


Foundations of Cardiometabolic Health Certification Course

Certified Cardiometabolic Health Professional (CCHP)



Treatment: non- pharmacologic approaches (lifestyle approaches) for hypercholesterolemia

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Outline



How much does lifestyle matter?



Dietary patterns that promote cholesterol management



The role of physical activity



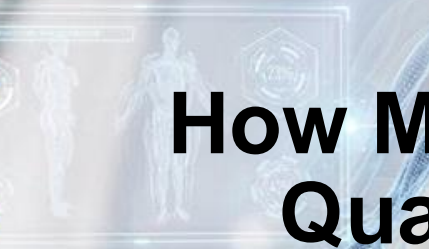
Level of ASCVD risk matters



Key takeaways

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How Much Does Diet Quality Matter?

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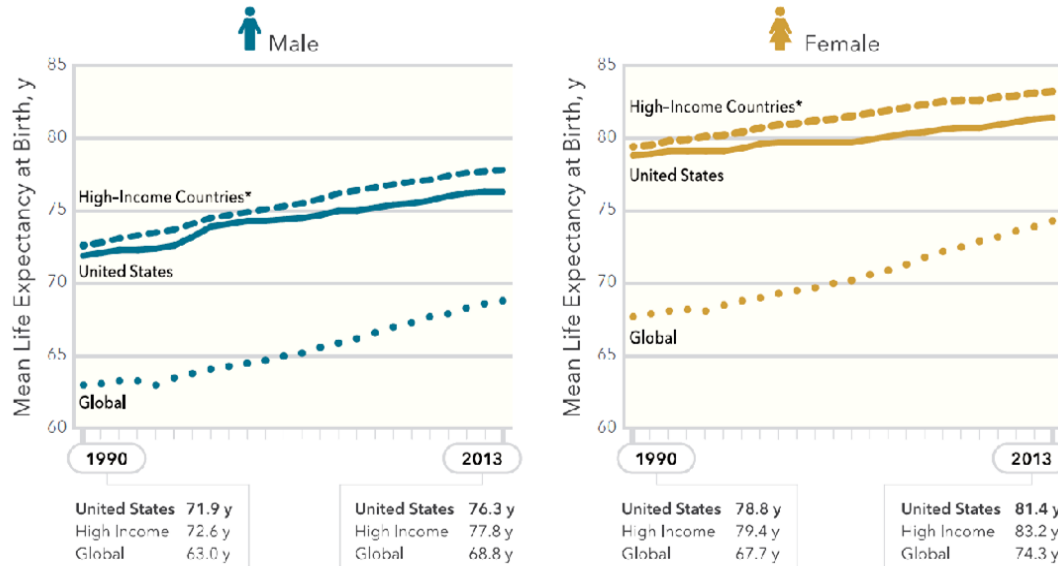
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Diet is an independent risk factor for morbidity and mortality

Diet quality matters! Diet accounts for 11 million deaths and 255 million disability-adjusted life years globally

When and Why People Die in the United States, 1990-2013

Change in Life Expectancy for Males and Females, 1990-2013



*World Bank-defined (includes United States)

TOP 10 CAUSES OF DEATH AND ASSOCIATED RISK FACTORS IN THE UNITED STATES, ALL AGES, 2013

Cause of Death

Male		Female
Ischemic Heart disease (20.3%)	1	Ischemic Heart disease (20.3%)
Alzheimer disease (8.3%)	2	Alzheimer disease (12.7%)
Lung Cancer (7.4%)	3	Cerebrovascular disease (7.3%)
COPD (5.8%)	4	Lung Cancer (5.7%)
Cerebrovascular disease (5.0%)	5	COPD (5.6%)
Lower respiratory infections (3.0%)	6	Lower respiratory infections (3.4%)
Diabetes (2.8%)	7	Breast cancer (3.4%)
Prostate cancer (2.8%)	8	Diabetes (2.8%)
CKD (2.7%)	9	CKD (2.6%)
Colorectal cancer (2.6%)	10	Colorectal cancer (2.5%)

Associated Risk Factors

Male		Female
Dietary Risk	1	Dietary Risk
Tobacco smoke	2	Blood pressure
Blood pressure	3	Tobacco smoke
BMI	4	BMI
Fasting Plasma glucose	5	Fasting Plasma glucose
Total cholesterol	6	Total cholesterol
Low Physical Activity	7	Low Physical Activity
Glomerular Filtration	8	Glomerular Filtration
Air pollution	9	Air pollution
Occupational Risk	10	Alcohol and drug use

Marczak, Laura, Kevin O'Rourke, and Dawn Shepard. *Jama* 315.3 (2016): 241-241.

Afshin A et al. *The Lancet*.2017

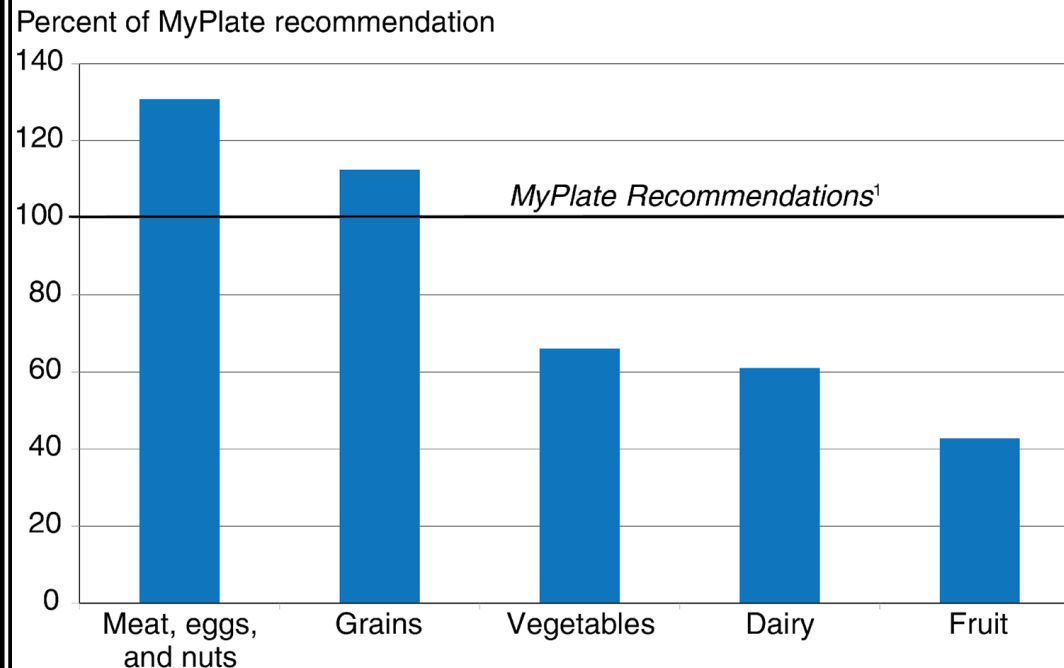
Diets among US Adults Need Improvement

Figure I-1
Adherence of the U.S. Population to the *Dietary Guidelines* Over Time, as Measured by the Average Total Healthy Eating Index-2015 Scores



NOTE: HEI-2015 total scores are out of 100 possible points. A score of 100 indicates that recommendations on average were met or exceeded. A higher total score indicates a higher quality diet.
Data Source: Analysis of What We Eat in America, National Health and Nutrition Examination Survey (NHANES) data from 2005-2006 through 2015-2016, ages 2 and older, day 1 dietary intake data, weighted.

Average U.S. consumption compared to recommendations, 2013



Note: Rice data were discontinued and thus are not included in the grains group.
 ¹Based on a 2,000-calorie diet.
 Source: USDA, Economic Research Service, Loss-Adjusted Food Availability Data.

The widely used Healthy Eating Index (HEI) measures how well your diet aligns with US Dietary Guidelines

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Dietary Patterns That Promote Cholesterol Management

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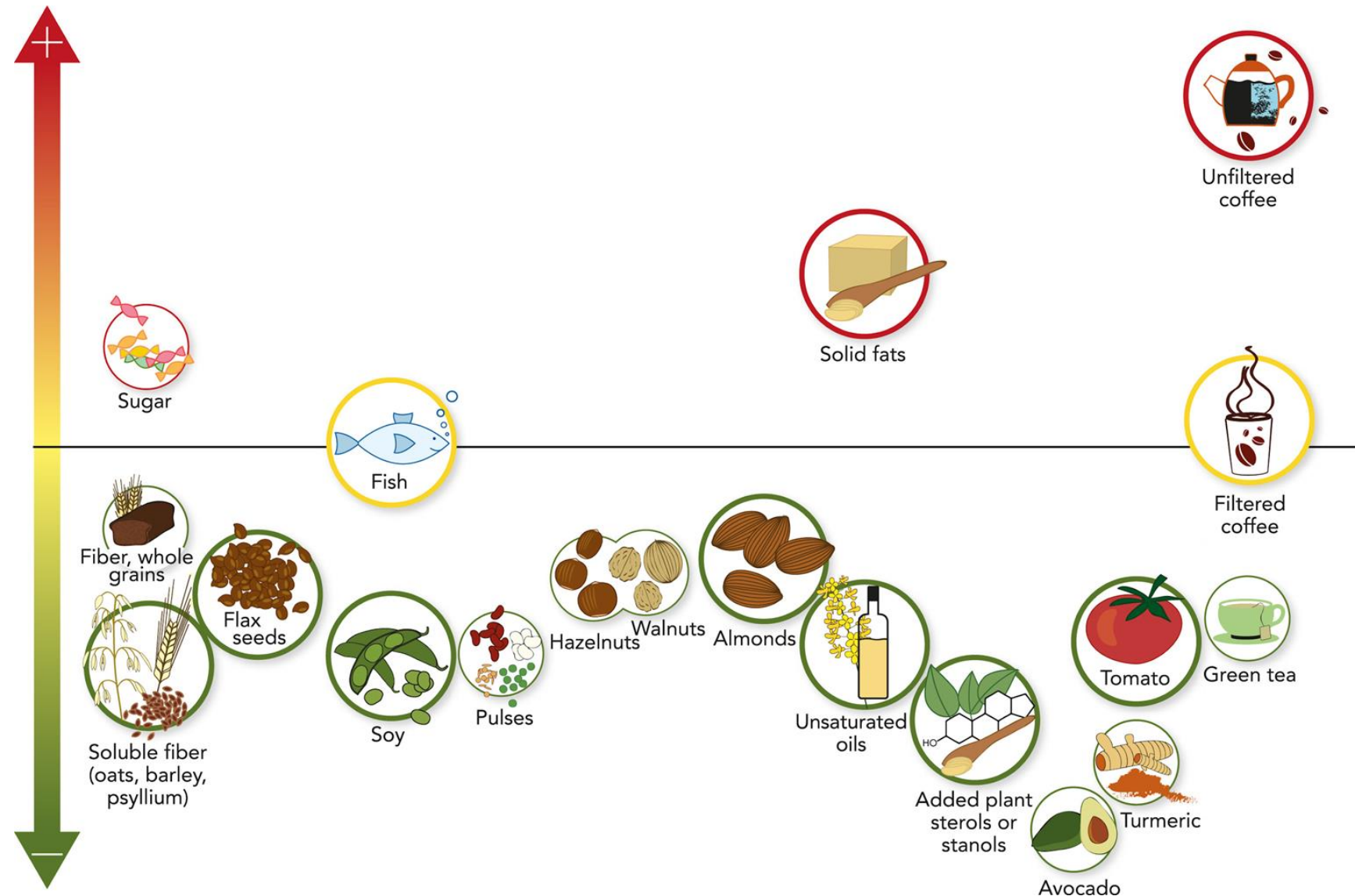
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Dietary patterns that promote cholesterol management: it's not all about dietary cholesterol

Dietary cholesterol is not a specific focus of dietary patterns to reduce cholesterol

Healthy dietary patterns like the Mediterranean-style and DASH (Dietary Approaches to Stop Hypertension) patterns are **INHERENTLY** low in cholesterol.

Foods that modify LDL cholesterol by effect and strength of the evidence. Larger circles indicate high GRADE evidence. Smaller circles indicate moderate GRADE evidence



The effects of foods on LDL cholesterol levels: A Systematic review of the accumulated evidence from systematic reviews and meta-analyses of randomized controlled trials.

2021. <https://doi.org/10.1016/j.numecd.2020.12.032>



What is the DASH Diet?



Key components of The DASH dietary pattern

The DASH eating plan requires no special foods and instead provides daily and weekly nutritional goals.

Eating vegetables, fruits, and whole grains

Including fat-free or low-fat dairy products, fish, poultry, beans, nuts, and vegetable oils

Limiting foods that are high in saturated fat, such as fatty meats, full-fat dairy products, and tropical oils such as coconut, palm kernel, and palm oils

Limiting sugar-sweetened beverages and sweets.

**Why DASH,
Mediterranean,
and Other Healthy
Patterns Promote
Cholesterol
Management**

High in fiber

Higher ratio of unsaturated
fats to saturated fats

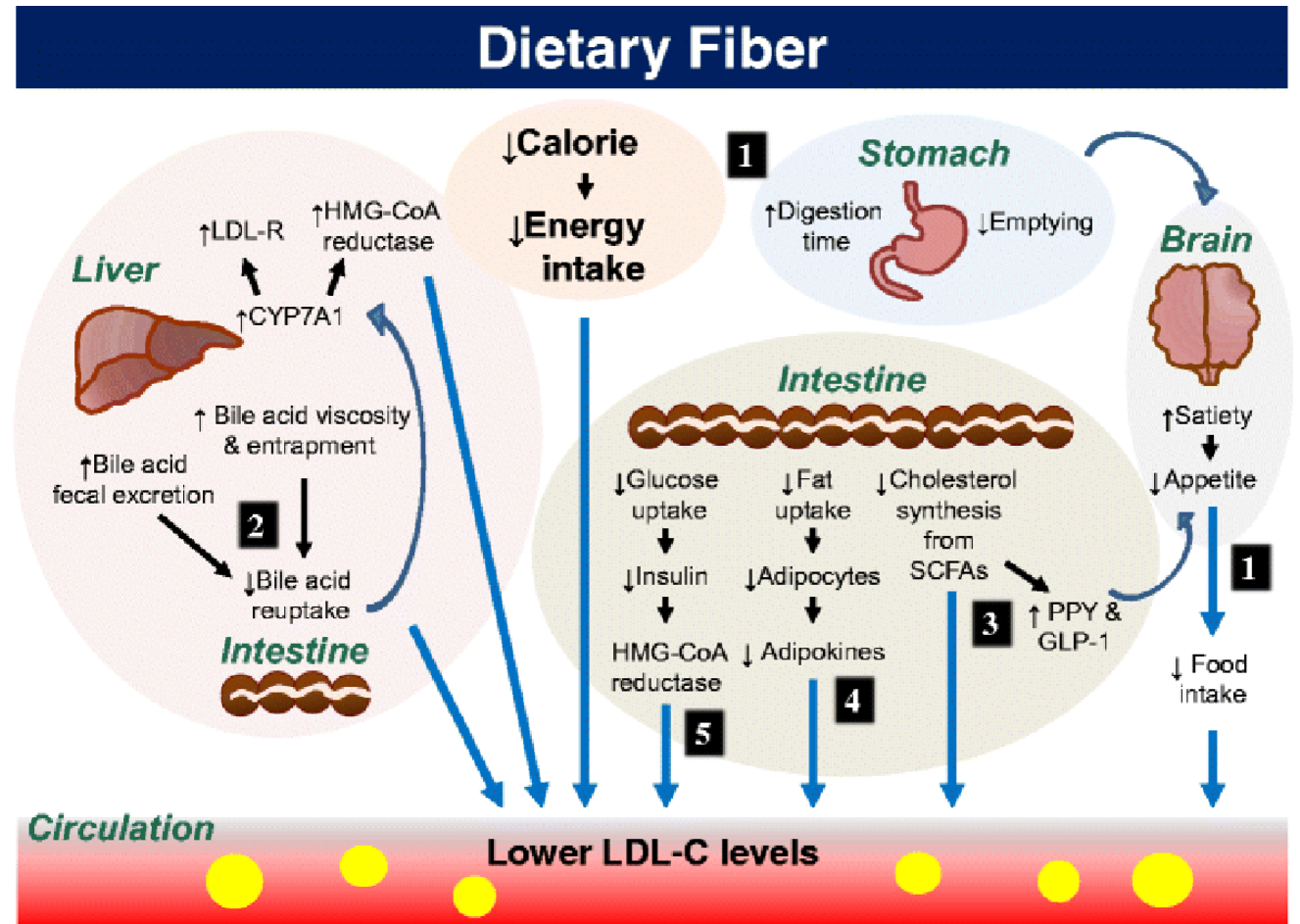
Low in trans fats

Moderate in dietary
cholesterol

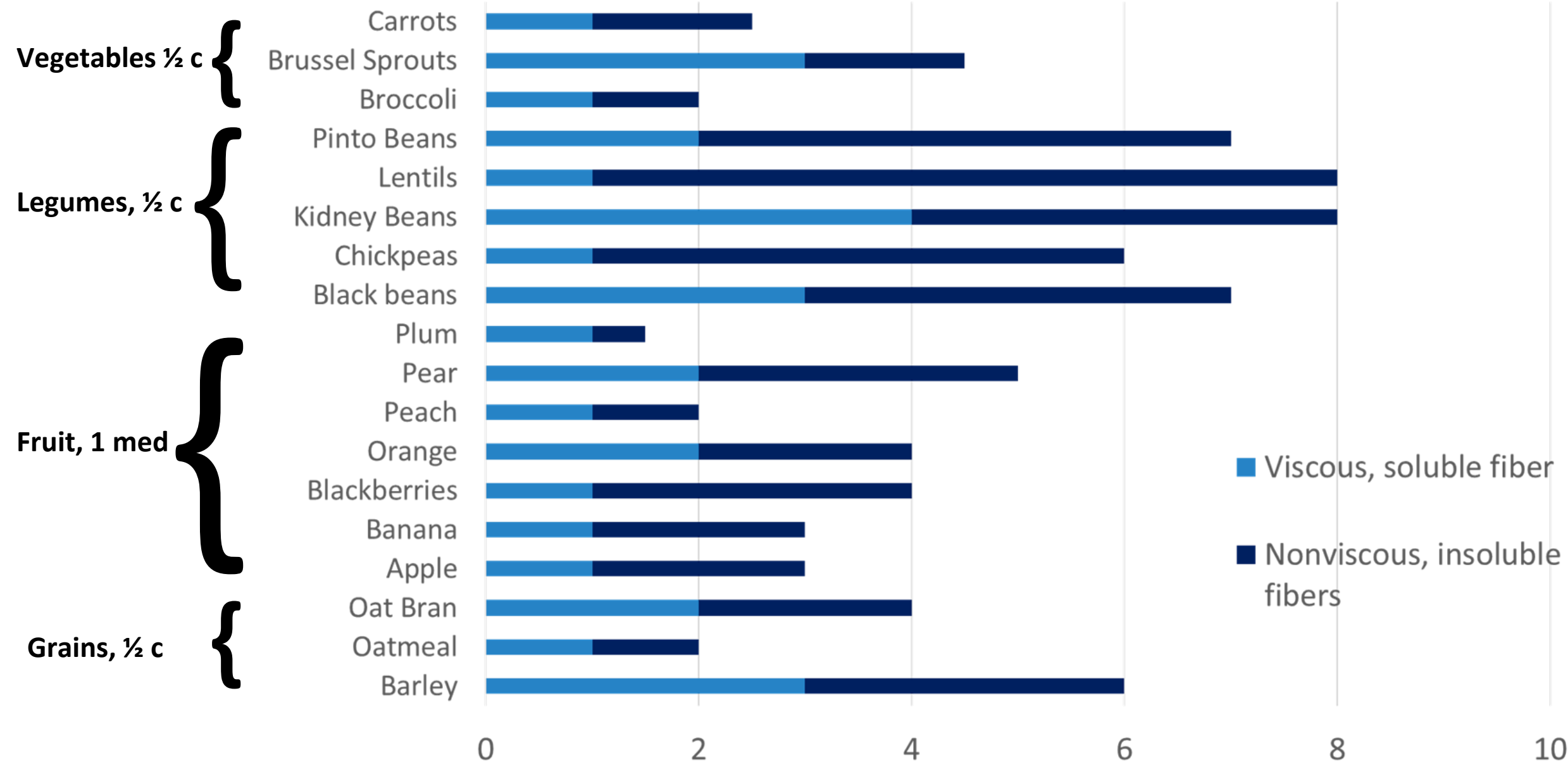


Mechanisms of Fiber

- Current Atherosclerotic Reports 2016 18:75



Fiber Grams per Serving



Trans Fatty Acids

DRI: consume as little as possible

- Have been shown to:
 - *Raise LDL and lower HDL*
 - *Produce inflammation*
 - *Increase the risk of heart disease*



On Monday, June 18, the U.S. Food and Drug Administration (FDA) officially **banned** the use of trans fats, or partially hydrogenated oils (PHOs), in all foods sold in American restaurants and grocery stores.

Removing PHOs, the FDA notes, "could prevent thousands of heart attacks and deaths each year." Trans fats are widely known to raise low-density lipoprotein (LDL) levels, lower high-density lipoprotein (HDL) cholesterol levels and increase an individual's risk of developing heart disease, stroke and type 2 diabetes.

Artificial *trans* fats have been removed from the US Food Supply since January 1, 2020

Replacing foods high in saturated and trans fat with unsaturated fats

Among 15 RCTs (16 comparisons, ~59,000 participants), that used a variety of interventions from providing all food to advice on reducing saturated fat:

- Reducing dietary saturated fat reduced the risk of combined cardiovascular events by **21%** (RR: 0.79; 95% CI: 0.66 to 0.93)
- A reduction of LDL-cholesterol by at least 0.2 mmol/L
- Most benefit currently seen by replacing saturated fats with polyunsaturated fats or non-refined grain carbohydrates

GOOD FATS vs. BAD FATS



Hooper L et al. Reduction in saturated fat intake for cardiovascular disease. Cochrane Database Syst Rev. 2020. doi: 10.1002/14651858.CD011737.pub2.

Effects of reducing saturated fat compared to usual saturated fat on CVD risk in adults

Low saturated fat compared with usual saturated fat for CVD risk

Patient or population : people at any baseline risk of CVD

Intervention : lower saturated fat intake

Setting: Any, including community-dwelling and institutions. Includes RCTs were conducted in North America, Europe and Australia/ New Zealand, no studies

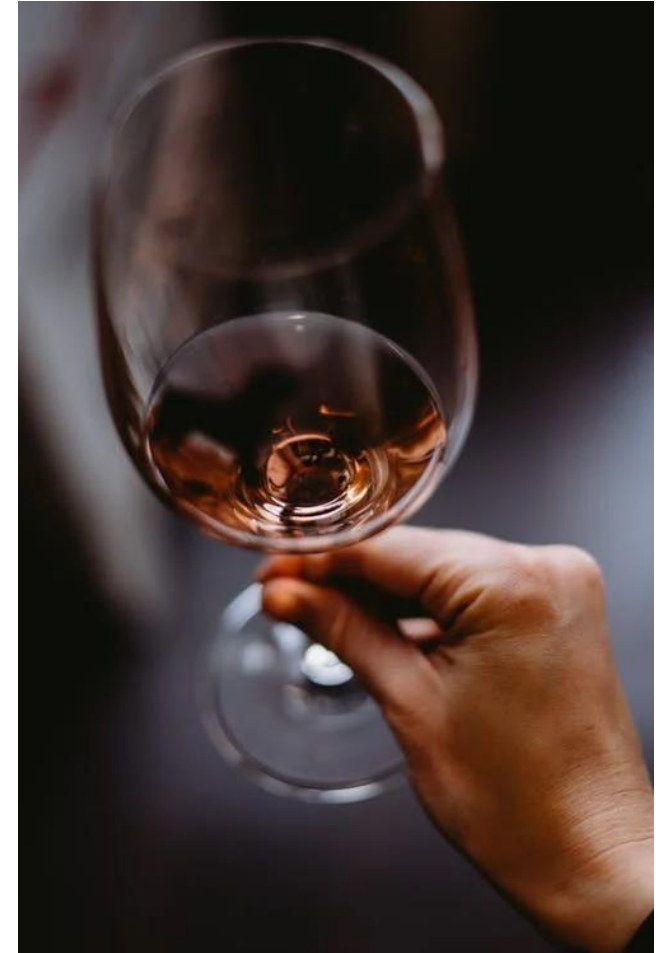
Were carried out in industrializing or developing countries.

Outcomes	Relative effect (95% CI)	Anticipated absolute effects (95% CI)	Risk with lower SFA intake	No. of participants (studies)	Quality of the evidence (GRADE)	Comments
All-cause mortality Follow-up mean duration 56 months	RR 0.96 (0.90 to 1.03)	62 per 1000	60 per 1000 (56 to 64)	55,858 (12)	Moderate	Critical importance. Reducing saturated fat intake probably makes little or no difference to all-cause mortality
Cardiovascular mortality Follow-up mean duration 53 months	RR 0.94 (0.78 to 1.13)	19 per 1000	18 per 1000 (15 to 22)	53,421 (11)	Moderate	Critical importance. Reducing saturated fat intake probably makes little or no difference to cardiovascular mortality
Combined CV events Follow-up mean duration 52 months	RR 0.79 (0.66 to 0.93)	84 per 1000	67 per 1000 (56 to 79)	53,300 (12)	Moderate	Critical importance. Reducing saturated fat intake probably makes little or no difference to cardiovascular mortality (to a greater extent with greater cholesterol reduction)
Myocardial Infarctions Follow-up mean duration 55 months	RR 0.90 (0.80 to 1.01)	32 per 1000	29 per 1000 (25 to 32)	53,167 (11)	Very low	Critical importance. Reducing saturated fat intake on risk of MI is unclear as the evidence is of very low quality

Hooper L et al. Reduction in saturated fat intake for cardiovascular disease. Cochrane Database Syst Rev. 2020. doi: 10.1002/14651858.CD011737. pub2.

Alcohol

- A tendency toward a small reduction in LDL cholesterol, with low quality evidence
- New guidance from the American Heart Association:
 - *If you do not drink alcohol, don't start. If you choose to drink alcohol, limit intake.*



The effects of foods on LDL cholesterol levels: A Systematic review of the accumulated evidence from systematic reviews and meta-analyses of randomized controlled trials. 2021.

<https://doi.org/10.1016/j.numecd.2020.12.032>

2021 Dietary Guidance to Improve Cardiovascular Health: A Scientific Statement From the American Heart Association. 2021

<https://www.ahajournals.org/doi/10.1161/CIR.0000000000001031>

Evidence from cohort studies suggests dairy may be protective against CVD incidence

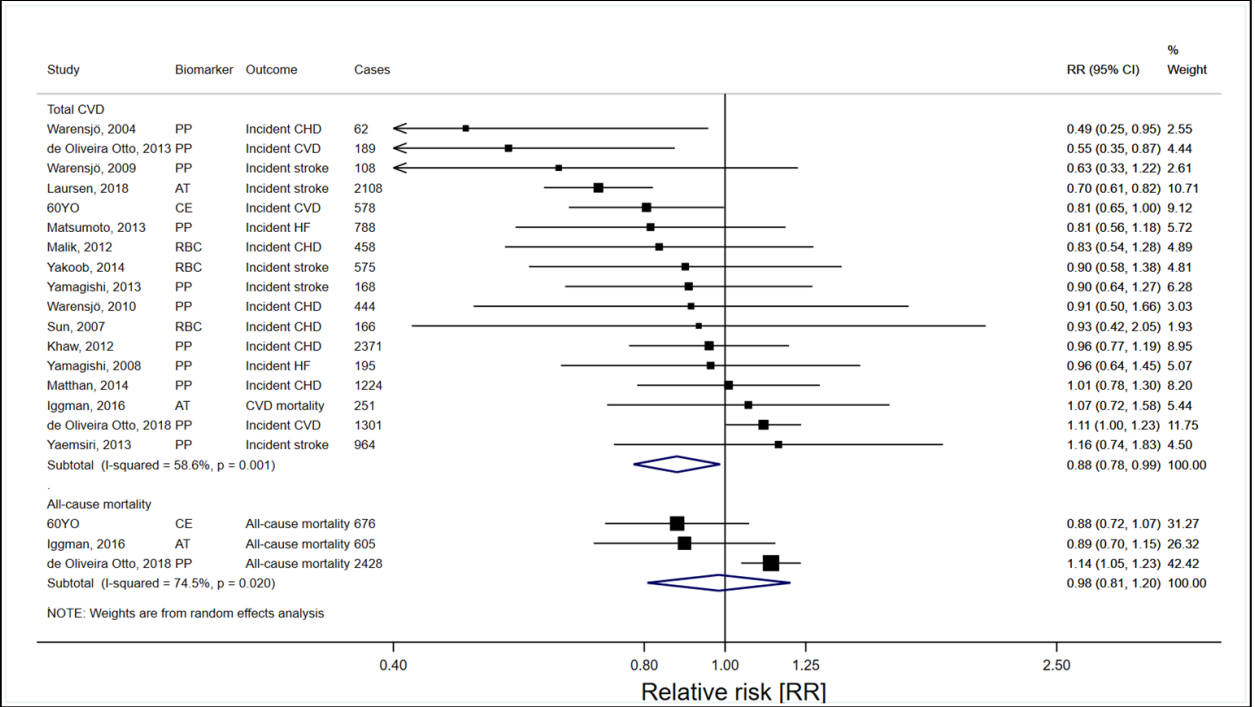


Fig 4. Risk estimates for CVD incidence and all-cause mortality in the top tertile of pentadecanoic acid (15:0) relative to the bottom tertile. AT, adipose tissue; CE, cholesterol ester; CHD, coronary heart disease; CI, confidence interval; CVD, cardiovascular disease; HF, heart failure; PP, plasma phospholipids; RBC, red blood cell (erythrocyte); RR, relative risk.

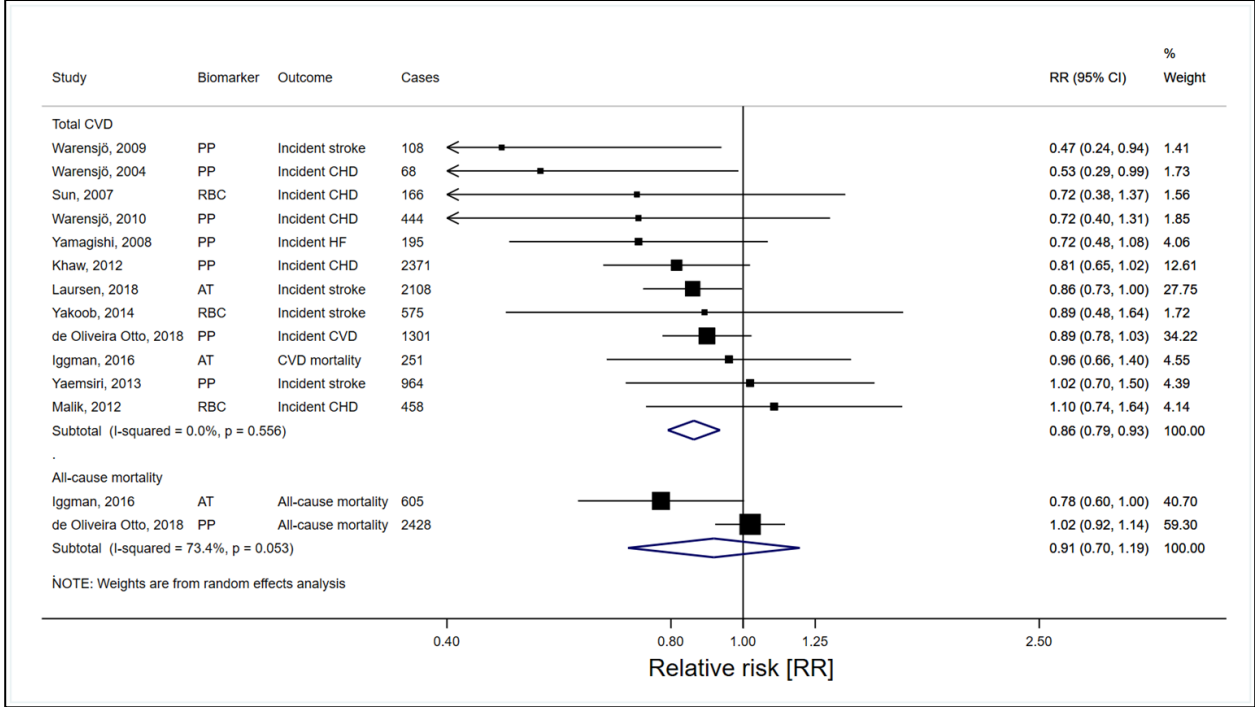


Fig 5. Risk estimates for CVD incidence and all-cause mortality in the top tertile of heptadecanoic acid (17:0) relative to the bottom tertile. AT, adipose tissue; CE, cholesterol ester; CHD, coronary heart disease; CI, confidence interval; CVD, cardiovascular disease; HF, heart failure; PP, plasma phospholipids; RBC, red blood cell (erythrocyte); RR, relative risk

Dairy

- Increased dairy intake has no clear effect on LDL cholesterol, but quality of evidence is low from RCTs
- Meta-regressions from well-controlled dietary RCTs provide high GRADE evidence that LDL cholesterol reduction is the **largest** when SFA or *trans* fatty acids are replaced by MUFA and PUFA
- Guidance from the American Heart Association:
 - *Choose healthy sources of protein (...low-fat or fat-free dairy products)*



The effects of foods on LDL cholesterol levels: A Systematic review of the accumulated evidence from systematic reviews and meta-analyses of randomized controlled trials. 2021.

<https://doi.org/10.1016/j.numecd.2020.12.032>

2021 Dietary Guidance to Improve Cardiovascular Health: A Scientific Statement From the American Heart Association. 2021

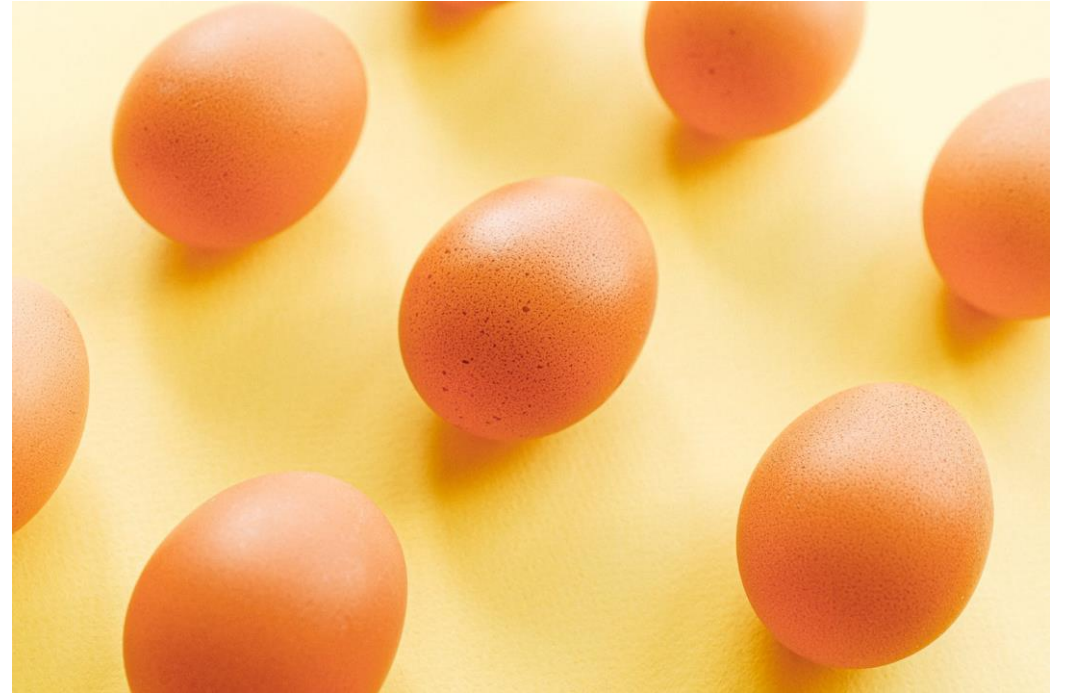
<https://www.ahajournals.org/doi/10.1161/CIR.0000000000001031>

Given the relatively high content of cholesterol in egg yolks, it remains advisable to limit intake to current levels. Healthy individuals can include up to a whole egg or equivalent daily. A 3-oz serving of shrimp is equivalent to about a whole egg. Shrimp and other shellfish can be incorporated into a heart-healthy dietary pattern when paired with other lean or plant-based protein sources. Caveats exist for the following subgroups:

- Vegetarians (lacto-ovo) who do not consume meat-based cholesterol-containing foods may include more dairy and eggs in their diets within the context of moderation discussed herein.
- Patients with dyslipidemia, particularly those with diabetes mellitus or at risk for heart failure, should be cautious in consuming foods rich in cholesterol.
- For older normocholesterolemic patients, given the nutritional benefits and convenience of eggs, consumption of up to 2 eggs per day is acceptable within the context of a heart-healthy dietary pattern.

Additional dietary guidance can be found online.^{70,71}

What about eggs?



The American Heart Association requests that this document be cited as follows: Carson JAS, Lichtenstein AH, Anderson CAM, Appel LJ, Kris-Etherton PM, Meyer KA, Petersen K, Polonsky T, Van Horn L; on behalf of the American Heart Association Nutrition Committee of the Council on Lifestyle and Cardiometabolic Health; Council on Arteriosclerosis, Thrombosis and Vascular Biology; Council on Cardiovascular and Stroke Nursing; Council on Clinical Cardiology; Council on Peripheral Vascular Disease; and Stroke Council. Dietary cholesterol and cardiovascular risk: a science advisory from the American Heart Association. *Circulation*. 2020;141:e39–e53. doi: 10.1161/CIR.0000000000000743.

A word on supplements...



- Currently, there is insufficient evidence to support the use of high dose vitamin and mineral supplements to prevent CVD.
- Trials to date on the effect of nutrient supplements and CVD outcomes have yielded largely null results.

Siscovick DS et al. Omega-3 polyunsaturated fatty acid (fish oil) supplementation and the prevention of clinical cardiovascular disease: a science advisory from the American Heart Association. *Circulation*. 2017;135:e867–e884. doi: 10.1161/CIR.0000000000000482

The STRENGTH Randomized Clinical Trial

QUESTION: In statin-treated patients with high CV risk, high triglycerides, and low HDL cholesterol, does adding a carboxylic acid Formulation of omega-3 FAs(EPA and DHA) to ongoing treatment improve CV outcomes?

CONCLUSION: The findings from this randomized trial do not support use of omega-3 FA formulation to reduce MACE in patients with high CV risk.

POPULATION

8510 Men
4568 Women

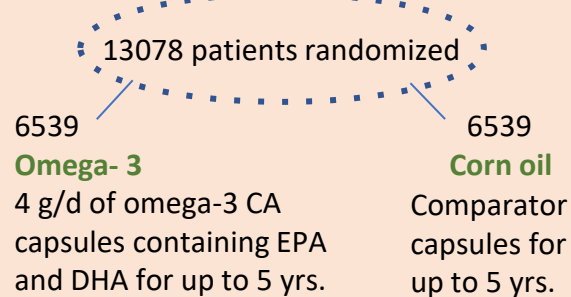
Adults with high TGL and low HDL levels, treated w/ statins, and at high risk of adverse CV outcomes

Mean age **62.5** years

LOCATIONS

675 hospitals
In 22 countries

INTERVENTION



PRIMARY OUTCOME

Composite of CV death and nonfatal MI, nonfatal stroke, coronary revascularization, Or unstable angina requiring hospitalization

FINDINGS

Occurrence of composite outcome events

Omega-3

785 of 6539 patients

12%

Corn oil

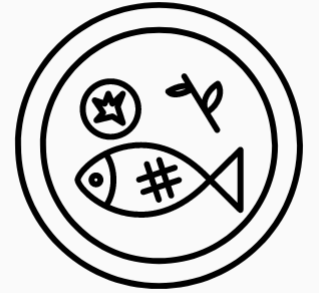
795 of 6539 patients

12.2%

At early trial termination, there was no significant Difference between groups in the primary outcome:

HR, **0.99** (95% CI, 0.90-1.09); *P* = 0.84

Regular intake of fish and seafood



- Moderate- and low-certainty evidence suggests that increasing long-chain omega-3 fats:
 - *slightly reduces risk of coronary heart disease mortality and events*
 - *reduces serum triglycerides (evidence mainly from supplement trials)*
- Increasing ALA slightly reduces risk of cardiovascular events and arrhythmia.

Abdelhamid AS, et al. Omega-3 fatty acids for the primary and secondary prevention of cardiovascular disease. Cochrane Database Syst Rev. 2020. doi: 10.1002/14651858.CD003177.pub5.

2021 Dietary Guidance to Improve Cardiovascular Health: A Scientific Statement From the American Heart Association. 2021
<https://www.ahajournals.org/doi/10.1161/CIR.0000000000001031>

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The Role of Physical Activity

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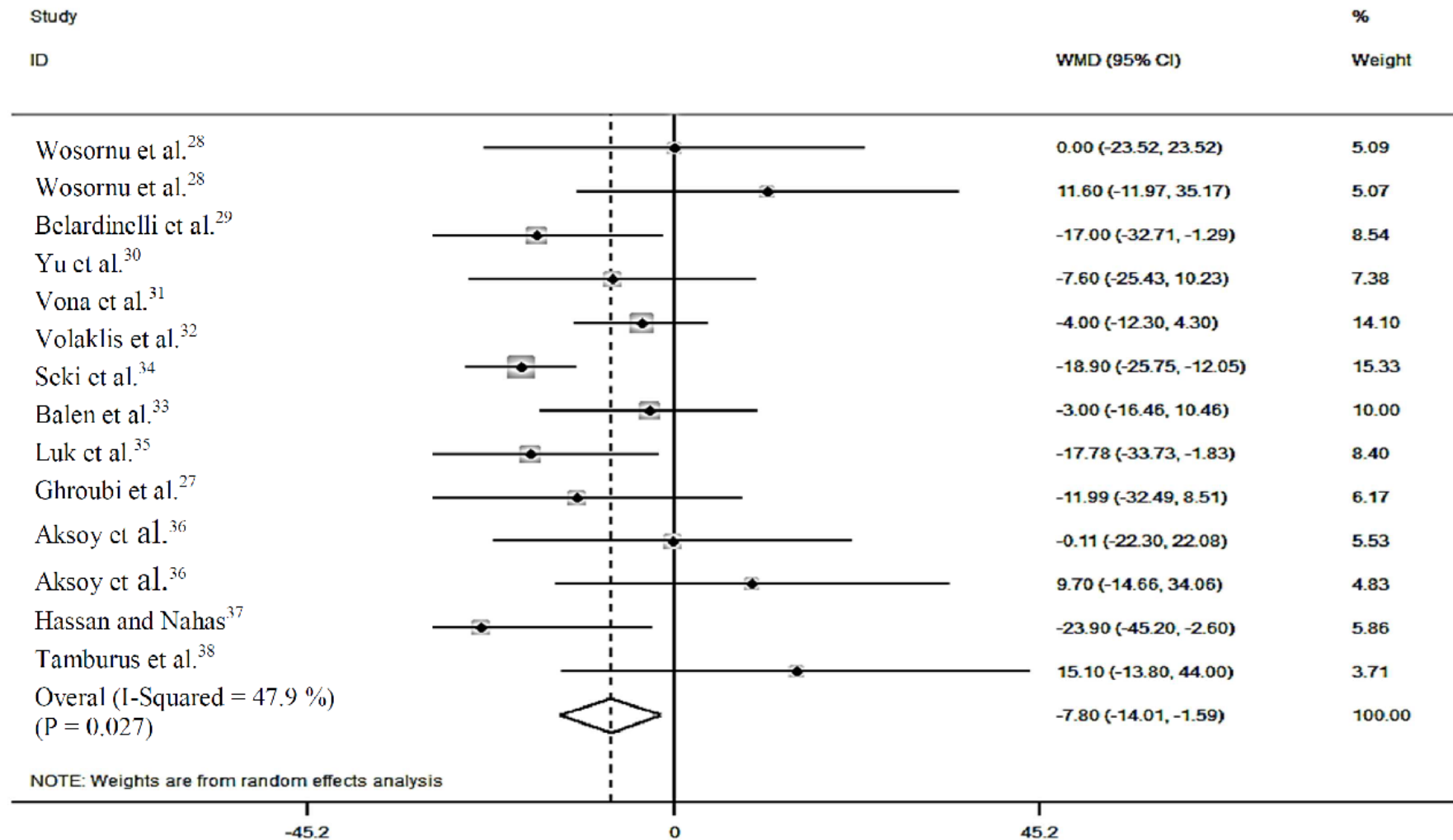
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Physical Activity



Exercise-based interventions non-significantly increase HDL and significantly decrease LDL, TC, and TG levels



Forest plots of low-density lipoprotein serum level differences between the intervention and control groups after cardiac rehabilitation using random effect analysis

Javaherian et al. ARYA Atheroscler 2020 doi: [10.22122/arya.v16i4.2123](https://doi.org/10.22122/arya.v16i4.2123)

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ASCVD Risk Levels & Key Takeaways

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New Guidelines to treat high cholesterol

2018 American College of Cardiology/American Heart Association Cholesterol Guidelines

ASCVD RISK Enhancers

- Family history of premature ASCVD
- Persistently elevated LDL-C ≥ 160 mg/dl (≥ 4.1 nmol/L)
- CKD
- Metabolic Syndrome
- Conditions specific to women (e.g. preeclampsia, premature menopause)
- Inflammatory diseases (especially rheumatoid arthritis, psoriasis, HIV)
- Ethnicity (e.g. South Asian ancestry)

LIPID/ BIOMARKERS:

- Persistently elevated TGLs (≥ 175 mg/dL, ≥ 2.0 mmol/L)

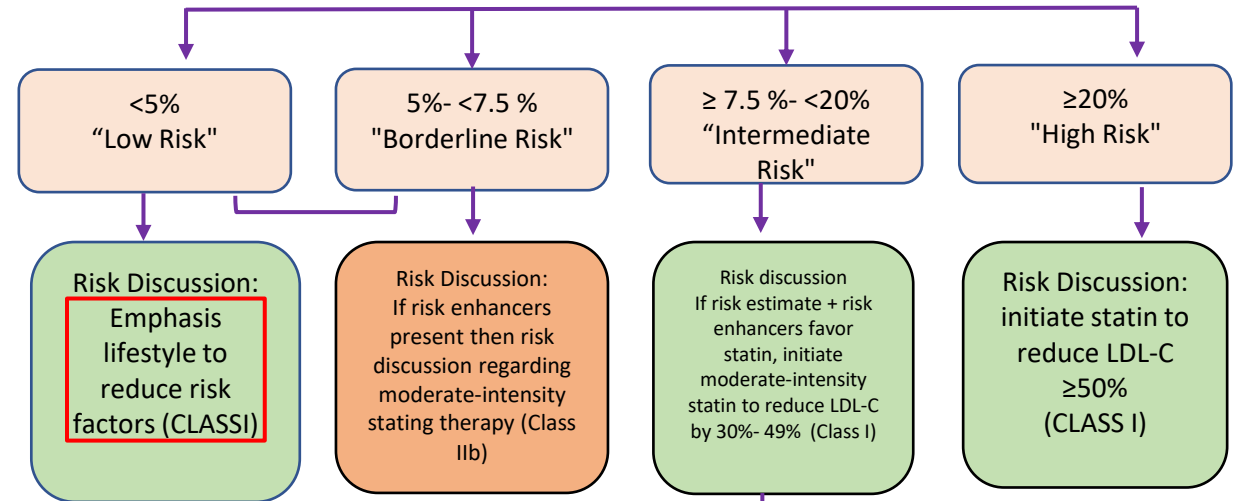
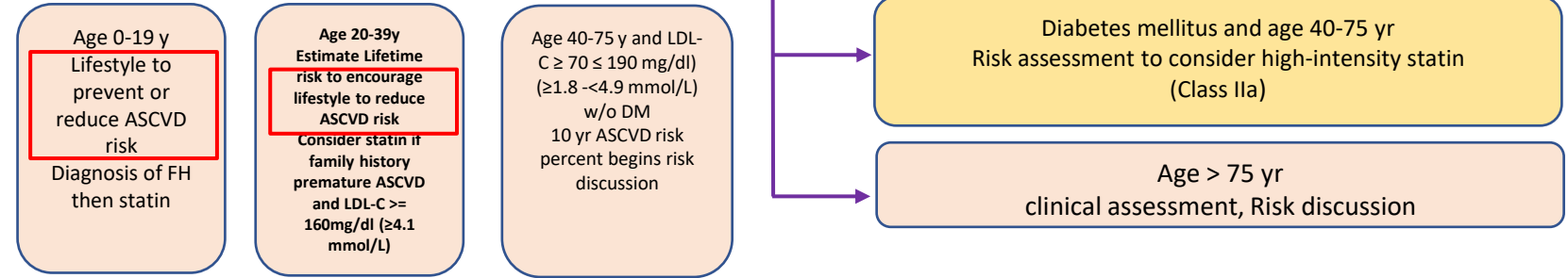
IN- SELECTED INDIVIDUALS IF MEASURED:

- hs-CRP ≥ 2.0 mg/L
- Lp(a) levels > 50 mg/dl or >125 nmol/L
- apoB ≥ 130 mg/dL
- Ankle-brachial index (ABI) <0.9

Primary Prevention

Assess ASCVD Risk in Each Age Gr.

Emphasize Adherence to healthy Lifestyle



If risk decision is uncertain:
 Consider easuring CAC in selected adults:
 CAC = zero (lowers risk; consider no statin, unless diabetes, family history of premature CHD, or cigarette smoking are present)
 CAC= 1.99 favors statin (especially after age 55)
 CAC =100+ and/ or ≥ 75 th percentile, initiate statin therapy

Cholesterol management guide for health care practitioners

Key Points:

- Use evidence-based tools such as the ASCVD Risk Calculator to identify patients at elevated risk who might benefit from treatment.
- Consider a patient's blood cholesterol level, a main modifiable risk factor, along with other health and lifestyle factors when assessing and calculating ASCVD risk.
- Statins are the first-line agents used to decrease cholesterol and reduce the risk of ASCVD events.
- Statin therapy is safe when used properly and monitored.
- Engage patients in the discussion before initiating statin therapy and lifestyle changes.
- Start with the appropriate intensity of statin therapy to reduce ASCVD risk, and regularly monitor patients for adherence to lifestyle changes and appropriate intensity of statin therapy.
- Evidence does not support treating to a specific LDL-C or non-HDL-C target.
- If a patient has problems taking a statin, or if a statin alone does not sufficiently lower cholesterol, consider a nonstatin drug therapy in combination or as monotherapy in selected individuals.

A recent clinical trial found DASH vs. healthy diet advice reduced LDL by 7.5% vs. 3.1% and HDL increased by 8.2% vs. 2.4% cholesterol over 12-weeks; ASCVD risk was comparable between groups

Table 5.

Comparing Pre- and Post-Treatment Results of the DASH Group (n = 46).

Variables	Before treatment	After treatment	P value*
	Mean ± SD	Mean ± SD	
BMI (kg/m ²)	35.72 ± 5.37	33.36 ± 5.18	<.001
Systolic blood pressure (mmHg)	140.34 ± 9.65	130.54 ± 9.26	<.001
FBS	109.76 ± 25.92	103.67 ± 22.51	<.001
Total cholesterol	224.4 ± 57.94	212.52 ± 54.18	<.001
LDL	148.06 ± 42.44	136.85 ± 36.95	<.001
HDL	36.78 ± 31.25	39.82 ± 5.89	<.001
TGs	172.93 ± 64.1	159.28 ± 61.42	<.001

Bold is statistically significant.

*Paired sample t test.

Table 6.

Comparing Pre- and Post-Treatment Results of the HDA Group (n = 46).

Variables	Before treatment	After treatment	P value*
	Mean ± SD	Mean ± SD	
BMI (kg/m ²)	31.5 ± 3.25	30.69 ± 3.16	<.001
Systolic blood pressure (mmHg)	134.56 ± 9.41	128.91 ± 8.36	<.001
FBS	107.56 ± 23.92	104.19 ± 22.37	<.001
Total cholesterol	218.84 ± 39.08	211.97 ± 34.63	<.001
LDL	144.39 ± 38.15	139.82 ± 35.71	<.001
HDL	37.1 ± 23.75	38.02 ± 5.8	<.001
TGs	186.54 ± 55.44	181.28 ± 53.95	<.001

Bold is statistically significant.

*Paired sample t test.

Key Takeaways

Foods to Decrease	Foods to Increase	Current Guidelines for the General Population
Unprocessed red meat Processed meats Sugar sweetened beverages High glycemic load CHO Sources of <i>trans</i> fats	Fruits Vegetables Beans/legumes Nuts and seeds Whole grains Fish Yogurt High omega-3 seafood High PUFA vegetable oils	A diet emphasizing intake of vegetables, fruits, legumes, nuts, whole grains, and fish Replacement of SFA with MUFA and PUFA A reduced amount of dietary cholesterol Minimizing intake of processed meats, refined CHO, and sweetened beverages Avoidance of <i>trans</i> fats

Feingold KR. The Effect of Diet on Cardiovascular Disease and Lipid and Lipoprotein Levels. 2021 Apr 16. In: Feingold KR, et al Endotext [Internet]. South Dartmouth (MA): MDText.com, Inc.; 2000-. PMID: 33945244.

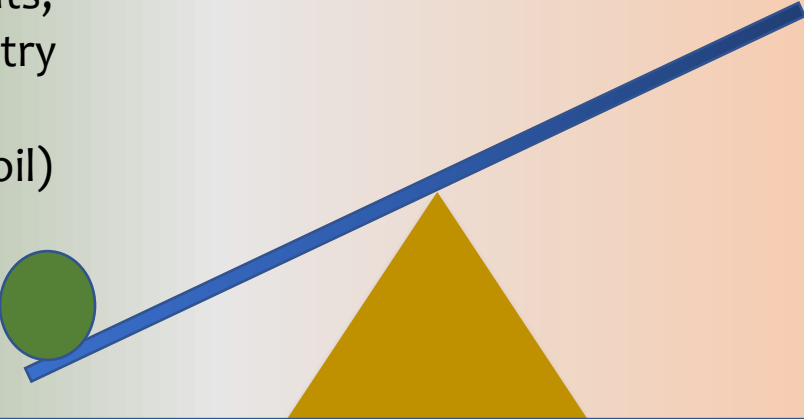
Updated Dietary Guidance from the American Heart Association

Emphasize

- Fruits and Vegetables
- Whole grain foods
- Healthy source of proteins; fish and seafood, legumes and nuts, low-fat/ fat free dairy, poultry and if desired lean meat
- Liquid plant oils (e.g. Canola oil)

Minimize

- Beverages and food w/ added sugars
- Ultra-processed foods
- Processed meats
- Food high in salt
- Alcoholic beverages
- Tropic oils

- 
- **Adjust energy intake to achieve and maintain a healthy body weight**
 - **Follow this guidance regardless where food is prepared or consumed**

Evidence-Based Dietary Guidance to Promote Cardiovascular Health

- 1. Adjust energy intake and expenditure to achieve and maintain a healthy body weight**
- 2. Eat plenty of fruits and vegetables, choose a wide variety**
- 3. Choose foods made mostly with whole grains rather than refined grains**
- 4. Choose healthy sources of protein a. mostly protein from plants (legumes and nuts) b. fish and seafood c. low-fat or fat-free dairy products instead of full-fat dairy products d. if meat or poultry are desired, choose lean cuts and avoid processed forms**
- 5. Use liquid plant oils rather than tropical oils (coconut, palm, and palm kernel), animal fats (e.g., butter and lard), and partially hydrogenated fats**
- 6. Choose minimally processed foods instead of ultra-processed foods***
- 7. Minimize intake of beverages and foods with added sugars**
- 8. Choose and prepare foods with little or no salt**
- 9. If you do not drink alcohol, do not start; if you choose to drink alcohol, limit intake**
- 10. Adhere to this guidance regardless of where food is prepared or consumed**

*There is no commonly accepted definition for ultra-processed foods, and some healthy foods may exist within the ultra-processed food category

Dietary Patterns *Most* in Alignment with 2021 AHA Guidance

Tier 1 patterns (when implemented as intended)

- ✓ DASH-style
- ✓ Mediterranean
- ✓ Pescetarian
- ✓ Ovo-, Lacto-, and Ovo-Lacto Vegetarian

Popular Dietary Patterns: Alignment With American Heart Association 2021 Dietary Guidance: A Scientific Statement From the American Heart Association 2023

<https://www.ahajournals.org/doi/10.1161/CIR.0000000000001146>

AHA Features*	Vegetarian									
	DASH-style (Nordic, Baltic)	Mediterranean	Pescetarian	Ovo, Lacto, Ovo-Lacto	Vegan >10% fat	Low-fat, (TLC, Volumetrics)	Very low-fat <10% fat (often vegan)	Low-carb (Zone, South Beach, Low-Glycemic Index)	Paleo	Very low-carb (Atkins, Ketogenic, WPKD)
1 Energy balance needed to maintain a healthy weight	Not Scored									
2 Eat plenty of vegetables and fruits, a wide variety†										
3 Choose mostly whole grains rather than refined grains‡										
4 Adequate Healthy Plant-Based and Other Protein Sources§	Mostly protein from plants (legumes and nuts)¶									
	Fish and Seafood¶									
	Low-Fat or fat-free dairy products instead of full-fat dairy¶									
	If consuming meat or poultry, choose lean cuts¶									
5 Use liquid plant oils rather than tropical oils†										
6 Minimize intake of beverages and foods with added sugars†										
7 Choose and prepare foods with little or no salt†										
8 If you do not drink alcohol don't start, if you choose to drink alcohol, limit intake**										
9 Choose minimally processed foods instead of ultra-processed foods††										
10 Adhere to this guidance whenever food is prepared or consumed‡										
Points	9	8	8.25	7.75	7	7	6.5	5.75	4.75	2.75
Score normalized to 100% (Range 0-100)¶¶	100	89	92	86	78	78	72	64	53	31
Tiers	Tier 1				Tier 2		Tier 3		Tier 4	

Legend

	1 point= fully meets recommendation
	0.75 points= mostly meets recommendation
	0.5 points= partially meets recommendation and/or insufficiently clear
	0 points= does not meet recommendation
	Not scored because food group is not included in the dietary pattern
	Hatched cells denote the 4 sub-features of the protein recommendation

Facilitators for Dietary Adherence: Clinician Guidance

- Emphasize plant-rich foods and inclusion of some animal-sourced protein if desired:
 - *Fruits and vegetables*
 - *Nuts and seeds*
 - *Whole grains*
 - *Heart-healthy oils*
 - *Low-fat dairy*
 - *Fish and seafood*
 - *Lean meats and poultry*

Pro Tips

- Frozen fruits and vegetables are more affordable and as nutrient dense as fresh produce
- Herring, rainbow trout, and some forms of tuna along with higher consumption of legumes can be more cost-effective
- Preparing foods from scratch makes it easier to adhere to lower salt diets

Popular Dietary Patterns: Alignment With American Heart Association 2021
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<https://www.ahajournals.org/doi/10.1161/CIR.0000000000001146>

Dietary Patterns *Least* in Alignment with 2021 AHA Guidance

Tier 4 Patterns (when implemented as intended)

- ✓ **Paleo**
- ✓ **Very low-carb (Atkins, Keto)**

Why Encourage Patients to Move Up to Higher Tier Patterns?

- Limits whole fruit, legumes, and whole grains
- Excess consumption of higher fat animal products (dairy and meat)
- Difficult to adhere to long-term

Popular Dietary Patterns: Alignment With American Heart Association 2021 Dietary Guidance: A Scientific Statement From the American Heart Association 2023
<https://www.ahajournals.org/doi/10.1161/CIR.0000000000001146>

Strategies to Promote Health Equity

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