

Heart Healthy Dietary Patterns: A Recipe for Life



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Disclosure

I have no financial interests or relationships to disclose.

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Contemplative Questions for Discussion

- What is the difference b/w “diet” and dietary pattern?
- What constitutes a heart healthy dietary pattern? Key elements & examples?
- Why less focus on the food pyramid & greater emphasis on “My Plate?”
- What/ Why a “recipe for life?”

3

Heart Healthy Dietary Patterns

- Dietary Principles
- Dietary Patterns that Promote CV Health
- Practical Pearls
- Controversies, Concerns, Questions
- Summary

4

Heart Healthy Dietary Patterns

- **Dietary Principles**
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Quest for Healthy Dietary Patterns Recent Phenomenon?

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Ludovicus Nonnius

Famous Antwerp Doctor (1553-1646)

One of the first to recognize
importance of a healthy diet

Most famous book, *Diaeteticon*,
published in 1627

Portrait by Peter Paul Rubens, 1627 (National
Gallery, London)



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Fast Forward from 1627 to 2005....

Journal of the American College of Cardiology
© 2005 by the American College of Cardiology Foundation
Published by Elsevier Inc.

Vol. 45, No. 9, 2005
ISSN 0735-1097/05/\$30.00
doi:10.1016/j.jacc.2004.11.068

STATE-OF-THE-ART PAPER

Diets and Cardiovascular Disease

An Evidence-Based Assessment

Parin Parikh, BA,* Michael C. McDaniel, MD,† M. Dominique Ashen, PhD, CRNP,*

Joseph I. Miller, MD,† Matthew Sorrentino, MD, FACC,‡ Vicki Chan, BS,*

Roger S. Blumenthal, MD, FACC,* Laurence S. Sperling, MD, FACC*

Baltimore, Maryland; Atlanta, Georgia; and Chicago, Illinois

With rising obesity, despite low-fat diet recommendations, there is an increased interest in weight loss and alternative dietary approaches for cardiovascular health. Physicians must have an understanding of the literature to better counsel their patients about diets and cardiovascular disease. This review examines several dietary approaches to cardiovascular health and evaluates the available scientific evidence regarding these diets. (J Am Coll Cardiol 2005;45: 1379-87) © 2005 by the American College of Cardiology Foundation

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2005 JACC

- 2005 highlighted JACC paper
- ACC CardioSurvey data
 - 90% of cardiologists reported no or minimal nutrition education in fellowship training
 - 95% of cardiologists believe their roles include personally providing patients with nutritional information

Devries S, et al. Am J Med 2017;130:1298-1305

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Top 10 Take Home Messages- 2018 Cholesterol Guideline

1. In all individuals, emphasize a heart-healthy lifestyle across the life course.

A healthy lifestyle reduces (ASCVD) risk at all ages. In younger individuals, healthy lifestyle can reduce development of risk factors and is the foundation of ASCVD risk reduction.



10



Top Take-Home Messages



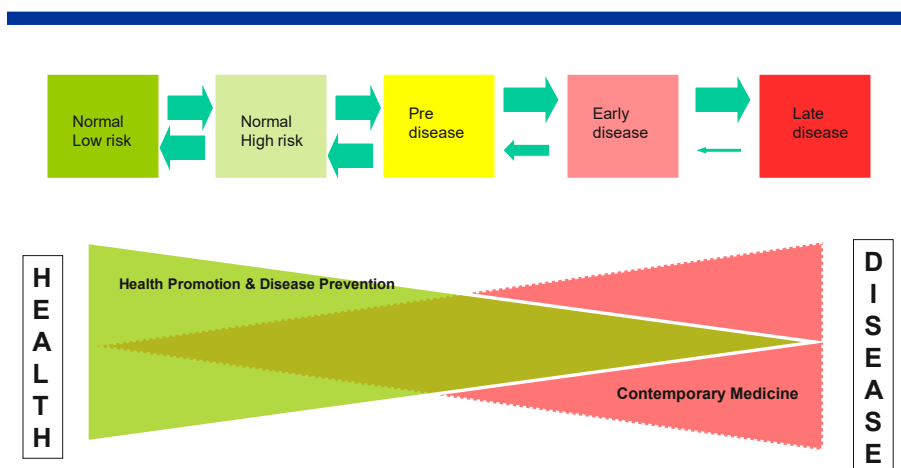
California Lifestyle Healthy Version of 2026 Dyslipidemia Guideline (Shared by Dr. Fatima Rodriguez Stanford)

- 1. Make Healthy dietary choices.** Enjoy vegetables, fruits, whole grains, beans, lentils, nuts, seeds, unsaturated fats, and lean proteins as a part of an overall healthy eating pattern. Limit ultra-processed foods that are high in saturated fats, added sugars, and sodium.

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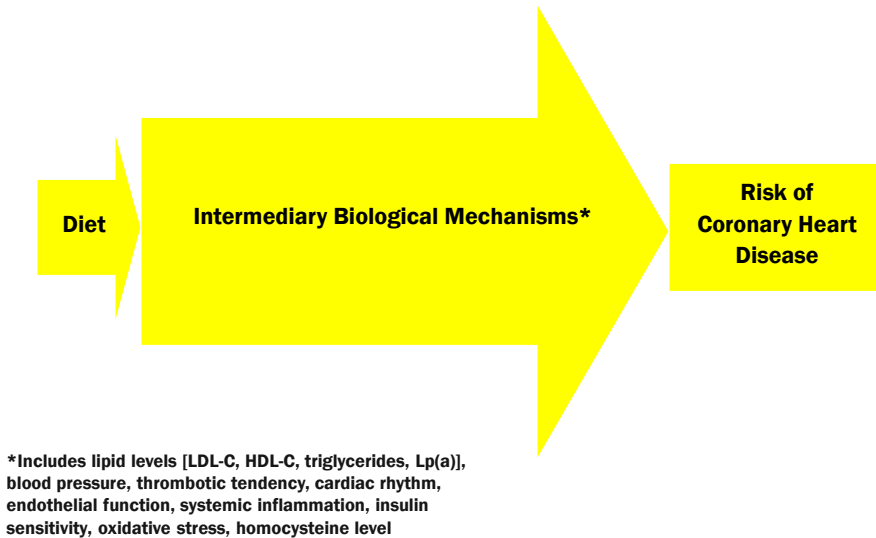
Focus on CV Population Health: The Health/Disease Continuum

Knapper JT, Quyyumi AA, Mensah GA, Sperling LS. JACC 2015;66:960-7



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Relationship Between Diet and CV Disease



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Elements of Dietary Pattern

- Composition
- Quality
- Quantity
- Adherence

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Caloric Mathematics

- 3500 calories = pound
- Caloric deficit : 500 cals/d = 1lb/wk
- 650,000 - 1,000,000 calories / year

15

The Twinkie Diet



- Kansas St. Univ. Nutrition Prof.
- 10 weeks
- Twinkies, Nutty Bars, powdered donuts....
- Doritos, sugar cereals, Oreos....
- MVI, protein shake, green beans
- **< 1800 cals/d**
- **LOST 27 LBS**

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Focus on Dietary Patterns: Problem with “Diets”

- Semantic confusion
 - “Diet” from Greek *diaita*.....a way of life
- Fad Diets
 - >95% who lose wt gain it back
 - restriction/complexity predict failure

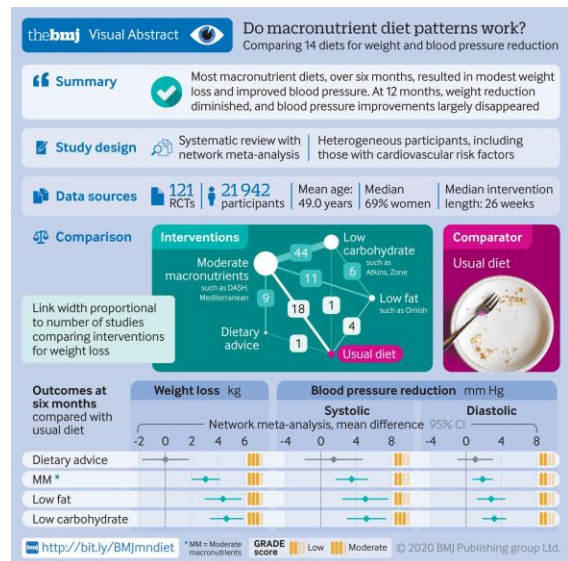
McGuire M et al. Journal Consulting and Clinical Psych 1999 67;2:177-85.

18

Popular Diets- Long-Term Benefit?

- Network meta-analysis 121 RCTs
- 22K participants
- Median age 49 ; BMI 33
- 14 named diets –low CHO, moderate macronutrients, low fat
- Effects diminished in 12 mo. with exception of LDL-C reductions with Med diet

Ge L, et al. BMJ 2020;369:m696

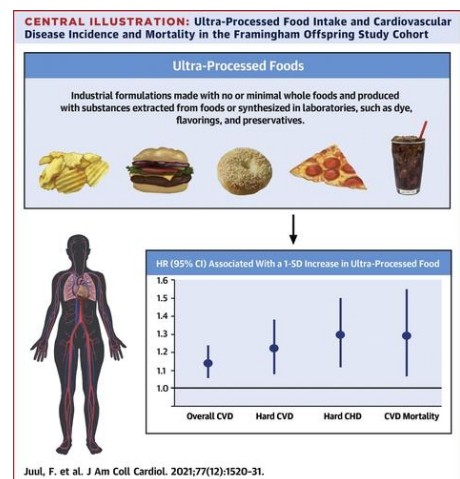


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Ultra-Processed Food & CVD

- **UPF provide 58% of total energy of U.S. diet**
 - Altered health benefits lacking nutrients, increased additives
- > 3K from Framingham Offspring Study (dietary intake followed 20 yrs; outcomes 30 yrs)
- Each additional serving UPF increase 7% CVD, (%CHD, CVD mortality 9%)
- Population-wide strategies needed

Juul F, et al. JACC 2021;77(12):1520-31



20

Eating Patterns in the United States

- > 90% of Americans eat more than 3 times per day
 - Mean =6 eating occasions / day
- **Median daily eating period is 14 hours**
- Only 10-15% of adults have a daily eating period < 12 hours
- Snacking: 240 kcal/day = 24 lb over 3 years(12 lb in yr 1)



Gill S, Panda S. Cell Metab (2015)

Popp CJ, et al. Nutrients (2021)

Petersen MC, et al. Physiol Rev (2022)

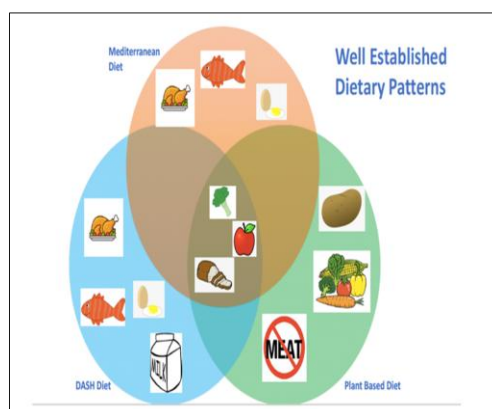
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Heart Healthy Dietary Patterns

- **Shared foundational components**
 - Fruits / veg's, legumes / nuts, whole grains
- CVD risk can be reduced by **as much as 28%** with health-promoting dietary patterns

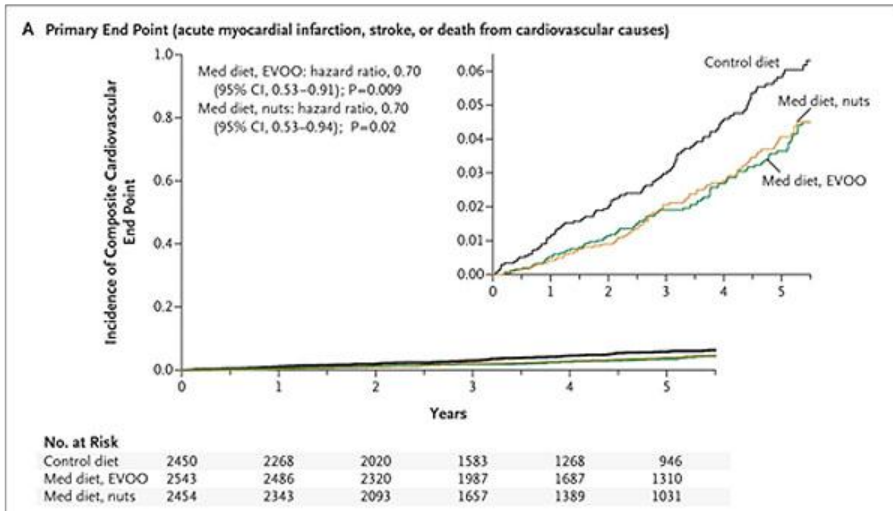
D'Souza MS, Freeman AM, Taub P, Sperling LS. Am J Med 2020;133 (10): 1126-1134

Zampelas A, et al. Proc Nutr Soc 2020;79(1): 68-75



22

Primary Prevention of Cardiovascular Disease with a Mediterranean Diet

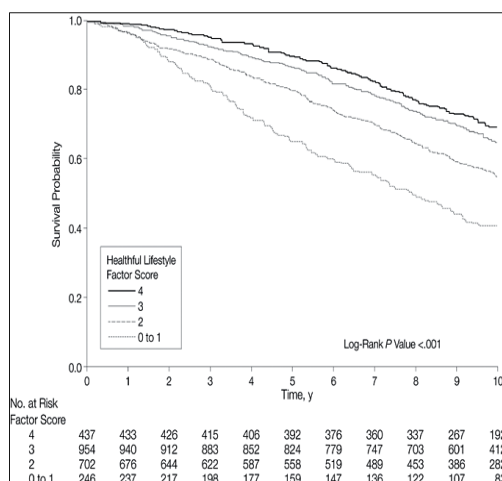


Estruch R et al. N Engl J Med 2013;368:1279-1290.



23

Mediterranean Lifestyle, and 10 Year Mortality in Elderly Europeans



- **Healthful Lifestyle Factors**
- Prospective study, 2300
- Adhering to Med diet, mod. Alcohol, physical activity, and non-smoking associated with lower risk **all-cause mortality (65% reduction)**
- Kim T, et al. JAMA 2004;292:1433-39

24

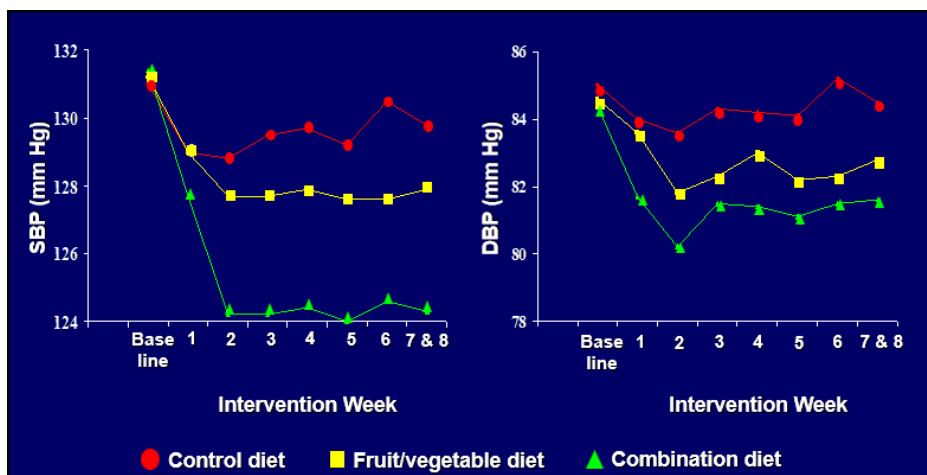
DASH: Effects of Diet on Blood Pressure

- **D**ietary **A**pproaches to **S**top **H**ypertension
- 459 adults mild HTN (<160/ 80-95)
8 wks
 - 1) Control diet *or*
 - 2) High fruit/vegetable diet *or*
 - 3) DASH combination diet (high fruit/vegetable, low saturated fat and cholesterol, high calcium, high potassium)
- **Sodium** intake and **body weight** remained **constant**

Appel LJ, et al. *N Engl J Med.* 1997;336:1117-1124.

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DASH Study Effects of Diet on Systolic and Diastolic Blood Pressure

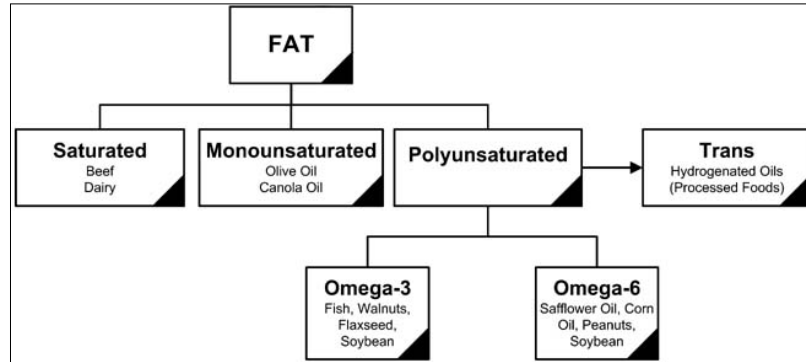


Appel LJ, et al. *N Engl J Med.* 1997;336:1117-1124.

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Classification of Fats

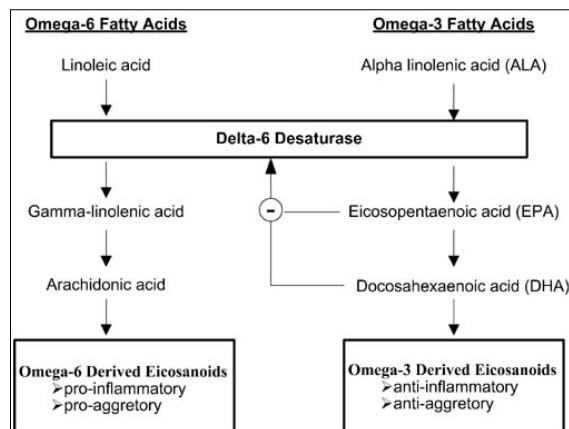
Defilippis AP and Sperling LS. Am Heart J 2006;151:565



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Metabolic Pathway of Omega-6 and Omega-3 Fatty Acids

Defilippis AP and Sperling LS. Am Heart J 2006;151:565



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Inuits- Dietary Adaptation

- Greenland Inuits
 - Ancestors lived on whales, seals, fish
 - Favorable FADS genetic variants detected
 - 95%
 - 15% Chinese
 - 2% Europeans



Nielsen R, et al. Science, (9/17/15)

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Fish and Seafood

- Prospective cohort studies support regular consumption of nonfried fish and seafood
- Associated with lower CVD events and MI
- Related to OM3 content or replacement of saturated fats?
- Fish oil supplementation alone not recommended; associated increased risk of atrial fibrillation



Lichtenstein AH, et al. Circulation 2026;153:e1285-e1295

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Salt and CVD- A Problem We Can Lick?

- 7227 participants – NHANES (What We Eat in America survey)
- > 75% sodium consumed from **processed foods** (65.2%) and **restaurants** (24.8%)
- Recommended by IOM
 - < 2300 mg for all
 - < 1500 mg for @ risk group

CDC MMWR : Vol. 61, Feb. 7, 2012



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Saving 100 Million Lives

- Goal- reducing sodium intake by 30% (1.7-3 million CVD deaths worldwide / yr)
- Population-wide reduction of sodium at the source- commercially processed & restaurant food

Frieden TR and Jaffe MG. J Clin Hypertens 2018;20: 208-211
He FJ, et al. JACC 2020;75(6)



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3 “Themes” of Heart Healthy Dietary Pattern

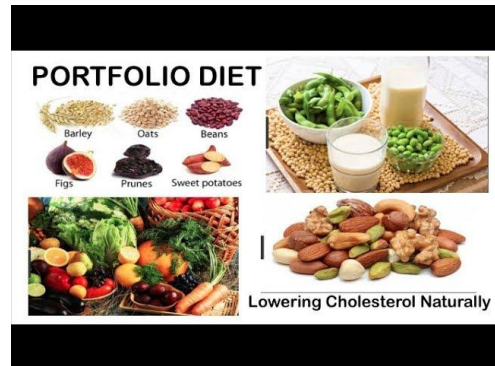
1. Mediterranean
2. Flexitarian
3. Cholesterol-lowering

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Portfolio Diet Score and Risk of CVD

- Findings from 3 prospective cohort studies;
> 200K; 30 years
- Cholesterol-lowering foods
 - Plant-based proteins
 - Nuts
 - Viscous fiber
 - Plant-based monounsaturated fats
- 14% lower composite risk of CVD

Glenn AJ, et al. Circulation 25 Oct 2023

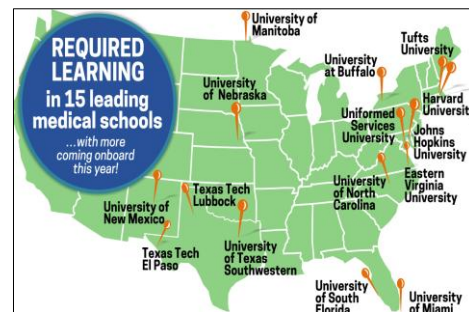


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Gaples Institute

- Balance nutritional education for general public, students, residents, clinicians
- Continually updated
- Many courses / resources free
- Some with modest cost

www.gaples_institute.org

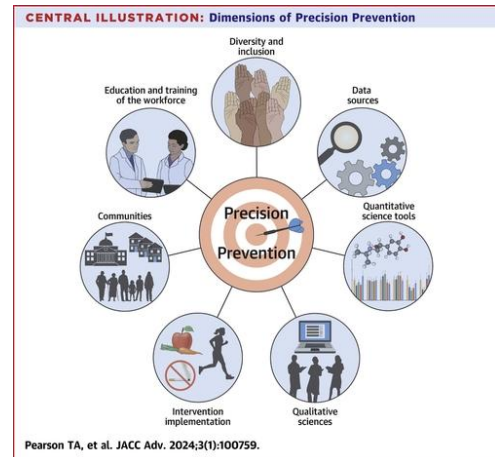


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The Science of Precision Prevention

Data-driven merger of Precision Medicine and Precision Public Health

Integration underscores opportunity to mitigate health disparities in individuals and communities



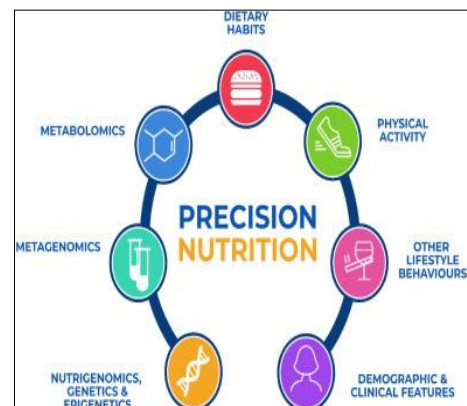
Pearson TA, et al. JACC Adv. 2024; 3(1): 100759.

Khoury MJ, et al. Am J Prev Med 2016;50(3):398-401

37

Precision Nutrition?

- Science / Technology
- Population public health-focused nutrition
- Public policy / environmental factors
- Industry / lobbies



Livingstone KM, et al. Trends in Food Science and Technology 2022;128:253-264

38

AI Nutrition?

- Machine learning; generative AI
- Personalized dietary recommendations, meal-plans, real-time tracking
- Digital coaching

Panayotova GG. Healthcare 2025;13(2): 2579



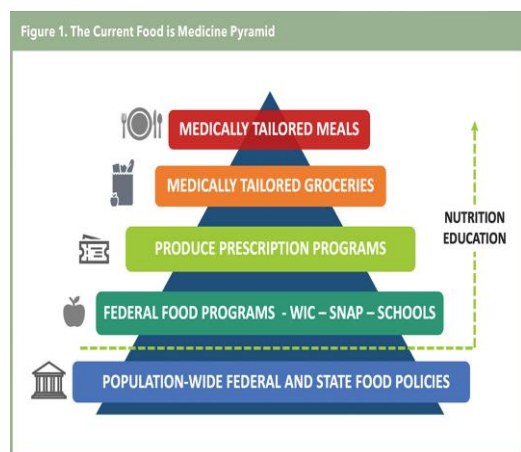
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Food Is Medicine: Components

- **Food Is Medicine within HHS**
 - Interventions with nexus between healthcare system and community by providing food that can help manage, treat, and prevent chronic conditions
- **Pyramid**
 - Top tiers focused on patients with greatest treatment needs
 - Lower tiers with broader impacts

<https://odphp.health.gov/foodismedicine>

Aspry KE, Malik FS. ACC Cardiology Magazine, Oct. 2023



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Heart Healthy Dietary Patterns

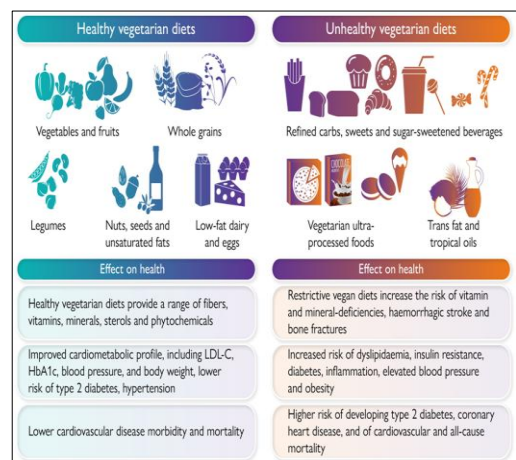
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Are All Vegetarian Diets Healthy?

- Extensive review
- Different types of plant-based diets
- Importance of dietary composition
- Replacing saturated fats with PUFAs (seeds and nuts) decreases CHD by 30%
- Analysis of 5 prospective studies (76K) lower CHD mortality than omnivores

Wang T, Masedunskas A, Willett WC et al. EHJ 2023;44:3423-3439



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Quality Rather than Quantity of Macronutrients Impact Mortality

- Prospective cohort 37K U.S. adults, NHANES, mean age 50, 298K person-years follow-up between '99 and '14
- 24 hour dietary recall-based scores
- Low-CHO and Low-fat diet scores not associated with mortality
- With each 20 percentile increase in poor quality mortality increased 6-7%
- With each 20 percentile improvement in quality mortality decreased 9-11%

Shan Z, et al. JAMA Intern Med 2020; doi 10.1001

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Processed Meat, Unprocessed Meat, Poultry Associated with CVD & All Cause Mortality

- Data from 6 U.S. prospective cohort studies, 30 K Adults, mean age 53, mean follow-up 19 years
- Composite of CV events
- Additional intake 2 servings / week
- Processed meat (HR 1.07)
- Unprocessed meat (HR 1.03)
- Poultry (HR 1.04)



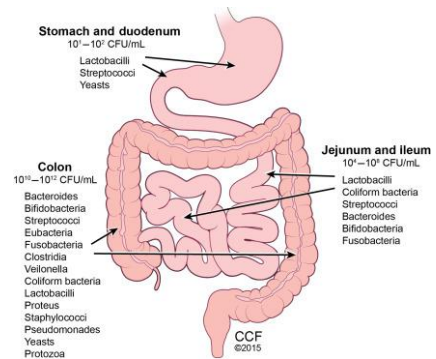
Zhong VW, et al. JAMA Int Med 2020;DOI: 10.1001

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Is Our Diet Turning Our Gut Microbiome Against Us?

- GMB **active intermediary** between us & diet
- Metabolites independent impact on health / risk for heart disease
- **TMAO** (trimethylamine N-oxide) synthesized from choline, L –carnitine (nutrients most abundant in food of animal origin)

Heidenreich PA, Mamic P. JACC 2020
Heianza Y, et al. JACC 2020;75(7)



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Southern Diet Associated with Higher Stroke Risk

- REGARDS study
 - Reasons for Geographic & Racial Differences in Stroke
 - > 20K, age > 45, weekly diet habits, > 5 yr f/u
- Southern dietary pattern
 - 41% increased risk / 63% in AA
- Med type diet
 - 29% lower risk

Judd S, et al. , presented 2/7/13, Am Stroke Association meeting

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“Portion Distortion”

Understanding + controlling **portion, package, and tableware size** –key to limiting caloric intake (22-29% reduction)

Serving size....cup pasta...baseball

Blackburn GL, Cleveland Clinic Journal of Medicine 2005; 72(7)
Cochrane Library Review, 9/14/15

Hardee's "Monster" Thickburger
2 1/3-pound slabs of Angus beef
4 strips of bacon
3 slices of cheese
Mayonnaise
Buttered sesame seed bun



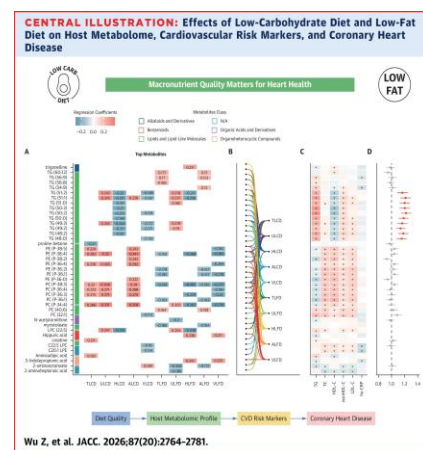
1420 Calories
107 g Fat

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Role of Dietary Quality in Determining Health Effects on CHD Risk

- Simultaneous evaluation of dietary and health variables, biomarkers and metabolic data from 3 large prospective cohort studies (5.2 M person-years follow-up)
- High quality-macronutrient LCD and LFD associated with lower CHD risk

Wu Z, et al. JACC 2026; 87(20): 2764-2781



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From Fad to Fact

D'souza MS, Dong TA, Freeman AM, Taub P, Sperling LS. Am J Med 2020;133 (10): 1126-1134

	Mediterranean Diet	Plant Based Diet	DASH Pattern	Ketogenic Diet	Intermittent Fasting
					
Obesity	✓	✓	✓	⌚	✓
Dyslipidemia	✓	✓	✓	⌚/✗	✓
Hypertension	✓	✓	✓	✓	✓
Diabetes	✓	✓	✓	✓	✓
Prevention of Cardiovascular Disease	✓	✓	✓	?	?
	✓ Demonstrated Benefit	✓ Prevention Benefit	⌚ Short-term Benefit Only	? Unclear Impact	✗ Demonstrated Harm

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Alternate Day Fasting vs. Time Restricted Feeding

- Potential metabolic benefits
- Potential wt loss/ improvement in CV RF's
- Caution in diabetics treated with hypoglycemic meds
- Larger trials needed to elucidate optimal regimens, impact on circadian rhythms, and outcomes

D'Souza MS, Freeman AM, Taub P, Sperling LS. Am J Med 2020;133 (10): 1126-1134

Intermittent Fasting Method		Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Alternate Day Fasting (ADF)	12am - 12pm							
	12pm - 8pm							
	8pm - 12am							
Time Restricted Feeding (TRF)	12am - 12pm							
	12pm - 8pm							
	8pm - 12am							

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Intermittent Fasting: A Heart Healthy Dietary Pattern?

Dong TA, Sandesara PB, Dhindsa DS, Dolar AL, Taub P, Sperling LS. Am J Med 2020;133 (8): 901-907

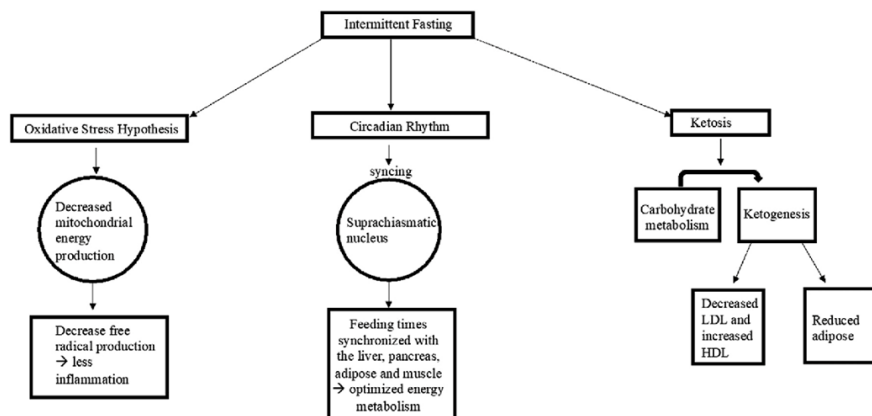


Figure 1 Mechanisms of intermittent fasting: Proposed mechanisms of how intermittent fasting reduces cardiovascular risk.

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Lewis et al. J Cardiovasc Aging 2023;3:14
DOI: 10.20517/jca.2023.1

The Journal of Cardiovascular Aging

Review Open Access

Can age be a modifiable risk factor? the impact of dietary patterns on the molecular mechanisms that underlie cardiovascular aging

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How to cite this article: Lewis SA, Britt WM, Koch RL, Razavi AC, Patel P, Sperling LS, D'Souza MS. Can age be a modifiable risk factor? the impact of dietary patterns on the molecular mechanisms that underlie cardiovascular aging. J Cardiovasc Aging 2023;3:14. <https://dx.doi.org/10.20517/jca.2023.1>

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Abstract
Aging is the number one risk factor for the development of cardiovascular disease (CVD). Therefore, an evaluation of therapies for the prevention of CVD should focus on factors that slow down aging, particularly cardiovascular aging. There are various proposed mechanisms that advance cardiovascular age; in this review, we focus on chronic inflammation, oxidative stress and epigenetics as the primary drivers of aging. Furthermore, we will evaluate several dietary patterns on their impact on these aging mechanisms. The traditional "heart-healthy" dietary patterns such as the Mediterranean diet, plant-based diet and intermittent fasting will be evaluated for their performance to slow down the aforementioned aging mechanisms. The aim of this review will be to guide practitioners and patients on the dietary components that can slow down the effects of aging to prevent CVD.

Keywords: Cardiovascular aging, dietary patterns, chronic inflammation, epigenetics, oxidative stress

Lewis SA, Britt WM, Koch RL, Razavi AC, Patel P, Sperling LS, D'Souza MS.
Can age be a modifiable risk factor? the impact of dietary patterns on the
molecular mechanisms that underlie cardiovascular aging.

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Table 1. Primary effects of dietary patterns on inflammation

Diet	Mediterranean diet	Plant-based dietary pattern	Intermittent fasting
Primary effect on inflammatory markers	↓CRP, IL-8, IL-6, TNF-α, MCP-1	↓CRP	↓CRP, IL-6
Proposed mechanisms	• High in anti-inflammatory polyphenols and long-chain fatty acids • Direct attenuation of immune cell pathways • Anti-platelet effects • Alteration of GI flora	• High in anti-inflammatory nutrients, polyphenols, and long-chain fatty acids • Decreased exposure to proinflammatory metabolites of animal products	• Highly effective for weight loss • Increased release of adiponectin, with vasorelaxant effect and decreased adhesion of monocytes to endothelial cells • Improved insulin sensitivity
Limitations	• Difficult to standardize across trials	• Difficult to standardize across trials • Can increase the risk of nutrient deficiency	• Different temporal fasting patterns • Lack of dietary guidance • Long-term sustainability

Lewis SA, Britt WM, Koch RL, Razavi AC, Patel P, Sperling LS, D'Souza MS.
Can age be a modifiable risk factor? the impact of dietary patterns on the molecular mechanisms that underlie cardiovascular aging.

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CENTRAL ILLUSTRATION: Evidence for Cardiovascular Health Impact of Foods Reviewed

Summary of heart-harmful and heart-healthy foods/diets

Evidence of harm; limit or avoid

 Coconut oil and palm oil are high in saturated fatty acids and raise cholesterol

 Eggs have a serum cholesterol-raising effect

 Juicing of fruits/vegetables with pulp removal increases caloric concentration*

 Southern diets (added fats and oils, fried foods, eggs, organ and processed meats, sugar-sweetened drinks)

Inconclusive evidence; for harm or benefit

 Sunflower oil and other liquid vegetable oils

 High-dose antioxidant supplements

 Juicing of fruits/vegetables without pulp removal*

 Gluten-containing foods (for people without gluten-related disease)

Evidence of benefit; recommended

 Extra-virgin olive oil reduces some CVD outcomes when consumed in moderate quantities

 Blueberries and strawberries (>3 servings/week) induce protective antioxidants

 30 g serving of nuts/day. Portion control is necessary to avoid weight gain.†

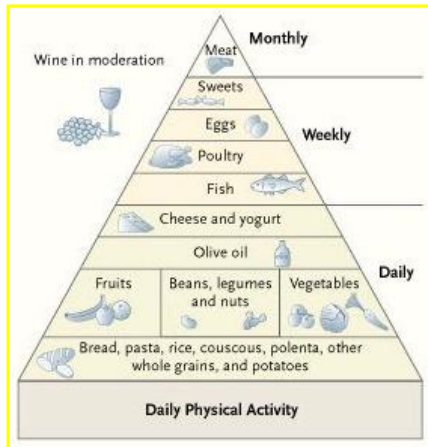
 Green leafy vegetables have significant cardio-protective properties when consumed daily

 Plant-based proteins are significantly more heart-healthy compared to animal proteins

Freeman, A.M. et al. J Am Coll Cardiol. 2017;69(9):1172-87.

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Dietary Pyramid?



Hu FB. *N Engl J Med.* 2003;348:2595-2596.

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USDA Nutrition Guidelines – June 2011

7 Key Messages

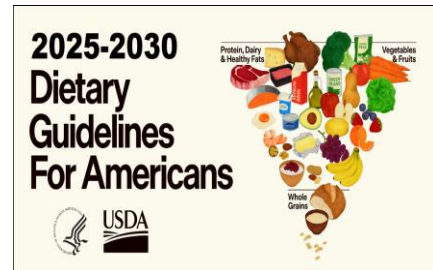
1. Enjoy food but eat less
2. Avoid oversized portions
3. half plate fruits/vegs
4. Water over sugary drinks
5. Fat free /low-fat milk
6. Compare sodium in foods
7. > half grains whole



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Dietary Guidelines for Americans

- Establish foundation for nation's food policy and nutrition assistance programs.
- Emphasize what is good
 - Document 10 pages (prior 164)
 - USDA GL Fact Sheet
 - Whole foods
 - Avoiding added sugar and highly processed foods



www.dietaryguidelines.gov; Jan 13, 2026

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Alcohol: An Ounce of Prevention?

- Relationship challenging
- Possible protective association for CVD although residual confounding
- Linear relationship with BP
- ***caloric impact
- Initiation of alcohol at any level to improve CV health is not recommended
- If alcohol is not consumed do not start; if alcohol is consumed, limit intake



Lichtenstein AH, et al. Circulation 2026;153:e1285-e1295

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- **Summary**

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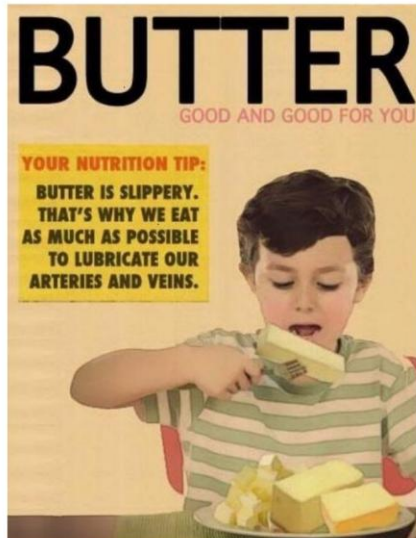
OPTIMAL DIET FOR CV HEALTH? Evidence?

- **Low-CHO Diets**
 - Short-term Wt ↓; long-term effects unknown
- **Glycemic Index**
 - guide to decreased consumption of energy dense carbs
- **Very-Low Fat Diets**
 - Possible ↓ CV events; concerns about sustainability
- **Mediterranean Diet**
 - Primary and secondary prevention; ↓ metabolic syndrome ; healthy; sustainable
- **DASH**
 - ↓ BP; similar to Mediterranean

Modified from Parikh P, McDaniel M, Ashen D, **Miller J**, Sorrentino M, Blumenthal R, **Sperling LS**.
Diets and CV Disease: An Evidence-Based Assessment, JACC 2005;45:1385

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Importance of Caution with Dietary Messages



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Cardiovascular Benefits of Dark Chocolate

- Cacao beans used as currency for Aztecs
- Benefits related to **epicatechin** (flavanol)
- NO bioavailability & mitochondrial function
- Favorable effects on BP, lipids, inflammation
- Lower risk CAD, stroke , CV mortality

Kowk C, et al. Heart 2015;101(16)1279-87

Higginbotham E, Taub PR. Current Treatment Options CV Medicine, 2016



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U.S. News & World Report

> 50 Diets Rated
(available evidence)

Panel of 43 experts

Multiple parameters

ST wt loss

LT wt loss

Diabetes

Heart health

Ease of compliance

Nutritional completeness

Health risks



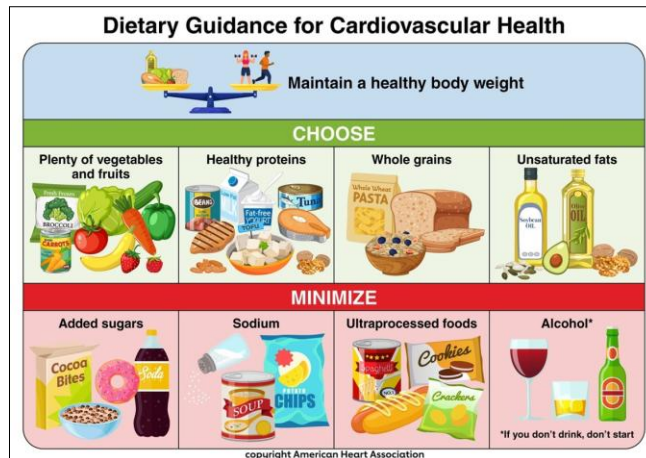
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2024 U.S. News Best Diets

- **Overall Best**
 - Mediterranean
 - DASH
 - MIND
- **Best Heart-Healthy**
 - Mediterranean
 - DASH
 - Ornish
- **Easiest to Follow**
 - Mediterranean
 - Flexitarian
 - DASH

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2026 Dietary Guidance to Improve CV Health: Scientific Statement from American Heart Association



Lichtenstein AH, Khera A, et al. Circulation 2026; 153: e1285-e1295L.

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Summary-Heart Healthy Dietary Patterns

- Dietary patterns vs. “Diets”
- Evidence to implementation
- People, Populations, and Clinicians interested in heart healthy dietary patterns
- Heart healthy dietary patterns have common “themes”
- Still a lot to learn
- Not as simple as giving advice to “eat better and lose weight”

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ARS Question #1

All Are Dietary Patterns That Promote Cardiovascular Health Except:

- A. DASH
- B. Keto
- C. Mediterranean
- D. Plant-based whole food



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ARS Question #2

Which Statement Is Supported by Evidence/Guidelines:

- A. Alcohol is recommended for CVD prevention
- B. Ultra-processed foods are not correlated with CVD risk
- C. Dietary fish and seafood is associated with lower CVD risk
- D. Portion control is not important for caloric balance



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