

Culinary Medicine

*The American College of Culinary Medicine
(ACCM)*

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“Let food be thy medicine
and medicine be thy food.”

–Hippocrates

- ◆ I have no financial interests or relationships to disclose.
- ◆ Permission was given for copyright images/slides and encouraged.

Culinary Medicine

Culinary Medicine is an evidence-based field incorporating the art of food and cooking with the science of medicine. It seeks to empower the patient to care for themselves on a daily basis, using food and beverage as a primary care technique.

Clinicians guide patients to access healthy ingredients within their budget while considering sociocultural preferences. Patients then create and consume delicious, nutrient-dense meals that contribute to the prevention and treatment of disease.



The problem

- ◆ 11-16% of American adults have diabetes
- ◆ More than 40 million Americans have diabetes.
- ◆ More than 1 in 4 adults with diabetes don't know they have it.

Centers for Disease Control and Prevention

<https://www.cdc.gov/diabetes/data-research/research/diabetes-screening-eligible.html>

Accessed April 7, 2026

Prevalence of Total, Diagnosed, and Undiagnosed Diabetes in Adults: United States, August 2021-August 2023 NCHS Data Brief. 2024. Gwira JA, Fryar CD, Gu Q.

The problem

- ◆ Nearly half of adults have high blood pressure (48.1%, 199.9 million).
- ◆ This is defined as $>130/80$ mm Hg or are taking medications for high blood pressure

Economic Impact – The Average Household Spend

\$5,850

*8% of total expenses on
healthcare*

US Bureau of Labor Statistics. <http://www.bls.gov/news.release/cesan.nr0.htm>. Accessed April 8, 2024.



\$1.1 Trillion

The estimated cost of cardiovascular disease by 2035¹; \$240 billion annually for heart disease in 2018-2019²

1. American Heart Association. Cardiovascular disease burden report. 2017. Accessed April 30, 2024 from <https://www.heart.org/-/media/Files/About-Us/Policy-Research/Fact-Sheets/Public-Health-Advocacy-and-Research/CVD-A-Costly-Burden-for-America-Projections-Through-2035.pdf>

2. Centers for Disease Control and Prevention. Heart Disease. Accessed April 30, 2024 from [cdc.gov](https://www.cdc.gov/heartdisease/)



\$412 + billion
Diabetes Related Illness

41.9%
Obesity

\$173,000,000,000

Cost of Obesity

What About Weight Loss?

160 women in 4 groups

Randomly assigned to one of the following diets:

- Atkins (carbohydrate restriction, n=40)

- Zone (macronutrient balance, n=40)

- Weight Watchers (calorie restriction, n=40)

- Ornish (fat restriction, n=40)

After 2 months of maximum effort, participants selected their own levels of dietary adherence.

42% Attrition

What About Weight Loss?



Comparison of Weight-Loss Diets with Different Compositions of Fat, Protein, and Carbohydrates

811 overweight adults randomized to one of four diets, with the targeted percentages of energy derived from:

Fat	Protein	Carbohydrates
20%	15%	65%
20%	25%	55%
40%	15%	45%
40%	25%	35%

At 6 months, participants had lost an average of 6 kg: ~7% of their initial weight

Sacks, FM et al. The New England journal of medicine. 2009; 360(9): 859-73. doi:10.1056/NEJMoa0804748



Mediterranean Diet vs Paleo vs Intermittent Fasting

Intermittent Fasting, Paleolithic, or Mediterranean Diets in the Real World: Exploratory Secondary Analyses of a Weight-loss Trial That Included Choice of Diet and Exercise

250 healthy but clinically overweight participants

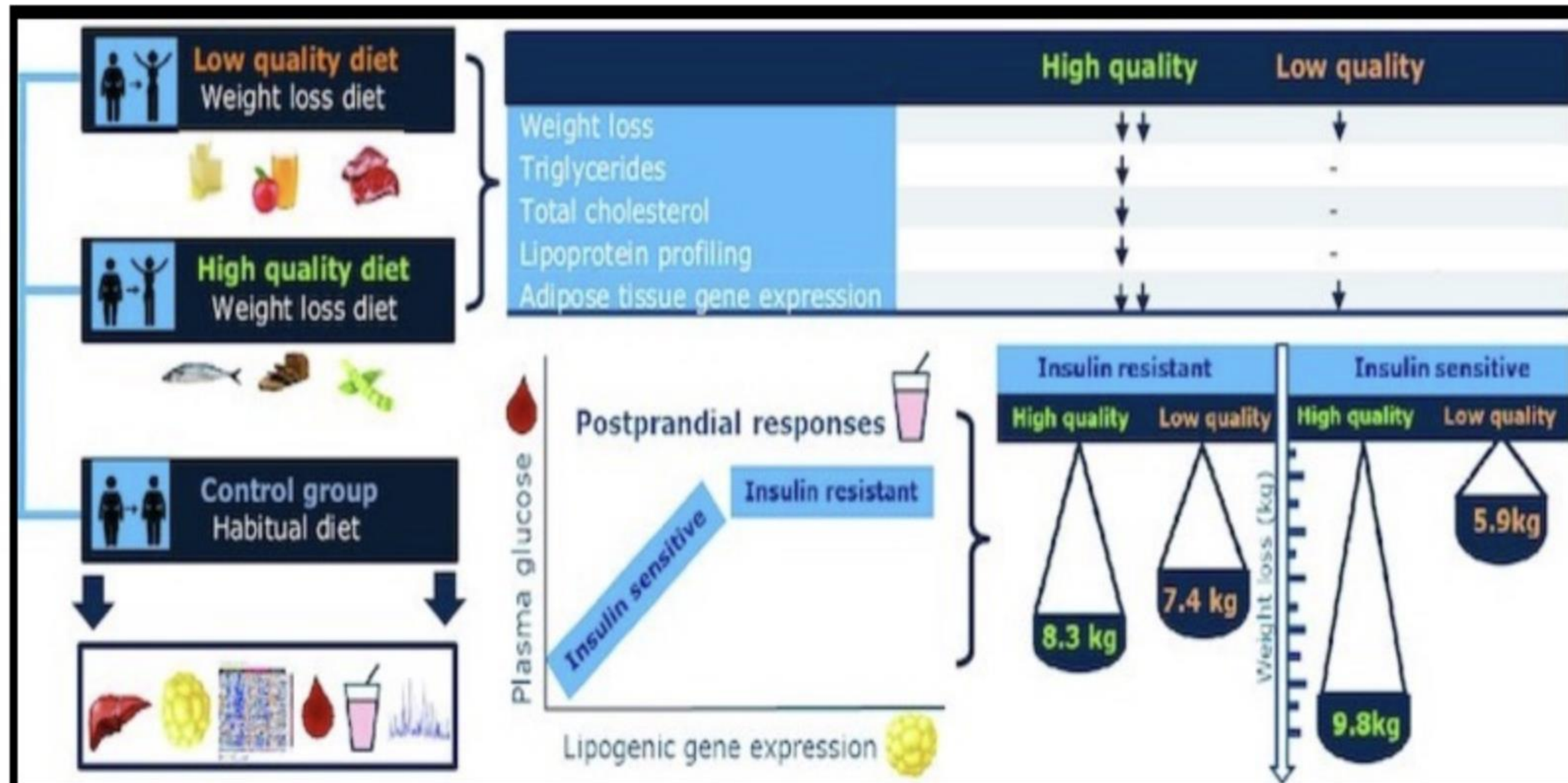
Diet	Choice	Attrition from Study	Stopped Following Diet	Final #	Weight Loss
Mediterranean Diet	54.4% / 136	31%	50%	21	2.8 kg
Intermittent Fasting	27.2% / 68	27%	50%	9	4.0 kg
Paleo Diet	18.4% / 46	45%	67%	7	1.78 kg

- 0.8% HgbA1c in the Mediterranean Diet group

Jospe MR et al. *The American Journal of Clinical Nutrition*. 2020;111(3):503-514. <https://doi.org/10.1093/ajcn/nqz330>.



Nutrient Quality Relating to Weight Loss



Schutte, Sophie et al. *The American Journal of Clinical Nutrition*. 2022;116(1): 132-150. doi:10.1093/ajcn/nqac025

HEALTH
meets
FOOD.

What About Weight Loss?

Diet v usual diet	Weight loss (kilograms)	Systolic blood pressure reduction (mm Hg)	Diastolic blood pressure reduction (mm Hg)	Low density lipoprotein reduction (mg/dL)	High density lipoprotein reduction (mg/dL)	C-reactive protein reduction (mg/dL)
Atkins	5.46	5.14	3.30	-2.75	3.41	0.64
Zone	4.07	3.46	2.33	-2.89	-0.33	0.27
DASH	3.63	4.68	2.84	3.93	-1.90	NA
Mediterranean	2.87	2.94	1.03	4.59	-0.61	0.25
Paleolithic	5.31	14.56	3.85	7.27	-2.52	0.52
Low fat	4.87	3.95	2.22	1.92	-2.13	0.33
Jenny Craig	7.77	7.86	7.81	0.21	-2.85	0.19
Volumetrics	5.95	2.93	1.95	7.13	-0.13	NA
Weight Watchers	3.90	2.80	1.03	7.13	-0.88	0.87
Rosemary Conley	3.76	2.39	1.44	7.15	-2.04	NA
Ornish	3.64	0.69	0.20	4.71	-4.87	1.11
Portfolio	3.64	5.97	3.98	21.29	-3.26	-0.37
Biggest Loser	2.88	3.17	2.20	3.90	-0.01	NA
Slimming World	2.15	NA	NA	NA	NA	NA
South Beach	9.86	NA	NA	-0.64	0.36	NA
Dietary advice	0.31	0.58	0.40	-2.01	-1.71	-1.15

■ "Among the most effective" with moderate to high certainty

■ "Inferior to the most effective/superior to the least effective" with moderate to high certainty

■ "Among the least effective" with moderate to high certainty

■ "Maybe among the most effective" with very low to low certainty

■ "Inferior to the most effective/superior to the least effective" with very low to low certainty

■ "Maybe among the least effective" with very low to low certainty

■ "Maybe worse than usual diet"

Ge, L et al. BMJ. 2020; 369: m696. doi:10.1136/bmj.m696

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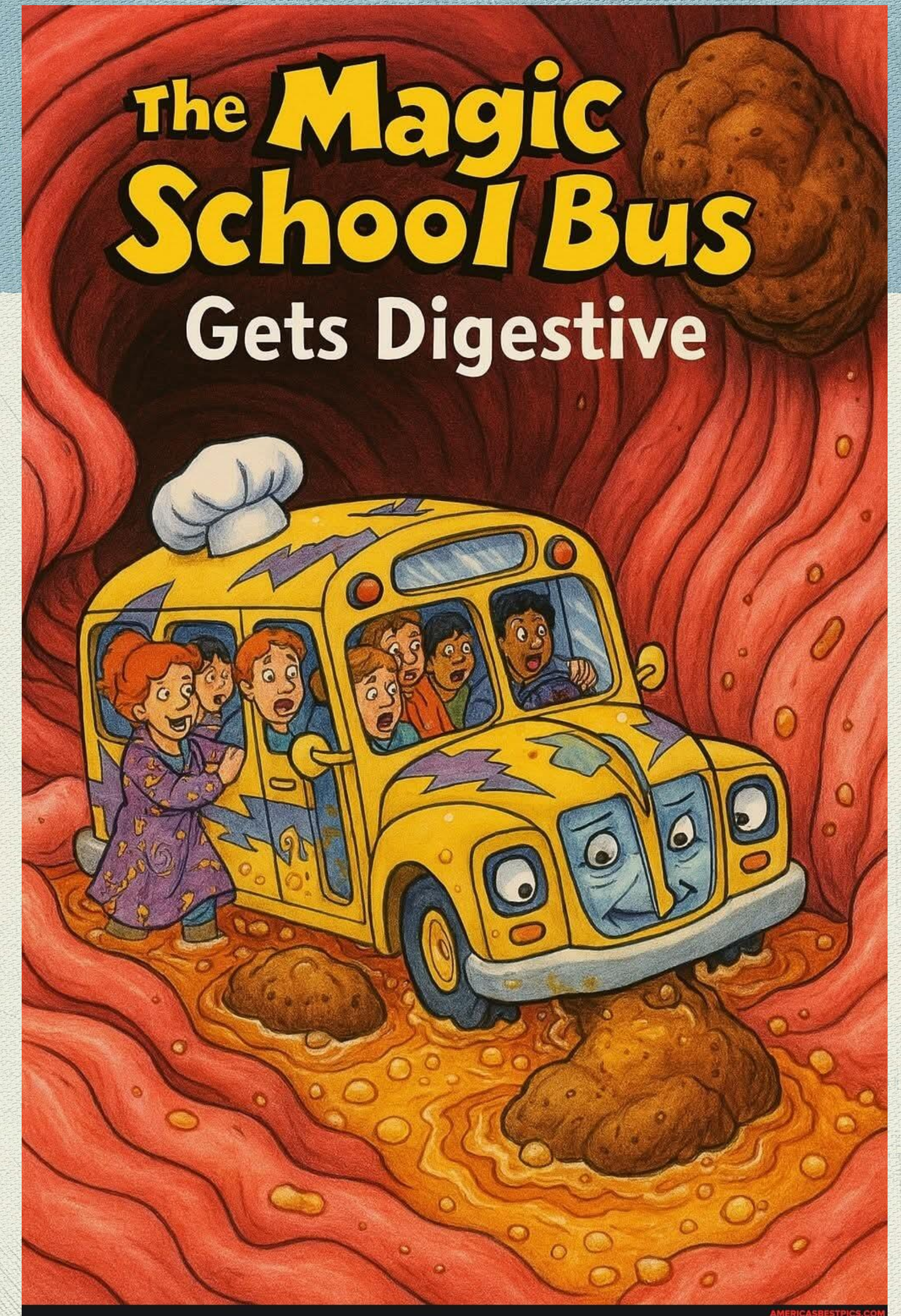


Ancel Keys, PhD

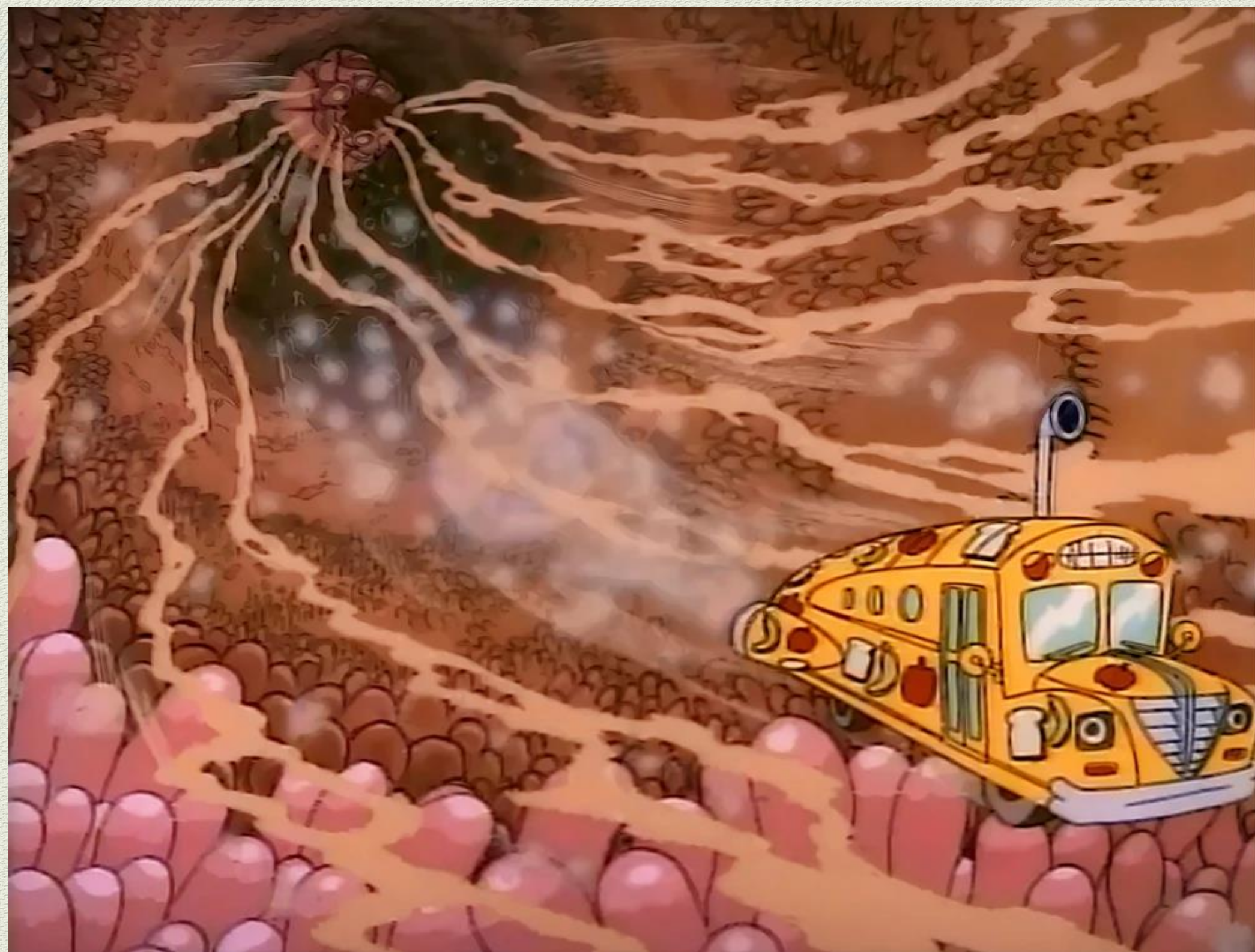
Gut Biome

- ~38 TRILLION BACTERIA, about equal TO THE NUMBER OF HUMAN CELLS

The Gut Microbiome: A Primer for the Clinician
The American Journal of Gastroenterology.2024. Aroniadis OC, Grinspan AM.



<https://americasbestpics.com/picture/the-magic-school-bus-gets-digestive-WHHWNqFNC>



https://static.wikia.nocookie.net/magicschoolbus/images/6/65/Arnold_small_intestine.png/revision/latest/scale-to-width-down/1000?cb=20260127074231

https://static.wikia.nocookie.net/magicschoolbus/images/8/84/Swimming_small_int.gif/revision/latest?cb=20260127074259





Caption

Gut Biome

- ◆ Largest proportion of the immune cells in our body
 - ◆ 70-75% of all lymphocytes
 - ◆ 80% of plasma cells
 - ◆ Gut-associated lymphoid tissue (GALT)



Gut Microbiota Functions

Influences

- Immune maturation and homeostasis
- Host cell proliferation
- Vascularization
- Neurologic signaling
- Pathogen burden
- Intestinal endocrine functions
- Bone density
- Energy biogenesis

Biosynthesis

- Vitamins
- Steroid hormones
- Neurotransmitters

Metabolism

- Branched-chain and aromatic amino acids
- Dietary components
- Bile salts
- Drugs
- Xenobiotics

Disease Indications

- Neurologic
- Psychiatric
- Respiratory
- Cardiovascular
- Gastrointestinal
- Hepatic
- Autoimmune
- Metabolic
- Oncologic

Gut Bacteria Cuts Weight Gain

- ◆ Turicibacter reduces weight gain in mice on high-fat diets
 - ◆ **Produces fatty acids that lower ceramides (harmful fat molecules linked to diabetes and heart disease)**
- ◆ Makes up 0.1% of gut bacteria
- ◆ Stops growing when fat levels, especially palmitate, rise but remains alive.
- ◆ Mice supplemented with Turicibacter gained less weight and showed improved glucose and lipid profiles despite fatty diets.

The Golden Child...

**The
Mediterranean
Diet**



Prospective study of 605 first heart attack patients.

Randomized into two groups.

1. Study group given instruction in Mediterranean Diet
2. Control told to follow a “prudent” diet.



Prospective study of 605 first heart attack patients.

Randomized into two groups.

1. Study group given instruction in Mediterranean Diet
2. Control told to follow a “prudent” diet.

Study group with a 50 - 70 % reduction in second event



Adherence to a Mediterranean Diet and Survival in a Greek Population - Antonia Trichopoulou

22,000 study population

Prospective Design

Significant reduction coronary disease AND cancer



Nine dietary components

Mediterranean Diet Score

from 0 - 9

depending on the amounts consumed daily (on average)

Mediterranean Diet



A two point improvement in Mediterranean diet score

– from 5 to 7 –

confers a 25% reduction in death from all causes including heart disease and cancer

Trichopoulos A, et al. *N Engl J Med*. 2003;348(26):2599–2608. doi:10.1056/NEJMoa025039





1. Vegetables

Male: ≥ 3.5 servings per day

Female: ≥ 3.65 servings per day

A serving equates to:

Broccoli	1 cup chopped or florets
Cauliflower	1 cup chopped or florets
Green or wax beans	1 cup cooked
Spinach	1 cup cooked
Carrots	2 medium or 1 cup baby carrots
Sweet potato	1 large baked (2 1/4" or more diameter)

Adjusted: 2000 calories in women & 2500 calories in men

No. of Servings based on Pyramid Servings Database, version 2.0

<https://www.ars.usda.gov/research/publications/publication/?seqNo115=171530>



2. Legumes

Male: ≥ 0.17 servings per day

Female: ≥ 0.12 servings per day

A serving equates to:

Dry beans and peas	1 cup whole cooked
Peanut Butter	1 Tablespoon
Tofu	2 ounces
Peanuts	1/4 cup
Hummus	2 Tablespoons
Refried Beans	1/4 cup

Adjusted: 2000 calories in women & 2500 calories in men

No. of Servings based on Pyramid Servings Database, version 2.0

<https://www.ars.usda.gov/research/publications/publication/?seqNo115=171530>



3. Fruits & Nuts

Male: ≥ 3.53 servings per day

Female: ≥ 3.57 servings per day

A serving equates to:

- An orange or apple the size of a baseball
- Seven 2 1/2 inch strawberries
- 1/2 cup of dried fruit
- 1 cup of fresh fruit
- 12 grapes

One serving of nuts is equivalent to

- 24 almonds
- 15 pecan halves
- 14 walnut halves
- 18 cashews

No. of Servings based on Pyramid Servings Database, version 2.0

Mediterranean Dietary Pattern and Prediction of All-Cause Mortality in a US Population *Results From the NIH-AARP Diet and Health Study* (Arch Intern Med. 2007;167(22):2461-2468)





4. Whole Grains

Male: ≥ 1.42 servings per day

Female: ≥ 1.18 servings per day

A serving equates to:

Oatmeal	1/2 cup cooked
Popcorn	3 cups popped
Brown Rice	1.2 cup cooked
Cornbread	2 1/2 inch square piece
Whole Wheat Pasta	2 ounces
Whole Wheat Bread	1 slice

Adjusted: 2000 calories in women & 2500 calories in men

No. of Servings based on Pyramid Servings Database, version 2.0

<https://www.ars.usda.gov/research/publications/publication/?seqNo115=171530>



5. Seafood

Male: 0.6 servings* (≥ 1 oz.) per day

Female: 0.5 servings* (≥ 1 oz.) per day

Aim for at least two, 4-oz servings a week:

1 four ounce can tuna

1 four ounce salmon steak

1 small trout (4 ounces)

4 ounces shrimp (peeled)

4 ounces crab

Adjusted: 2000 calories in women & 2500 calories in men

*No. of Servings based on Pyramid Servings Database, version 2.0

<https://www.ars.usda.gov/research/publications/publication/?seqNo115=171530>



6. Oils and Fats

1:1.6 grams = 10 saturated : 16 unsaturated

Mediterranean Dietary Pattern and Prediction of All-Cause Mortality in a US Population *Results From the NIH-AARP Diet and Health Study* (Arch Intern Med. 2007;167(22):2461-2468)



6. Oils and Fats

1:1.6 grams = 10 saturated : 16 unsaturated

Male: 1: 1.23 (saturated to unsaturated)

Female: 1: 1.22 (saturated to unsaturated)

A serving equates to:

- 1 teaspoon of any vegetable oil
- 1 teaspoon of butter

Mediterranean Dietary Pattern and Prediction of All-Cause Mortality in a US Population *Results From the NIH-AARP Diet and Health Study* (Arch Intern Med. 2007;167(22):2461-2468)





7. Dairy

Male: <1.42 servings per day

Female: <1.32 servings per day

A serving equates to:

Milk	1 cup
Yogurt	6 ounces
Cottage Cheese	1/2 cup
Cheddar Cheese	1/2 ounce
Kefir	6 ounces
Swiss Cheese	1/2 ounce

Adjusted: 2000 calories in women & 2500 calories in men

No. of Servings based on Pyramid Servings Database, version 2.0

<https://www.ars.usda.gov/research/publications/publication/?seqNo115=171530>

Mediterranean Dietary Pattern and Prediction of All-Cause Mortality in a US Population *Results From the NIH-AARP Diet and Health Study* (Arch Intern Med. 2007;167(22):2461-2468)





8. Land Animal Protein

Male: <4.02 servings* per day (≤ 8 oz total)

Female: <2.8 servings* per day (≤ 6 oz total)

Males aim for ≤ 2 , 4-oz servings/day

Females aim for ≤ 2 , 3-oz servings/day

A four ounce serving is about the size of a deck of cards.

Avoid processed meats

Include lean cuts such as pork tenderloin, trimmed chicken thighs, lean ground beef, venison

Adjusted: 2000 calories in women & 2500 calories in men

*No. of Servings based on Pyramid Servings Database, version 2.0

<https://www.ars.usda.gov/research/publications/publication/?seqNo115=171530>



9. Alcohol

Male: 10 - 50 grams = ~ 2 drinks

Female: 5 - 25 grams = ~ 1 drink

One drink is equivalent to:

- 12 ounces of regular beer (about 5% alcohol)
- 5 ounces of wine (about 12% alcohol)
- 1.5 ounces of distilled spirits (about 40% alcohol)



9. Alcohol

Male: 10 - 50 grams = ~ 2 drinks

Female: 5 - 25 grams = ~ 1 drink

In Mediterranean countries alcohol was more likely to be consumed with meals.

Mediterranean Dietary Pattern and Prediction of All-Cause Mortality in a US Population Results From the NIH-AARP Diet and Health Study (Arch Intern Med. 2007;167(22):2461-2468)



9. Alcohol

- Compared to non- or occasional drinking (≤ 1 g/day), light/moderate drinking (up to 2 drinks/day) was associated with a decreased risk of CRC (OR: 0.92)
- Heavy drinking (2–3 drinks/day) was not significantly associated with CRC risk (OR: 1.11),
- Very heavy drinking (more than 3 drinks/day) was associated with a significant increased risk (OR: 1.25)

Mediterranean Dietary Pattern and Prediction of All-Cause Mortality in a US Population *Results From the NIH-AARP Diet and Health Study* (Arch Intern Med. 2007;167(22):2461-2468)

Mediterranean Diet in the United States

In 1995 - 380,000 members of the AARP – Prospective
No history of cancer, heart disease, diabetes, chronic disease
Five years of follow-up
Median Caloric Intake
 Women = 1863 kcal
 Men = 2354 kcal

Causes of death in the over 12,000 subjects who had died during
Correlated with each subject's dietary score

Mediterranean Diet in the United States

In 1995 - 380,000 members of the AARP – Prospective
No history of cancer, heart disease, diabetes, chronic disease
Five years of follow-up
Median Caloric Intake
 Women = 1863 kcal
 Men = 2354 kcal

For men, high adherence to Mediterranean Diet (score 7-9) were 23% less likely to die from any cause than those whose diets received the lowest scores (0-3)

Women saw a 12% lower risk of death from cancer and 20% lower risk of all-cause mortality

One point increase in the dietary score conferred an additional 5% reduction in risk of all-cause mortality

Association of the Mediterranean Diet with Onset of Diabetes in the Women's Health Study

Women's Health Study launched in 1992
20 years of data on over 25,000 American women
Mediterranean Diet score = 0 - 9

*Those with scores above 6 were 30%
less likely to have diabetes*

Mediterranean Diet and Diabetes

Effects of a Mediterranean-Style Diet on the Need for Antihyperglycemic Drug Therapy in Patients with Newly Diagnosed Type 2 Diabetes (Ann Intern Med. 2009;151:306-314.)

4 years, 215 participants – **Prospective**

New-onset diabetics

Endpoint: Medication

After 4 years:

only 44% in the study group needed medication

70% of the standard low-fat diet needed medication

26% difference with diet alone



Mediterranean Diet in the United States

The 2020 Dietary Guidelines Advisory Committee conducted a systematic review to examine the relationship of dietary pattern consumption and all-cause mortality

Strong evidence was linked to reduced risk of all-cause mortality in adults and older adults for the following dietary pattern:

Included:

- vegetables, fruits, legumes, nuts, whole grains
- unsaturated vegetable oils,
- fish, lean meat or poultry when meat was included

Avoided or minimized:

- red and processed meat
- high-fat dairy
- refined carbohydrates or sweets

Alcoholic beverages were also part of some of these dietary patterns

High Adherence to a Mediterranean Diet at Age 4 Reduces Overweight, Obesity, and Abdominal Obesity Incidence in Children at the Age of 8

Mothers of newborns interviewed at birth of their child.
Dietary and demographic questionnaire at age 4 and 8.

At age 4 those with high adherence (11 – 16 points) were:

- 62% less likely to be overweight
- 14% less likely to be obese
- 60% less likely to have abdominal obesity

For every 2-point increase they were:

- 12% less likely to be overweight
- 20% less likely to be obese
- 18% less likely to have abdominal obesity

Blue Zones

Blue Zones

As of 2014, there are five globally-recognized Blue Zones that satisfy Extreme Longevity Index (ELI) criteria:

- Sardinia, Italy
- Okinawa, Japan
- Nicoya, Costa Rica
- Ikaria, Greece
- Loma Linda, California (Seventh Day Adventists)

As of 2023, Singapore was added to the Blue Zone 2.0 list

- Engineered an increase in life expectancy of nearly 20 years in one lifetime
- Highest life expectancy worldwide at 84.9 years
- Number of Centenarians increased from 700 to 1,500 in last decade

Shared Traits of Centenarians from Blue Zones

9 Shared Traits of people from the Blue Zones:

1. Move Naturally
2. Conduct rituals to reduce stress
3. Have a sense of purpose
4. Drink wine
5. Eat diets largely of plants, whole grains, sour dough, and beans
6. Incorporate strategies to prevent overeating
7. Cultivate and prioritize relationships
8. Belong to a faith-based community
9. Curate a social network who have healthy habits

Initiative to engineer Blue Zones within the United States:

Albert Lea, Minnesota

- 3,400 participants (24% of the population),
- Estimated average life expectancy increase of 3.2 years due to lifestyle changes
- Self-reported a weight loss of 7,280 pounds total among all participants
- Achieved a 40% reduction in health care costs for city workers

Los Angeles Beach Cities (Hermosa, Redondo, and Manhattan Beach)

- Measured a 14% reduction in obesity, 30% drop in smoking, increased physical activity, and improved self-reported eating habits

Iowa

- State-wide initiative with key model cities such as Spencer, Iowa
- Significant reductions in obesity and health care costs
- Estimated 5 billion dollars in health care costs saved over 10 years

Why should future physicians and other healthcare professionals care about understanding nutrition in terms of food?¹

What roles can you play to have an influence over patient health?²

1: Frank, et al *Arch Fam Med*. 2000;9:287-290
2: Kreuter, et al *Arch Fam Med*. 2000;9:426-433)



Translating Mediterranean Diet Principles to Any Cuisine



Ingredient	Mediterranean swap	Category
Flour tortilla	Corn or whole wheat tortilla	Whole grains
Fried fish/shrimp	Baked fish/shrimp with olive oil	Seafood/oils and fats
80/20 ground beef	90/10 beef; beef with lentils	Meats/legumes/oils and fats
Iceberg lettuce	Red cabbage, spinach, roasted cauliflower, mushrooms	Vegetables
Sour cream	Lowfat Greek yogurt	Dairy

Translating Mediterranean Diet Principles to Any Cuisine



Ingredient	Mediterranean swap	Category
Semolina Noodles	Whole wheat noodles; lentil noodles; legume/semolina mixture	Whole grains
80/10 beef	90/10 beef; smaller amount 80/10 beef with mushrooms; lentils or texturized soy protein	Meat Oils and fats Legumes
Iceberg lettuce salad with Ranch dressing	Spinach or mixed greens salad with balsamic vinegar and olive oil dressing; Add extra veggies; consider adding fruit	Vegetables Oils and fats Fruit



Translating Mediterranean Diet Principles to Any Cuisine



Ingredient	Mediterranean Swap	Category
White bread / bun	Whole grain bread / bun	Whole grains
80/20 ground beef	90/10 beef with optional lentils or mushrooms; black bean burger	Meats/legumes Vegetables
French fries	Baked sweet potato fries or baked potato wedges	Oils and fats
No vegetable	Carrot sticks, roasted broccoli with garlic, salad, vegetables with hummus	Vegetables Oils and fats

Dietary Approach to Stop Hypertension

“DASH Diet”

DASH Diet

Food Group	Daily Servings	Serving Size	Choices	Notes
Grains, grain products	7–8	1 slice bread, 1 oz. dry cereal,† 1/2 cup cooked rice, pasta, or cereal	Whole wheat bread, English muffin, pita bread, bagel, cereals, grits, oatmeal, crackers, unsalted pretzels, popcorn	Major sources of energy and fiber
Vegetables	4–5	Serving sizes: 1 cup raw leafy vegetable, 1/2 cup cooked vegetable, 6 oz. vegetable juice	Tomatoes, potatoes, carrots, green peas, squash, broccoli, turnip greens, collards, kale, spinach, artichokes, green beans, lima beans, sweet potatoes r	Rich sources of potassium, magnesium, and fiber
Fruits	4–5	Serving sizes: 6 oz. fruit juice, 1 medium fruit, 1/4 cup dried fruit, 1/2 cup fresh, frozen, or canned fruit	Apricots, bananas, dates, grapes, oranges, orange juice, grapefruit, grapefruit juice, mangoes, melons, peaches, pineapples, prunes, raisins, strawberries,	Important sources of potassium, magnesium, and fiber
Low-fat or fat-free dairy	2–3	Serving sizes: 8 oz. milk, 1 cup yogurt, 1 1/2 oz. cheese	Fat-free (skim) or low-fat (1%) milk, fat-free or low-fat buttermilk, fat-free or low-fat regular or frozen yogurt, low-fat and fat-free cheese	Major sources of calcium and protein
Meats, poultry, and fish	2 or less	Serving sizes: 3 oz. cooked meats, poultry, or fish	Select only lean meats; trim away visible fat; broil, roast, or boil, instead of frying; remove skin from poultry	Rich sources of protein and magnesium
Nuts, seeds, and dry beans	4–5 per week	Serving sizes: 1/3 cup or 1 1/2 oz. nuts, 2 Tbsp. or 1/2 oz. seeds, 1/2 cup cooked dry beans	Almonds, filberts, mixed nuts, peanuts, walnuts, sunflower seeds, kidney beans, lentils, peas	Rich sources of energy, magnesium, potassium, protein, and fiber
Fats and oils‡	2–3	Serving sizes: 1 tsp. soft margarine, 1 Tbsp. low-fat mayonnaise, 2 Tbsp. light salad dressing, 1 tsp. vegetable oil	Soft margarine, low-fat mayonnaise, light salad dressing, vegetable oil (eg, olive, corn, canola, safflower)	DASH has 27% of calories as fat, including that in or added to foods
Sweets	5 per week	Serving sizes: 1 Tbsp. sugar, 1 Tbsp. jelly or jam, 1/2 oz. jelly beans, 8 oz. lemonade	Maple syrup, sugar, jelly, jam, fruit-flavored gelatin, jelly beans, hard candy, fruit punch, sorbet, ices	Sweets should be low in fat

Focus attention on eating the food

1. Meditation before meal begins
2. Disengage from TV, Internet, & phones
3. Awareness regarding urges to eat:
 - Hunger and fullness
 - Pace of eating
 - Portion sizes

MIND Diet Defined

Mediterranean-DASH Diet Intervention for Neurodegenerative Delay (MIND) Diet

MIND Diet Components	Minimize
Whole Grains $\geq 3/d$	Red Meats and products $< 4/wk$
Green Leafy $\geq 6/wk$	Fast/fried food $< 1/wk$
Other Vegetables $\geq 1/d$	Butter, margarine $< 1T/d$
Berries $\geq 2/wk$	Cheese $< 1/wk$
Fish $\geq 1/wk$; :	Pastries, sweets $< 5/wk$
Poultry $\geq 2/wk$	Alcohol/wine 1/day
Beans $> 3/wk$	
Nuts $\geq 5 /wk$	
Olive Oil primary oil	

Morris, Martha Clare et al. "MIND diet associated with reduced incidence of Alzheimer's disease." *Alzheimer's & dementia : the journal of the Alzheimer's Association* vol. 11,9 (2015): 1007-14. doi:10.1016/j.jalz.2014.11.009

HEALTH
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Choosing Brain Food

The typical American diet is high in processed, fatty, and sugary foods. There is evidence in the research that shows when consuming foods lacking in nutrients that the human body needs, memory and other functions of the brain decrease. Instead of eating processed, fatty, and sugary foods we can choose other options. Here are some easy choices to make instead:

Eat This For Brain Food	Instead of This
Whole Grain Bread/Pasta and Brown Rice	White Refined Grain Bread/Pasta and White Rice
• The whole grain options also have a lower glycemic index (won't spike blood sugar as high as refined grains) while the white grains have a higher glycemic index (will spike blood sugar higher than whole grains). · When we consume the refined grains there is a higher risk of Type 2 Diabetes. · Individuals with Type 2 Diabetes are one and a half times more likely to experience episodes of dementia. • The fiber and protein in these options will keep you satisfied longer throughout the day compared to the white refined grains.	
Plant oils (Olive, Canola, etc.), Nuts & Seeds, Fish, Avocados	Animal fat, Butter & Lard, Tropical Plant Oils (cottonseed, palm kernel), Cheese & Dairy
• These oils and foods provide healthy fats (unsaturated, Omega-3s, and monounsaturated) which we want in our diet while the other oils and foods provide unhealthy fats (saturated, Omega-6s, and Trans fats) which we want to limit. • Diets high in saturated fat have been linked to damages in mental function, specifically functions involving memory, speed, and flexibility in both short and long term. • You can incorporate these easily by just switching the type of oil you use to olive or canola oil.	
Add More Fruits and Vegetables to Every Meal	
• Add vegetables to sandwiches, omelets, or stir-fry or add a low-salt seasoning to vegetables and roast them in the oven. • When you want something sweet for a snack, grab a piece of fruit that doesn't need much preparation like grapes, an apple, or berries to satisfy that craving. • Add fresh fruits like berries to cereal or to plain or vanilla yogurt for a sweet flavor.	

Protein Recommended Daily Allowance

Average Protein Consumption in Americans

- Young Children - 56 g/day
- Adults (ages 19 to 30) - 91 g/day
- Older adults - 66 grams per day

Age Group	Protein RDA in Grams per Day
Children, age 1-3	13
Children, age 4-8	19
Children, age 9-13	34
Females, 14-18	46
Males, 14-18	52
Women, 19-70+	46
Men, 19-70+	56

<https://www.ncbi.nlm.nih.gov/books/NBK589212/>

<https://www.cdc.gov/nchs/hus/topics/nutrition.htm#featured-charts>



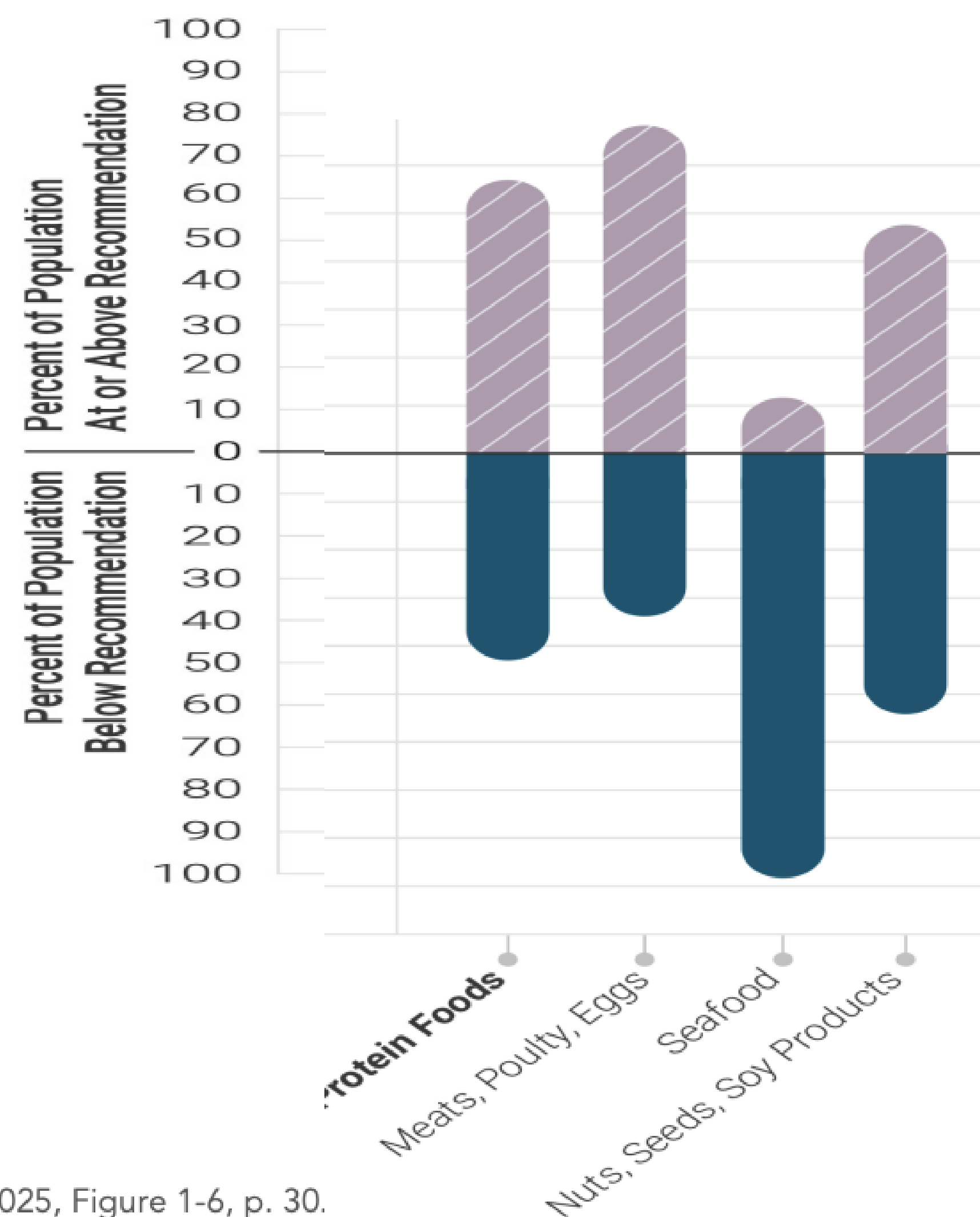
Dietary Guidelines for Americans, 2020-2025



Dietary Guidelines for Americans, 2020-2025, Figure 1-6, p. 30.



Dietary Guidelines for Americans, 2020-2025: Protein Consumption



The center (0) line is the goal or limit. For most, those represented by the **dark blue** section of the bars can improve their dietary pattern by shifting toward the center line.

Dietary Guidelines for Americans, 2020-2025, Figure 1-6, p. 30.
[/fastats/diet.htm](https://www.dietaryguidelines.gov/fastats/diet.htm)



Protein Requirements

Average adult = 0.8 grams protein/kg per day^{1,2}

Athletes = 1.2 to 1.7 grams protein/kg per day²

Injury or stress = 1.0 to 2.0 grams protein/kg per day

1 kg = 2.2 lb

Example: Lightly active 140 lb. female

$140 / 2.2 = 63.6 \text{ kg} * 0.8 = 51 \text{ g protein per day}$

4 calories per gram = 204 calories per day

This represents about 15% of calories in a 1,400 calorie diet.

1. Hudson, Joshua L et al. *Advances in nutrition*; 2020; 11(3) 548-558. doi:10.1093/advances/nmz106

2. American College of Sports Medicine. 2015. Accessed on July 15, 2024 from

<https://www.acsm.org/docs/default-source/files-for-resource-library/protein-intake-for-optimal-muscle-maintenance.pdf>



Protein Requirements

Example: Lightly active 140 lb. female
 $140/2.2 = 63.6 \text{ kg} * 0.8 = 51 \text{ g protein per day}$
4 calories per gram = 204 calories per day

2 eggs (12g protein)
+ 4 ounces chicken (33g protein)
+ 4 ounces quinoa (5g protein)

= 50 grams of protein



Protein Requirements: Older Adults

Recommended Dietary Allowance (RDA) 0.8g¹
protein/kg/day is sufficient for most needs

1.2-1.5 g protein/kg/day protein safe in long-term,
prospective studies²

1g protein/kg/day advised by the American College of
Sports Medicine for 50 plus years of age³

1. Food and Nutrition Board of the Institute of Medicine. Chapter 10: Protein and Amino Acids. 2003. Retrieved on July 15, 2024 from <https://nap.nationalacademies.org/read/10490/chapter/122>.

2. Pedersen, Agnes N, and Tommy Cederholm. "Health effects of protein intake in healthy elderly populations: a systematic literature review." *Food & nutrition research* vol. 58 10.3402/fnr.v58.23364. 11 Feb. 2014, doi:10.3402/fnr.v58.23364

3. American College of Sports Medicine. 2015. Accessed on July 15, 2024 from <https://www.acsm.org/docs/default-source/files-for-resource-library/protein-intake-for-optimal-muscle-maintenance.pdf>





It starts early...

Prenatal Vitamins

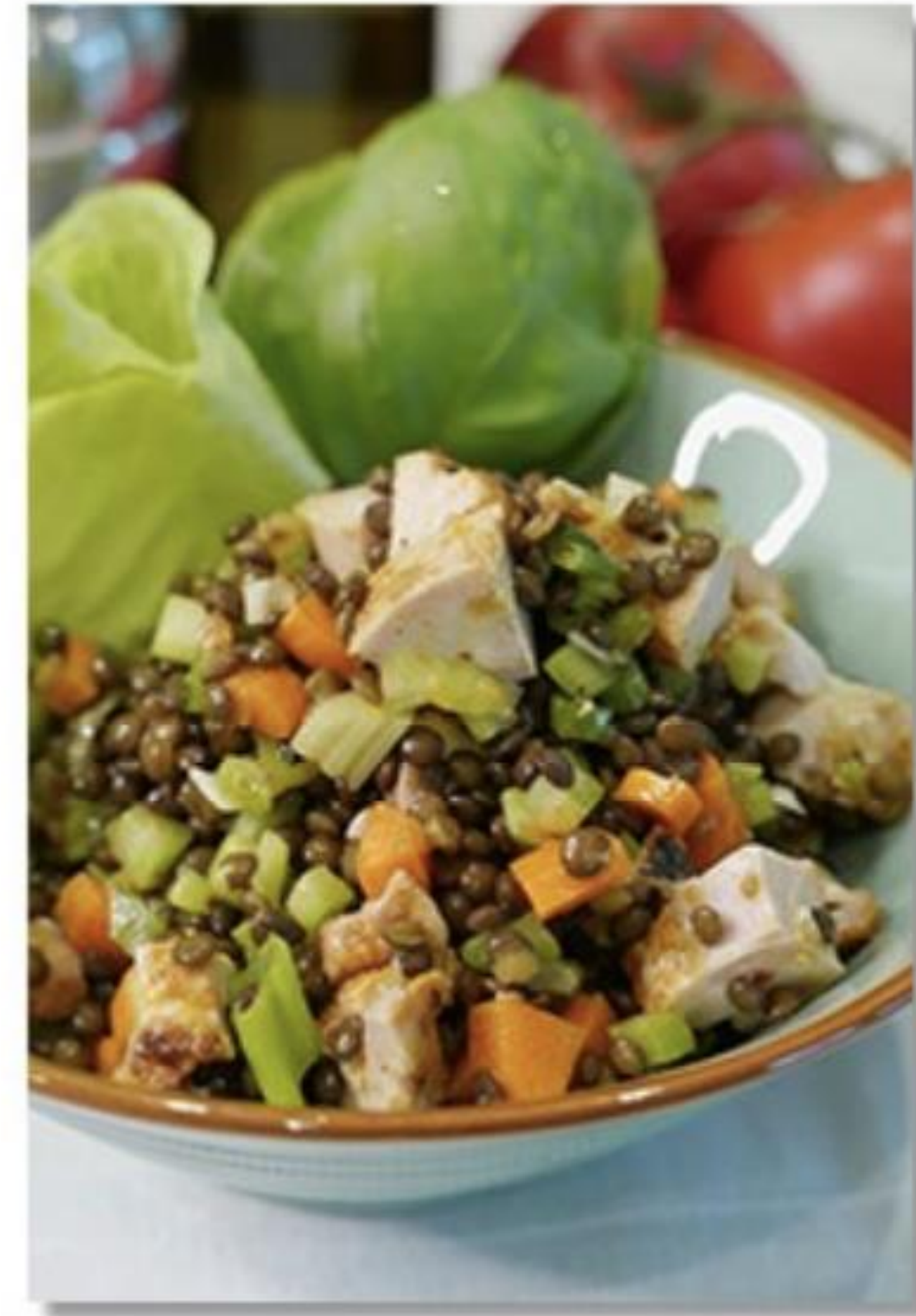
- No brand is typically recommended over another
- Most important are folic acid and iron
- All women are recommended to take prenatal vitamins
- For women with nausea and vomiting, consider alternatives
 - Folic acid alone
 - Gummy vitamins (note that they do not contain iron/calcium)

Oh, Christina, Emily C Keats, and Zulfiqar A Bhutta. "Vitamin and Mineral Supplementation during Pregnancy on Maternal, Birth, Child Health and Development Outcomes in Low- and Middle-Income Countries: A Systematic Review and Meta-Analysis." *Nutrients*, 12, no. 2 (February 2020): 491., <https://doi.org/10.3390/nu12020491>. (slide 17-36)



Folic Acid: Common Dietary Sources

1 cup edamame: 482 mcg
1 cup fortified cereal: over 200 mcg
1/2 cup cooked lentils: 179 mcg
2 Tablespoons peanut butter: 173 mcg
1/2 cup garbanzo beans: 141 mcg
1/c cup cooked asparagus: 134 mcg
1/2 cup cooked spinach: 132 mcg
1 cup collards cooked: 129 mcg
1 cup avocado: 122 mcg
1/2 cup fortified rice cooked: 98 mcg



U.S. Department of Agriculture. Food Data Central. <https://fdc.nal.usda.gov/>



Iron

- Mineral, important for hemoglobin production
- Actively transported across placenta for fetal hematopoiesis, independent of maternal iron stores
- Most common cause of anemia during pregnancy
- Recommended dose of elemental iron: 27 g/day (18 for nonpregnant)

Iron: Common Dietary Sources



- 1 cup fortified cereal: > 5 mg
- 1 tablespoon blackstrap molasses: 3.5 mg
- 1/2 cup cooked lentils: 3.3 mg
- 1/2 cup cooked spinach: 3.21 mg
- 3 oz cooked beef: 2.32 mg
- 1 oz roasted cashew nuts: 1.7 mg

Animal sources (heme-bound) provide greater bioavailability than plant-based sources (non-heme-bound).

Vitamin C can increase the bioavailability of non-heme sources.

Choline

- Essential nutrient, important for cellular structure and signaling, neurotransmitters, lipid transport
- Critical during fetal development for signaling proliferation and apoptosis
- Integral in formation of the brain, spinal cord and neural tube formation

Recommended amount is 450 mg/day
for pregnant women

Dietary sources include
1 slice beef liver: 353 mg
1 egg: 169 mg
3 ounces shrimp: 87 mg
2 tbsp wheat germ: 27 mg



U.S. Department of Agriculture. Food Data Central. <https://fdc.nal.usda.gov/>



Mediterranean Diet Benefits

Pregnancy Effects

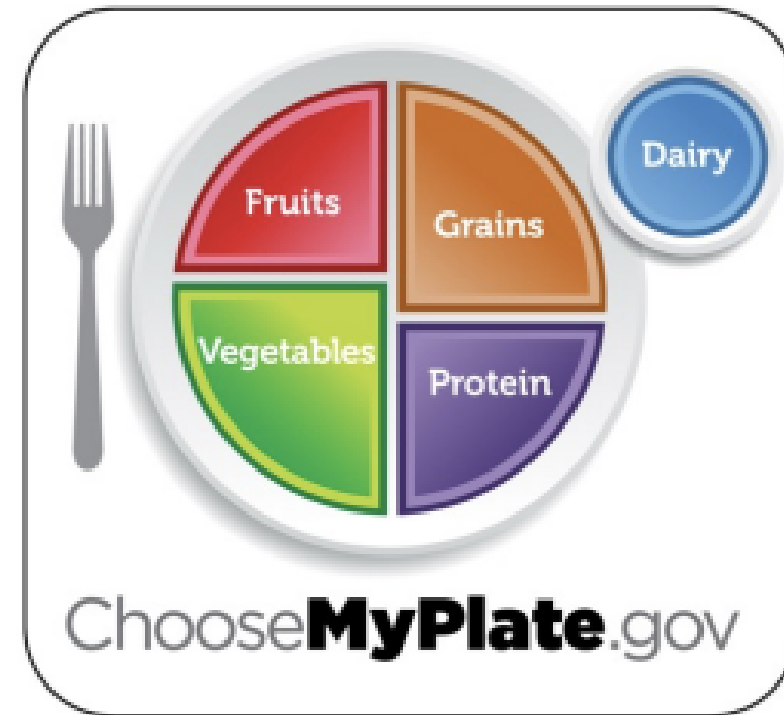
- Protective against the development of gestational diabetes
- Lower maternal gestational weight gain
- Increased fetal growth

Perinatal Effects

- Reduction in rate of preterm births
- Reduction in intrauterine growth retardation
- Reduction in occurrence of macrosomia

Zaragoza-Martí, Ana, Nuria Ruiz-Rodenas, Irene Herranz-Chofre, Miriam Sanchez-SanSegundo, Veronica de la Cruz Serrano Delgado, and Josen Antonio Hurtado-Sanchez. "Adherence to the Mediterranean Diet in Pregnancy and Its Benefits on Maternal-Fetal Health: A Systematic Review of the Literature." *Frontiers in Nutrition* 9, (March 2022). <https://doi.org/10.3389/fnut.2022.813942>.

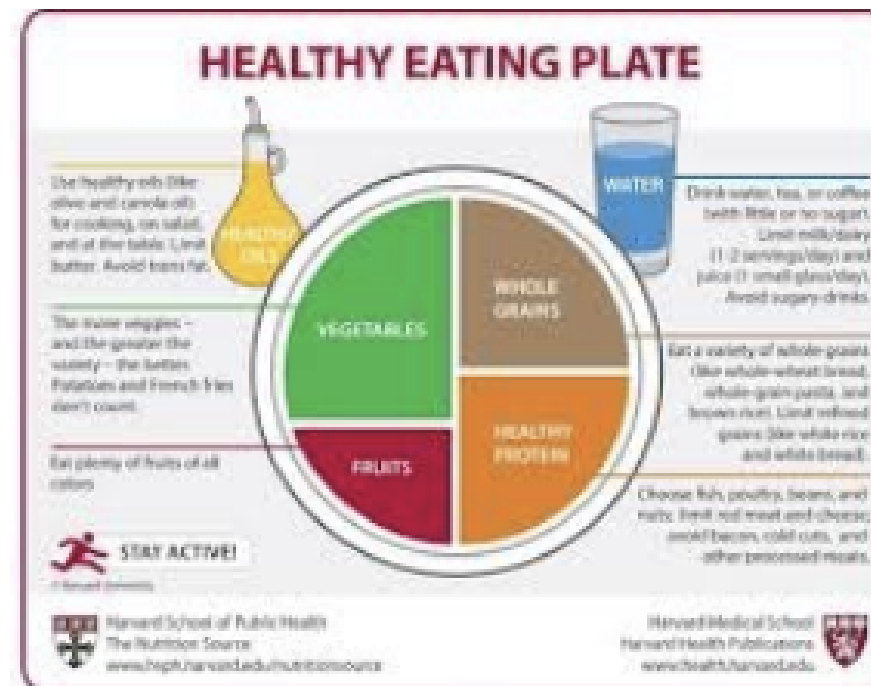




USDA MyPlate

- Shows proportions of food groups in balanced diet
- Protein < 1/4 of daily food intake
- Emphasis on half the plate being fruit and vegetables
- Approximately 1/3 of the plate as whole grains
- Interactive website to build personalized diet plan
- Educational material on foods, healthy eating habits and exercise with food tracker

Healthy Eating Plate



Harvard Plate

- Shows proportions of food groups in balanced diet
- Shows fats and water as part of a balanced diet
- Emphasis on half the plate being fruit and vegetables
- Approximately 1/4 of the plate as whole grains
- Reminds people to exercise by stating "Stay Active"



MyPlate Daily Recommendations

	Age	Protein Amounts
Children	2 - 3 years old	2 ounce equivalents
	4 - 8 years old	4 ounce equivalents
Girls	9 - 18 years old	5 ounce equivalents
Boys	9 - 13 years old	5 ounce equivalents
	14 - 18 years old	6 ½ ounce equivalents
Women	19 - 30 years old	5 ½ ounce equivalents
	31+	5 ounce equivalents
Men	19 - 30 years old	6 ½ ounce equivalents
	31 - 50 years old	6 ounce equivalents
	51+	5 ½ ounce equivalents

Nishimura, Yusuke et al. *Nutrition Research Reviews* 36.1 (2023): 69–85.

MyPlate. Accessed on Aug. 15, 2024, from: <https://www.myplate.gov/eat-healthy/protein-foods>



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Men	19 - 30 years old	6 ½ ounce equivalents
	31 - 50 years old	6 ounce equivalents
	51+	5 ½ ounce equivalents

Examples of protein servings considered as 1 ounce equivalent:

1 ounce of beef, pork, lamb, poultry or fish

1/4 cup cooked beans

1 large egg

1 tablespoon of peanut butter

1/2 ounce nuts or seeds

Nishimura, Yusuke et al. *Nutrition Research Reviews* 36.1 (2023): 69–85.

MyPlate. Accessed on Aug. 15, 2024, from: <https://www.myplate.gov/eat-healthy/protein-foods>



Conclusion

1. There is no bad food. There is only a lack of:
 - Balance
 - Moderation
 - Variety
2. Healthy food should look good.
3. Healthy food should taste good.
4. Healthy food should be affordable.



The Mediterranean Diet

The focus of this diet is 9 nutritious food groups. Adding just a few of these healthy food groups into your diet can result in better mental and physical health and may prevent deaths from heart disease and cancer.



Food Group	How Much?	Foods to Try
Vegetables	Aim for at least 3 to 4 servings per day	Dark leafy greens, carrots, squash, peppers, eggplant, cucumbers, tomatoes, broccoli, beets, cauliflower, asparagus
Legumes	Aim for at least 1 to 2 servings per week	Lentils, peas, beans, okra, chickpeas, peanuts, green beans, kidney beans (1 serving = ½ cup cooked legumes or ¼ cup peanuts)
Fruits and Nuts	Aim for at least 3 to 3.5 servings of fruit per day and at least 1 serving of nuts per week	Apples, berries, citrus, peaches, grapes, almonds, walnuts, cashews, pistachios 1 serving = 1 cup fresh fruit or ½ cup dried Nuts: 1/4 cup <i>per day</i>
Cereals and Whole Grains	Aim for at least 1 to 2 servings per day ("whole" grain on ingredient list)	Brown rice, corn, popcorn, quinoa, whole wheat breads/pastas, corn tortillas, oats, farro, bulgur
Seafood	Aim for at least two 4 oz servings per week	Cod, shrimp, rockfish, drum, tuna, salmon, crabs, clams, shrimp, scallops, oysters, mackerel
Oils / Fats	Choose plant-based fats over animal fats	Unsaturated oils such as olive, canola, sesame, sunflower, safflower, cottonseed
Dairy	Less than 1 cup (8 ounces) <i>per day</i>	Low fat and fermented: yogurt, cheese, kefir, cottage cheese, ricotta cheese
Land Animal Protein	Aim for less than 4 oz servings per day	Pork tenderloin, chicken breast or trimmed thigh, lean ground beef
Alcohol	Women: 1 drink <i>per day</i> Men: 2 drinks <i>per day</i>	All alcohols are included but should be consumed with meals. Avoid binge drinking.