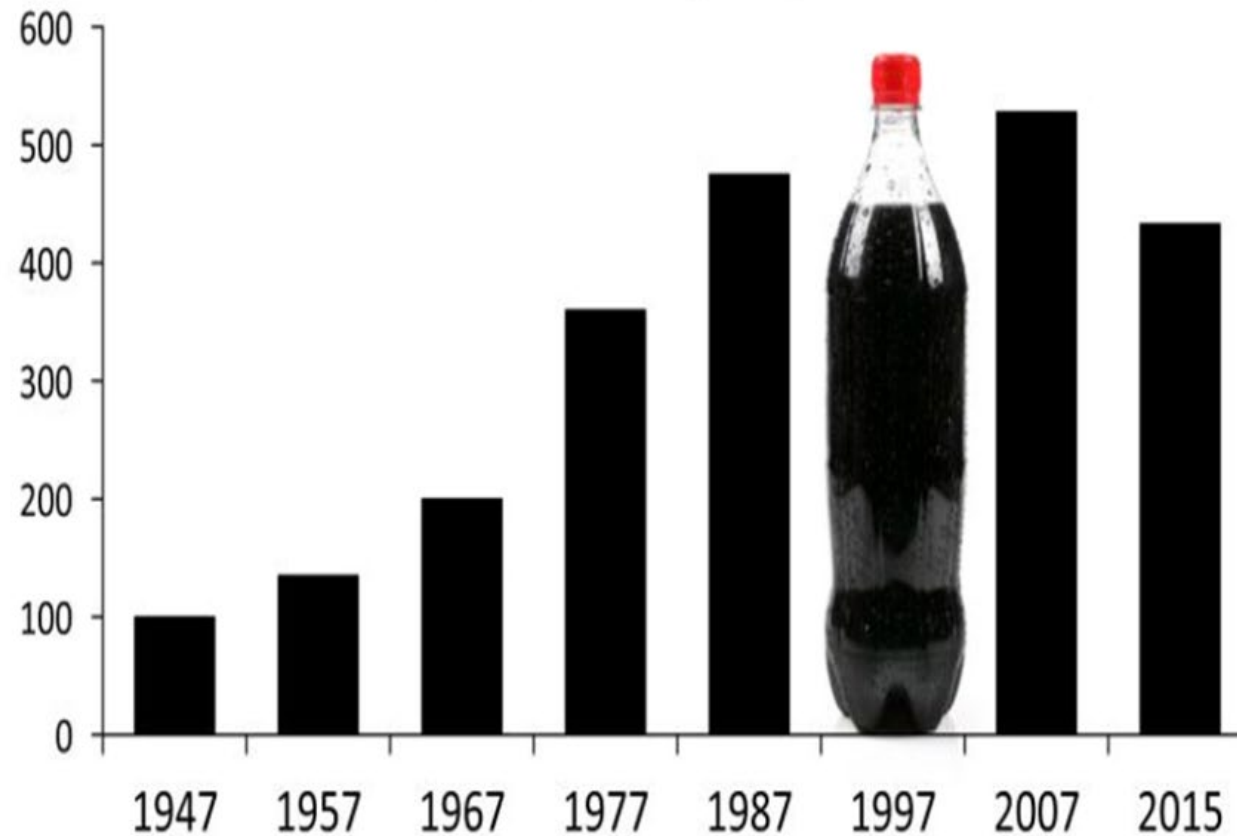


Source: United States Department of Agriculture, Economic Research Service Food Availability (Per Capita) Data System, Loss-Adjusted Food Availability



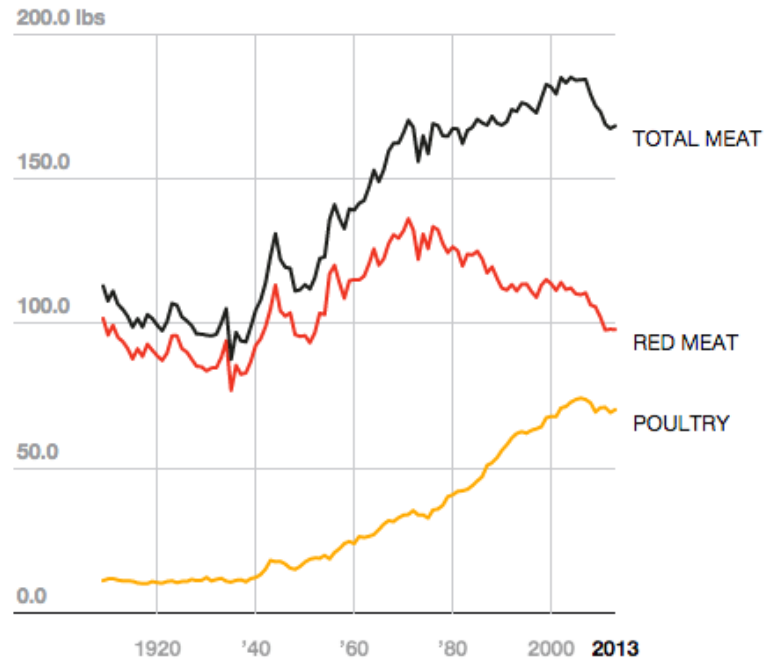
US Food Trends

U.S. Annual Soft Drink Consumption 12-ounce cans per person



US Food Trends

Annual total U.S. meat consumption, pounds per capita

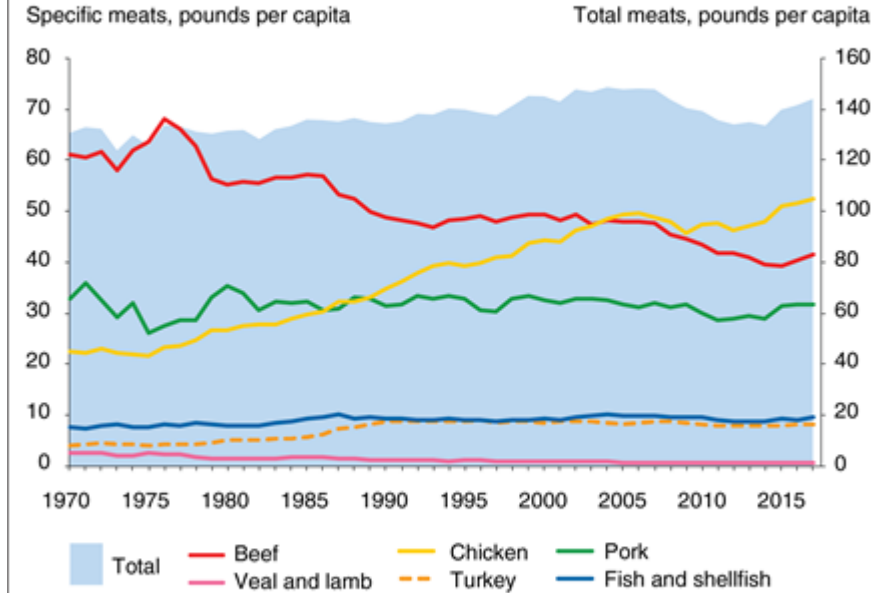


NOTE: The USDA uses meat available in our food supply, minus estimated loss at the retail and consumer levels, as a proxy for consumption.

Source: U.S. Department of Agriculture

FORTUNE

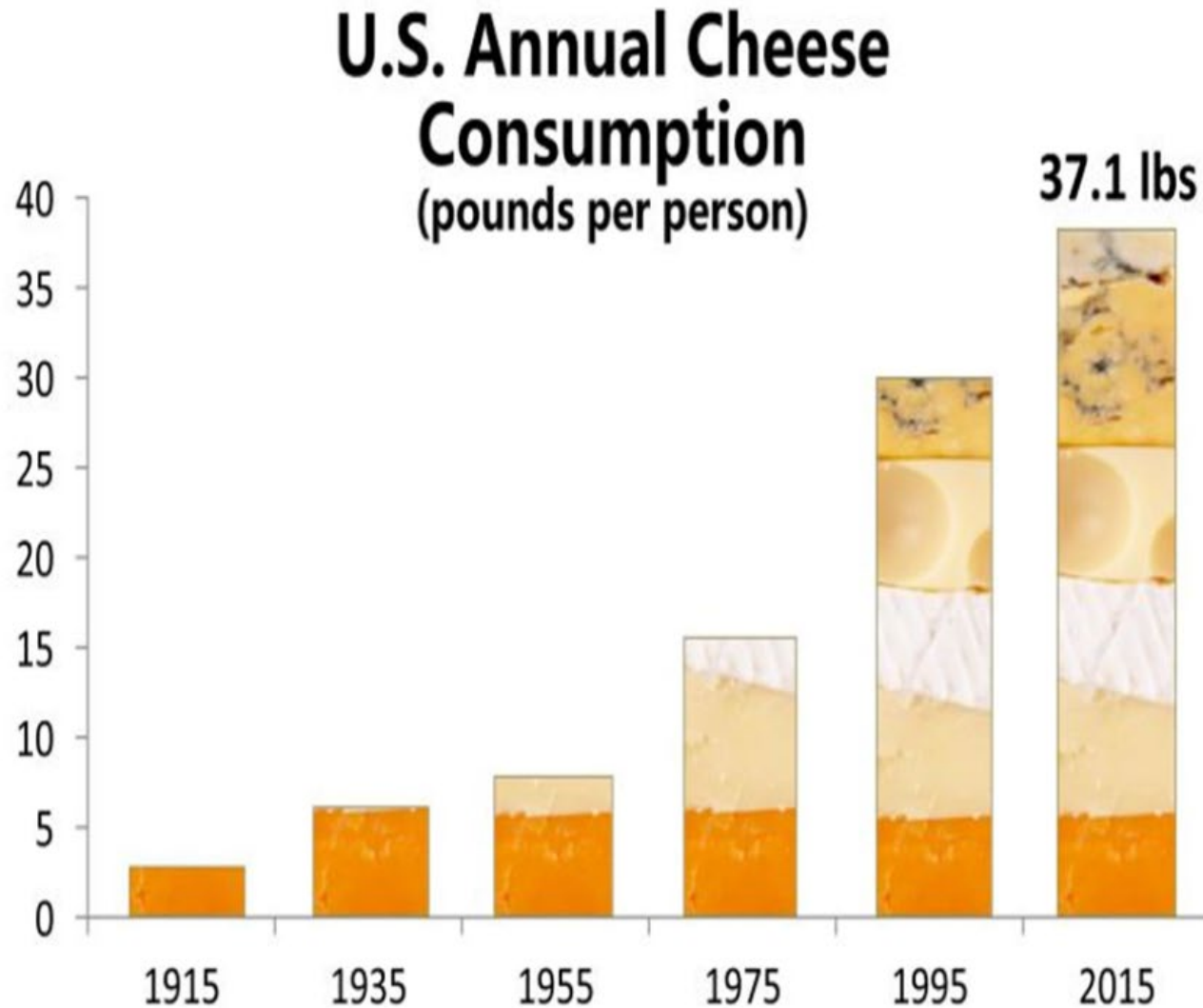
Loss-adjusted supplies of red meat, poultry, and seafood available for U.S. consumption, 1970-2017



Source: USDA, Economic Research Service using loss-adjusted food availability data from its Food Availability (Per Capita) Data System.



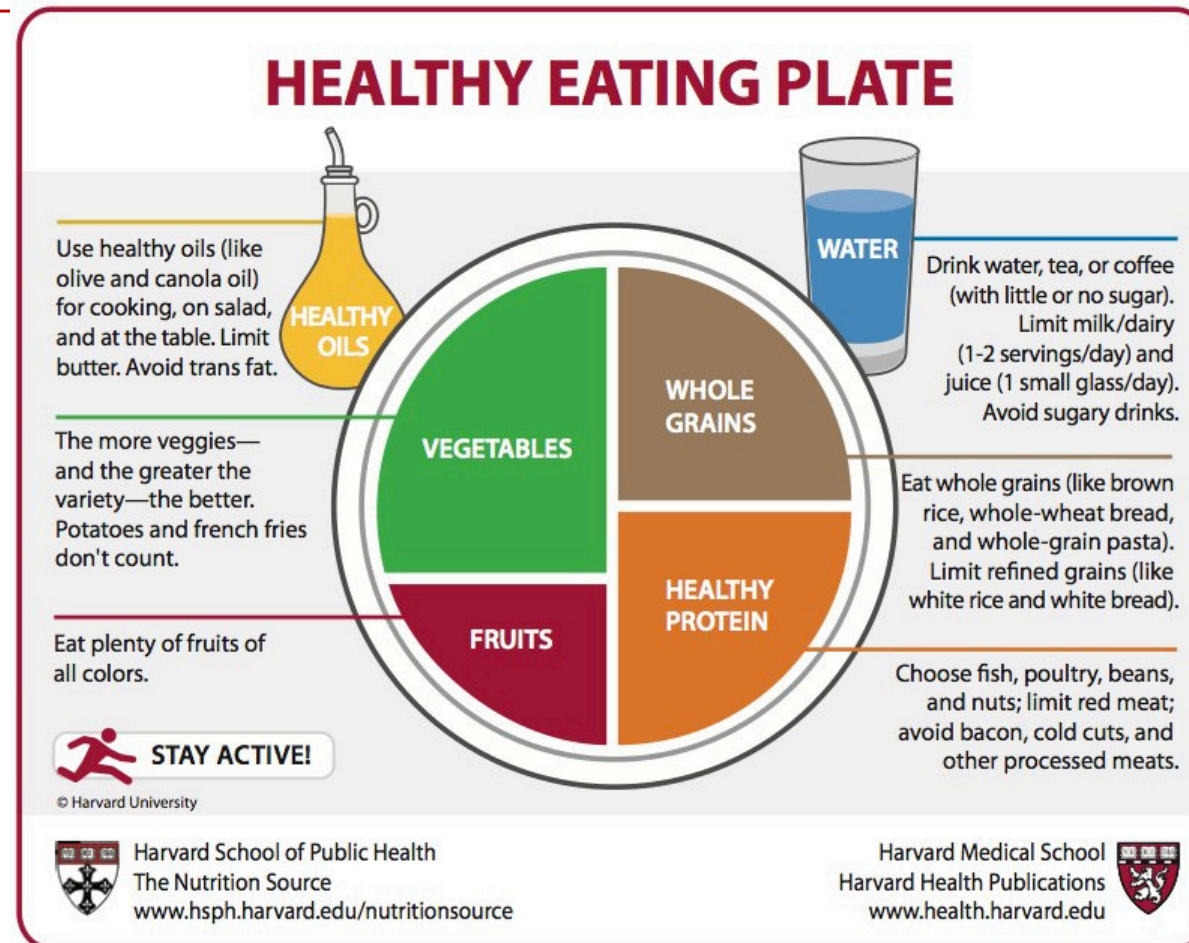
US Food Trends



<http://media.eatwisconsincheese.com/dairyimpact/statistics/cheeseStatistics.aspx>



What Your Plate Should Look Like...



Standard American Diet (SAD)

U.S. FOOD CONSUMPTION AS A % OF CALORIES

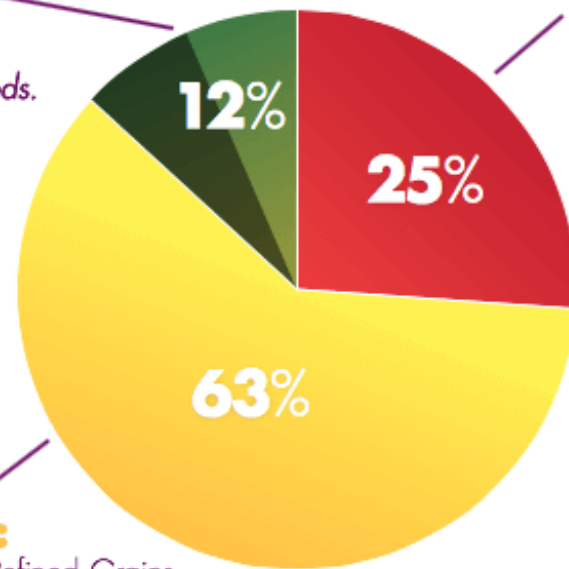
PLANT FOOD:

Vegetables, Fruits, Legumes,
Nuts & Seeds, Whole Grains
Fiber is only found in plant foods.

NOTE: Up to half of this category may be processed, for example almonds in candy bars, apples in apple pies or spinach in frozen spinach soufflé, and of course these would not be healthy choices. The focus should be on whole unprocessed vegetables, fruits, legumes, nuts and seeds and whole grains.

PROCESSED FOOD:

Added Fats & Oils, Sugars, Refined Grains



ANIMAL FOOD:

Meat, Dairy, Eggs, Fish, Seafood
Cholesterol is only found in animal foods. Animal foods are the **PRIMARY** source of saturated fat.

GUIDE TO HEALTHY EATING:

Much easier to understand than the USDA Food Pyramid, with no food industry influence.

Eat **LESS** from the animal and processed food groups and **MORE** whole foods from the plant food group.

In general, food from the animal and processed food group contribute to disease, while **WHOLE** foods from the plant group contribute to good health.



Source: USDA Economic Research Service, 2009; www.ers.usda.gov/publications/EIB33; www.ers.usda.gov/Data/FoodConsumption/FoodGuideIndex.htm#calories
New York Coalition for Healthy School Food * www.healthyschoolfood.org
Special thanks to Joel Fuhrman, MD, author of *Disease Proof Your Child: Feeding Kids Right* * Graphics by Michelle Bando.com
© 2009, New York Coalition for Healthy School Food

The Weight of the Evidence

↓ Two categories of food are largely responsible for our epidemic of obesity and chronic disease:

1. Processed foods with added fat, sugar and salt.
2. Animal products rich in saturated fat.



↓ The most protective foods are high fiber, whole plant foods such as vegetables, fruits, legumes, whole grains, nuts and seeds.



Eating is a Way of Life...

(Diet is a 4-letter word)

- Eat Food.
- Mostly Plants.
- Not too Much!

Michael Pollan

In Defense of Food



Eat Real Food

- Hyper-palatable foods are addictive
- Fat, sugar and salt make us crave more fat, sugar and salt
- Eat foods, not processed chemicals





Roll over image to zoom in

Wonder Classic White Bread

20 oz

\$2.43 (\$0.13/oz)



[Icon details](#)

Product description

This is it-the loaf that made Wonder Bread a household name. It's soft, white and as wholesome as childhood itself.

Ingredients

Unbleached Enriched Flour (Wheat Flour, Malted Barley Flour, Niacin, Reduced Iron, Thiamin Mononitrate, Riboflavin, Folic Acid), Water, High Fructose Corn Syrup, Yeast, Contains 2% or Less of Each of the Following: Calcium Carbonate, Soybean Oil, Wheat Gluten, Salt, Dough Conditioners (Contains One or More of the Following: Sodium Stearoyl Lactylate, Calcium Stearoyl Lactylate, Monoglycerides, Mono- and Diglycerides, Distilled Monoglycerides, Calcium Peroxide, Calcium Iodate, DATEM, Ethoxylated Mono- and Diglycerides, Enzymes, Ascorbic Acid), Vinegar, Monocalcium Phosphate, Yeast Extract, Modified Corn Starch, Sucrose, Sugar, Soy Lecithin, Cholecalciferol (Vitamin D3), Soy Flour, Ammonium Sulfate, Calcium Sulfate, Calcium Propionate (to Retard Spoilage).



What is a processed food?



“The longer the shelf life of a **food product** (such as neon-orange cheese puffs) the shorter the shelf life of the person who consumes it regularly.”

David Katz, MD, MPH, *Disease Proof*



Eat Real Food

- The problem with a focus on macronutrients...



Quality Over Quantity

- All Carbs are not created equally...

Good vs. Bad Carbohydrates: Know the Difference

By PositiveMed.com

Good Carbs

More fiber, minerals & vitamins, Low glycemic index, Feel full on fewer calories



Whole-grain



Oatmeal



Green vegetables



Fruits

Bad Carbs

Low fiber & nutrients, High glycemic index, Lots calories needed to make you full



Refined grains



Sugary cereals



Soda & sugary drinks



Candies & cookies



More health tips on [PositiveMed.com](https://www.positivemed.com)



Quality over Quantity

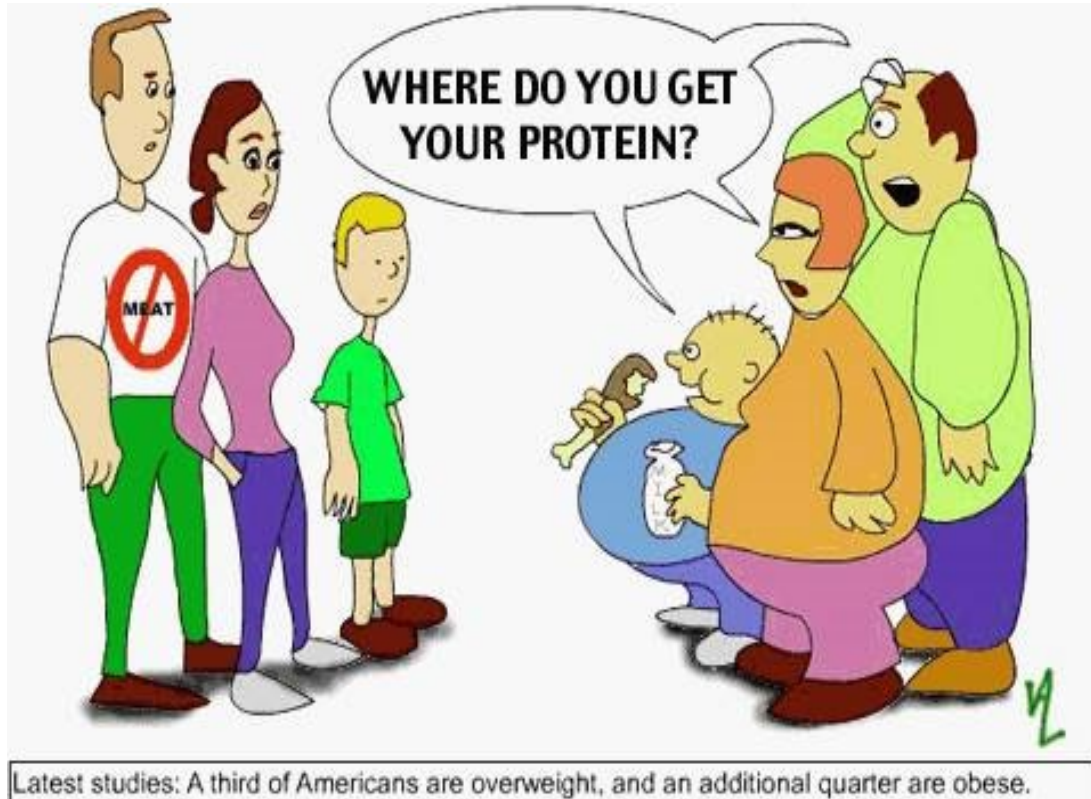
- And neither are fats...



GOOD FATS
VS.
BAD FATS



Plant vs. Animal Protein



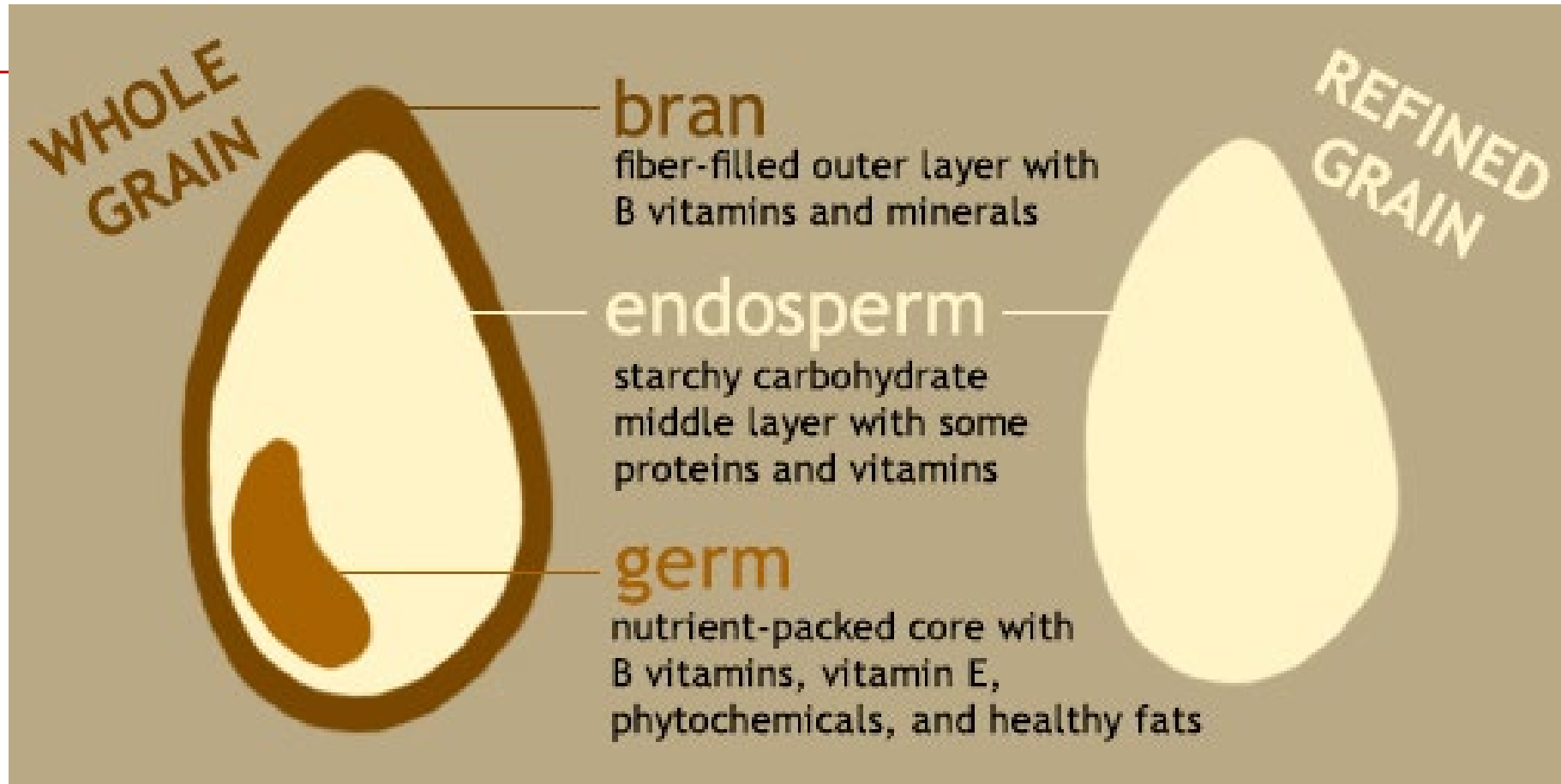
Protein requirements:

Male = 56 gm/d Women = 46 gm/d

<u>1/2 cup serving</u>	<u>grams of protein</u>
Lentils	8.8
Edamame	8.5
Chickpeas	7.5
Firm tofu	10
Quinoa	4
Peanuts	20
Almonds	16

Med stock broccoli	4
1 tbsp. chia seeds	2
1 tbsp. hemp seeds	5

Whole vs Refined Grains



What Foods Does a Plant-based Diet Include?

- Vegetables
- Fruits
- Grains
- Legumes and Pulses
- Roots and Tubers
- Fungi
- Nuts and Seeds
- Herbs and Spices



Powerful ingredients in whole, plant foods

FIBER

found exclusively in plant foods (animal foods contain no fiber), associated with lower rates of cancer and other chronic diseases, and facilitates healthy weight.

WATER

hydrates the body, which is crucial to proper immune, endocrine, cardiovascular, neural, gastrointestinal, muscle and skeletal function. Plant foods are rich in water!

ANTIOXIDANTS & PHYTONUTRIENTS

abundant in plant foods. Slow aging, reduce inflammation in the body, and help protect against diseases — especially cancers and heart disease.



Foods To Limit or Avoid



Meat, Poultry and Fish



High in unhealthy **saturated fat**

Raises cholesterol and increases the risk of cardiovascular disease.

High in **cholesterol**

Found only in animal foods

Linked to high blood cholesterol and heart disease

Fish is also high in cholesterol and industrial pollutants



Eggs, Processed Meats

One egg yolk contains more cholesterol than a double quarter pounder with cheese!

Research has shown that eating eggs regularly increases the risk of diabetes and heart disease.



Refined Grains and Added Sugars



- Refined grains are almost or completely void of fiber
- Found in processed foods, which are linked to obesity and other chronic diseases
- Consuming 10%-24.9% of calories increases risk CVD 30%
- Consuming 25% calories increases risk 175%

Diets high in sweets and sugar sweetened beverages contribute to pro-inflammatory profile-elevated CRP, leptin and MCP-1 and interacts with SNP's epigenetically.



Processed Oils

Unlike whole plant food sources of fat, processed oils are lower in nutrients and higher in calories.

Even olive oil is not a health food — it's 100% fat.

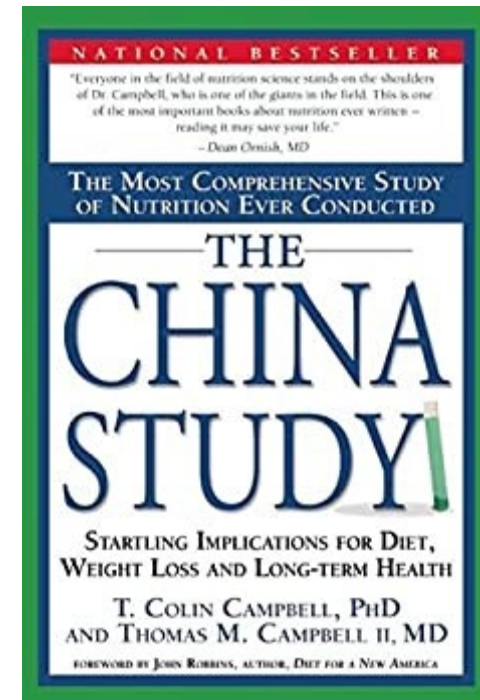
Every tablespoon of oil contains 120 calories!

Eat the fiber-filled, nutrient dense olive, not the oil.



Dairy Products

- High in unhealthy saturated fat and cholesterol
- Contains casein, the protein found in dairy products, which is linked to disease
- ≥ 3 servings/day low fat dairy vs. < 1 servings/day results in 39% increased risk of Parkinson's
- Whole milk servings in men increases prostate cancer risk by 43%
- Replacing Dairy with 5% of calories from plants
 - Decreases CHD risk by 24%
 - Decreases stroke risk by 25%



Food as Medicine

Protective Factors

- ✓ Fiber
- ✓ Phytochemicals
- ✓ Plant enzymes
- ✓ Antioxidants
- ✓ Anti-inflammatory compounds
- ✓ Plant sterols and stanols
- ✓ Pre- and probiotics
- ✓ Macronutrients from whole plant foods
- ✓ Micronutrients



Food as Medicine

Pathogenic Factors

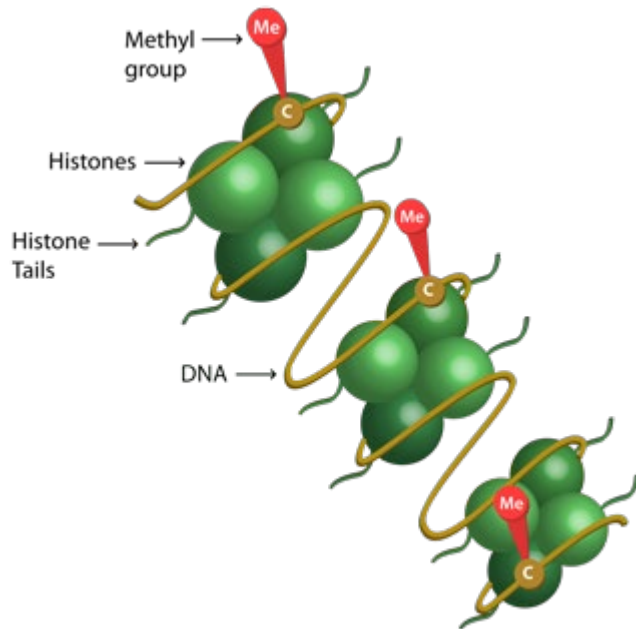
- ✓ Trans fatty acids
- ✓ Excessive saturated fat
- ✓ Refined carbohydrates
- ✓ Excessive sodium
- ✓ Neu5Gc
- ✓ Chemical contaminants
- ✓ Products of high temperature cooking
- ✓ Pro-oxidants (e.g. heme iron)
- ✓ TMAO



Epigenetics

- DNA is not our destiny – Dinner is!

- David Katz, MD



How Powerful are Plant-based Diets?





Benefits of Plant Based Diets

- Lower rates of overall and all-cause mortality
- Lower risk of cancer
- Lower prevalence and incidence of type two diabetes
- Lower rates of hypertension, cholesterol and cardiovascular disease
- Lower BMI
- Lower rates of cataracts, diverticular disease, endocrine disorders, gallstones, and renal disease

Orlich, 2014; Dinu, 2017;
Tonstad, 2013; Crowe, 2013; Appleby, 2011



Cardiovascular Disease

FIGURE 1

Restoration of myocardial
perfusion²

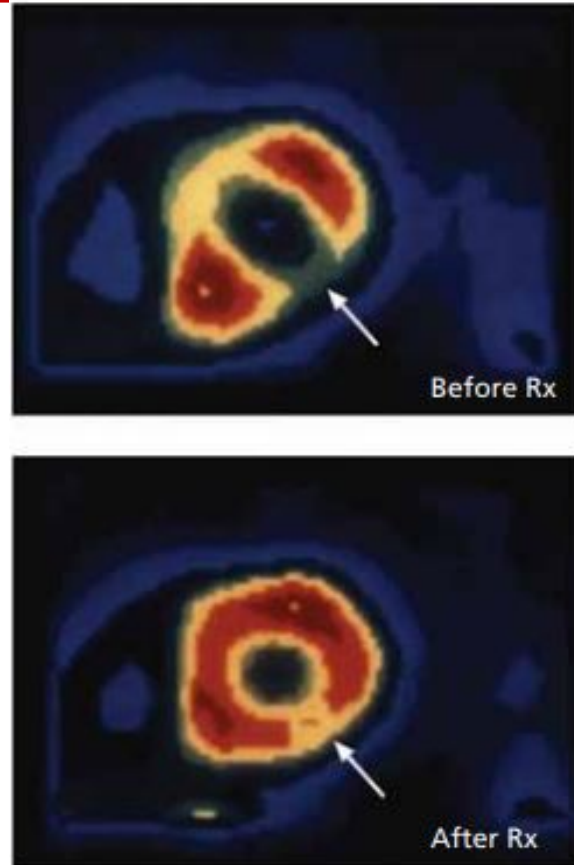
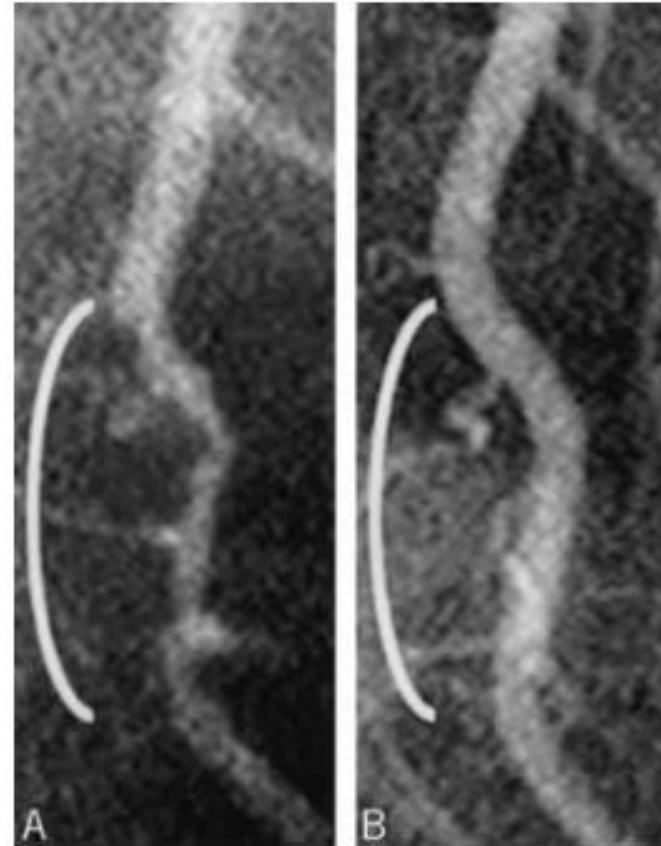


FIGURE 2

Reversal of coronary
artery disease⁴



Adventist Health Study-2

Similar step-wise drop in rates
Note not all-or-nothing: a spectrum of benefit

TABLE 1

Mean BMI (in kg/m²) and the prevalence of diabetes and hypertension in different types of vegetarians compared with nonvegetarians in California

Diet group	BMI	Diabetes	Hypertension
Nonvegetarian	28.26 (28.22, 28.30)	1.00	1.00
Semivegetarian	27.00 (26.96, 27.04)	0.72 (0.65, 0.79)	0.77 (0.72, 0.82)
Pescovegetarian	25.73 (25.69, 25.77)	0.49 (0.44, 0.55)	0.62 (0.59, 0.66)
Lactoovo-vegetarian	25.48 (25.44, 25.52)	0.39 (0.36, 0.42)	0.45 (0.44, 0.47)
Vegan	23.13 (23.09, 23.16)	0.22 (0.18, 0.28)	0.25 (0.22, 0.28)
<i>P</i>	0.0001	0.0001	0.0001

n = 89,224





AHS-2: Vegetarian Diet and Cancer

- Colorectal cancer
 - ~20% reduction for all vegetarians
 - ~40% reduction for pesco-vegetarians, specifically
- Prostate cancer
 - ~35% reduction for vegans
- Breast cancer
 - No significant risk reduction for all vegetarians
 - Vegans consistently lower risk of 22% reduction (but non-significant $P=0.09$)



Tantamango-Bartley et al., 2013; Ornish et al., 2015; Tantamango-Bartley et al., 2016; Penniecook-Sawyers et al., 2016

Prostate Cancer



**Eat Well, Move More,
Stress Less, Love More**

- 93 men with prostate CA **randomized** to intensive lifestyle change (ILC) therapy or standard care, followed for one year
- ILC group: **0** needed conventional treatment, PSA **decreased 4%**
- Control group: **6** needed conventional treatment, PSA **increased 6%**
- Growth of prostate CA cells in cell culture **inhibited** nearly **8X** more with serum from ILC group vs. control group



Ornish D, et.al. Intensive Lifestyle Changes May Affect the Progression of Prostate Cancer. The Journal of Urology. 2005, September; 174:1065-1070

Plant-based vs ADA Diet

- NIH study: 49 participants on PBD vs 50 on ADA 2002 recommendations
 - No modification of exercise

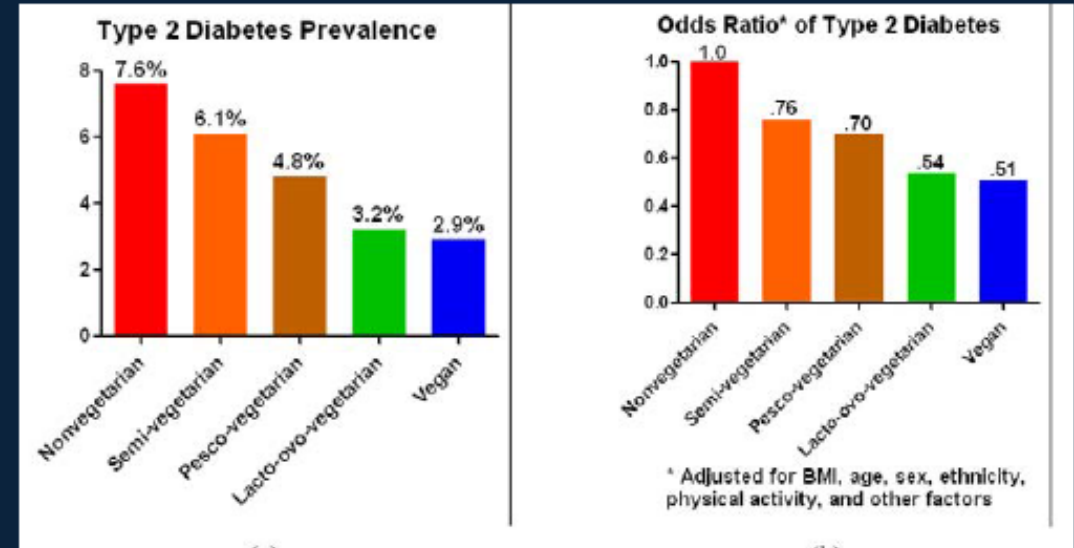
	PBN	ADA
A1C	↓1.23%	↓.38%
LDL	↓21.2%	↓9.3%
Weight	↓14.3 lbs	↓6.8 lbs
Medications Req.	↓43%	↓26%

Barnard ND, Cohen J, Jenkins DJ, Turner-McGrievy G, Gloede L, Jaster B, Seidl K, Green AA, Talpers S: A low-fat vegan diet improves glycemic control and cardiovascular risk factors in a randomized clinical trial in individuals with type 2 diabetes. *Diabetes Care* 29:1777–1783, 2006



EPIC Study – Diabetes and Meat Consumption

- EPIC study 38,094
 - Every 5% of calories from animal protein resulted in a 30% increased risk of diabetes
 - Vegetable protein was not associated with increased risk of DM



Barnard et al.

Sluijs, Beulens JWI Van Der A DL et al. Dietary intake of total animal and vegetable protein and risk of diabetes in the European prospective investigation into cancer and nutrition (EPIC-NL study). *Diabetes Care* 2010;33:43-48

Diabetes Prevention – the DPP Study

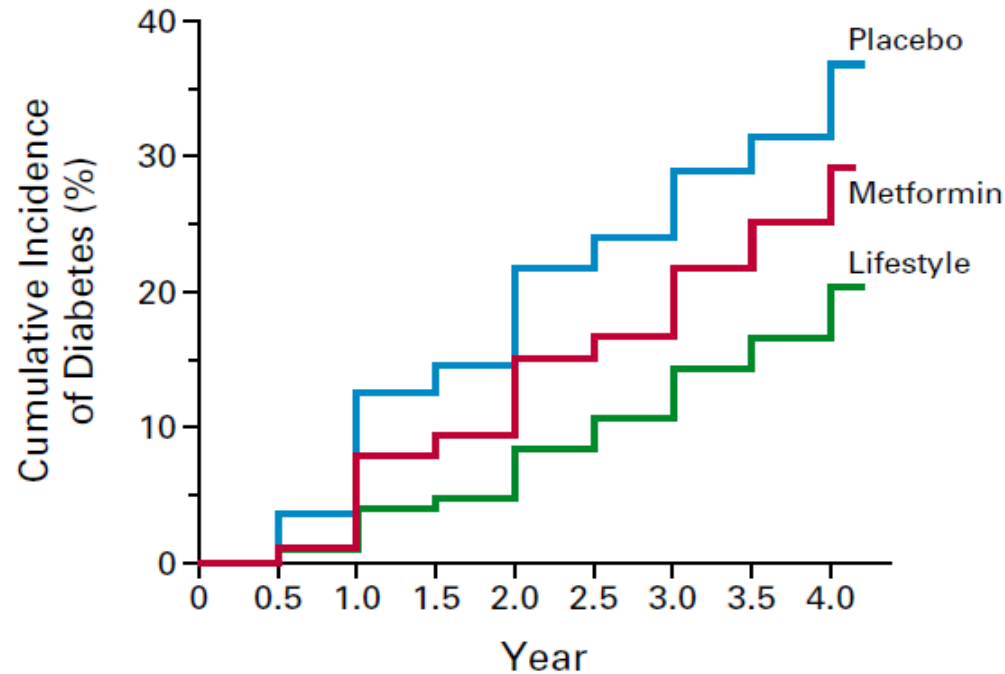


Figure 2. Cumulative Incidence of Diabetes According to Study Group.

The diagnosis of diabetes was based on the criteria of the American Diabetes Association.¹¹ The incidence of diabetes differed significantly among the three groups ($P < 0.001$ for each comparison).



MIND Diet – Rush University Memory and Aging Project

- Strict adherence to MIND diet (lots of plants, limited meat and dairy) resulted in 53% reduction in risk of AD
- Moderate adherence associated with 35% reduction in risk
- Participants with high adherence to diet had cognitive functioning equivalent to a person who was 7.5 years younger



Autoimmune disorders

Dietary intervention found to be the most effective treatment for MS ever reported

LE JOURNAL CANADIEN DES SCIENCES NEUROLOGIQUES
Volume 39, No. 3 - May 2012

Is the Treatment of Multiple Sclerosis Headed in the Wrong Direction?

Is the profound cerebral hypoperfusion that we see in multiple sclerosis reversible with dietary intervention? This is an example of where research should be focused. Instead, angioplasties and stents are now being used to treat CCSVI.

pioneering research of Dr. Roy Laver Swank. The results of his 34-year study published in *The Lancet* in 1990 remain the most effective treatment of multiple sclerosis ever reported in the peer review literature. In patients with early stage MS, 95% were without progression of their disease 34 years after adopting his low saturated fat dietary program.¹ Even patients with initially advanced disease showed significant benefit. To date, no medication or invasive procedure has ever come close to demonstrating such success.

predominates. Some of Dr. Swank's earliest research showed that a single high fat meal caused the red blood cells to aggregate and sludge³ rendering the perivascular territories most

164:798-811.

4. Swank RL, Lerstad O, Strom A, Backer J. Multiple sclerosis in rural Norway: its geographic distribution and



Food as Medicine: The Power of Lentils/Beans

Group 1

Usual Diet
+



1 cup legumes

Group 2

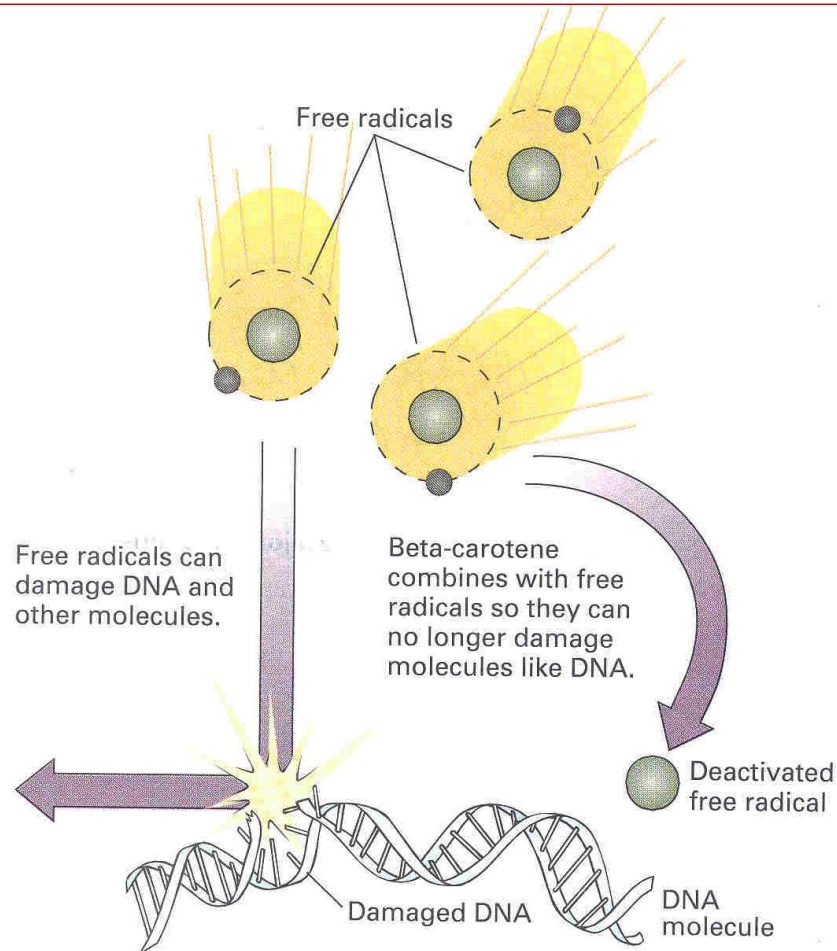
↓ 500 Calories

- Equal weight loss and HbA1c control
- Improved cholesterol and insulin reg for the legume group

Mollard, RC, et al. Br J Nutr 2012

The Power of Plants

- Antioxidants
- Inflammation
- Gut bacteria



CALORIE DENSITY

WHAT 500 CALORIES LOOK LIKE

OIL



CHEESE



MEAT



POTATOES,
RICE, BEANS



FRUITS &
VEGGIES



...and why whole plant-based foods will help keep you lean and satisfied.

forksoverknives.com



WFPB Diets Impact Disease States

- Heart Disease
- Renal disease
- Autoimmune conditions – IBD, Lupus, RA, psoriasis, MS
- High cholesterol
- Hypertension
- Cancer
- Dementia and Alzheimer's
- Diabetes
- Diabetic Neuropathy
- Weight management
- Asthma
- Migraines
- Erectile dysfunction
- Fibromyalgia
- Overall morbidity and mortality

Steiber, 2011;
Grant, 2014





Additional benefits of WFPB Diets

- Mood
- Psychological wellness
- Energy levels
- Memory
- Cognitive function
- Sleep
- Acne
- Hormone balance
- Psychological wellness
- Sexual wellbeing
- Less Menstrual Pain
- Disease prevention

Hughes, et al. 2010



Helping Patients Take the Right Path



~~Pills and Procedures~~



Lifestyle Changes and SDOH





WFPB Resources

- Plantrician Plant-Based Nutrition Quick Start Guide (pdf guide)
- Forks Over Knives Documentary and Meal Planner
- Dr. McDougall's Quick Start Program (video)
- Center for Nutrition Studies: 7-Day Kick Start (emails)
- Physician's Committee for Responsible Medicine 21 Day Vegan Kickstart (emails, menus, phone app)
- Nutrition Facts Daily Dozen Challenge



Lifestyle Medicine creates sustainable transformation in care delivery

- Team-Based Care
- Group Visits & Support Groups
- Value-Based Care
- Proven Outcomes
- Improved Patient Satisfaction
- Renewed Physician Passion



eat plants

keep moving

sleep well

be present

stay calm

love people

