The Role of Nuts & Dried Fruits in Improving Diet Quality

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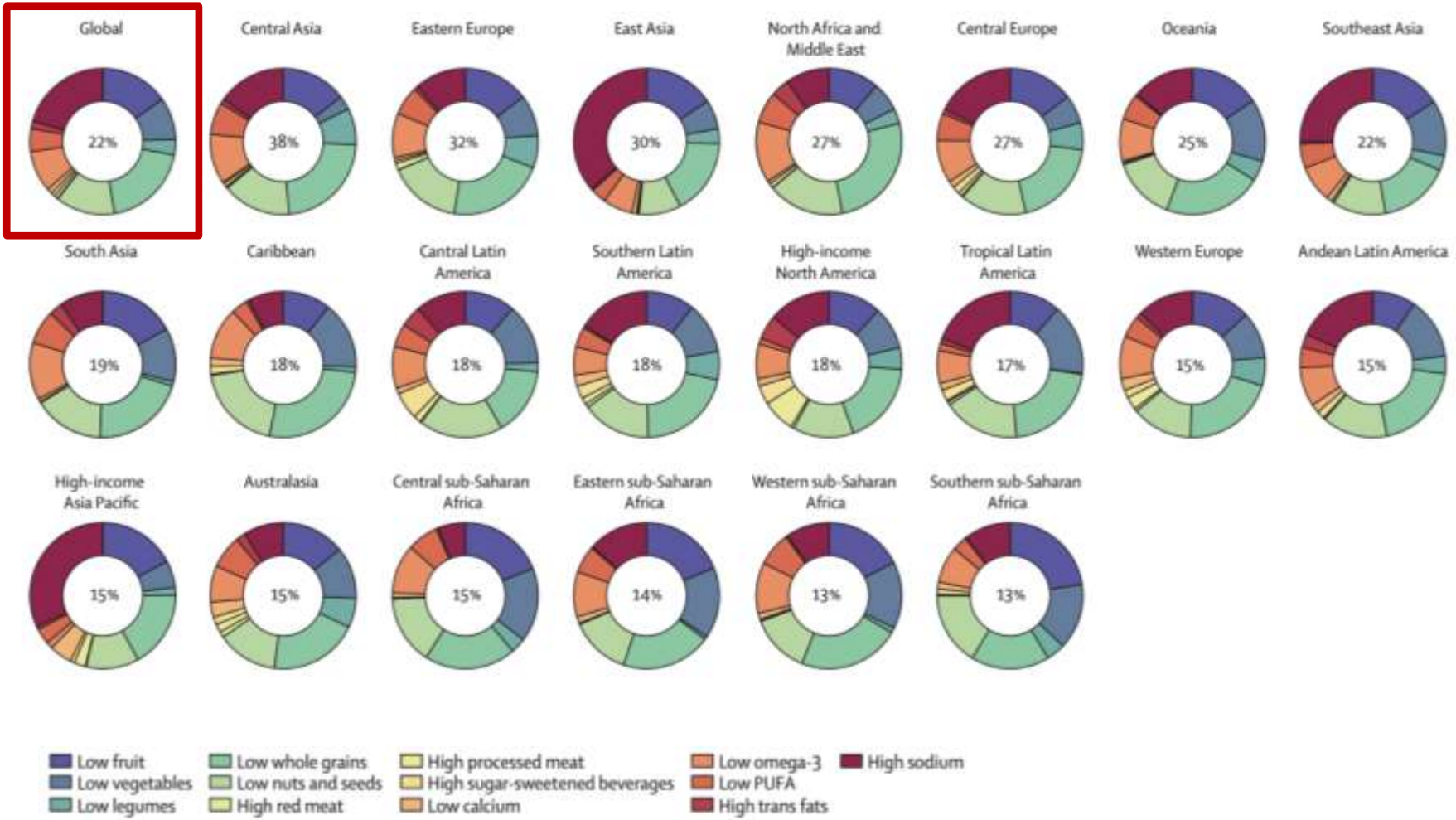
Nutritional Sciences

Overview

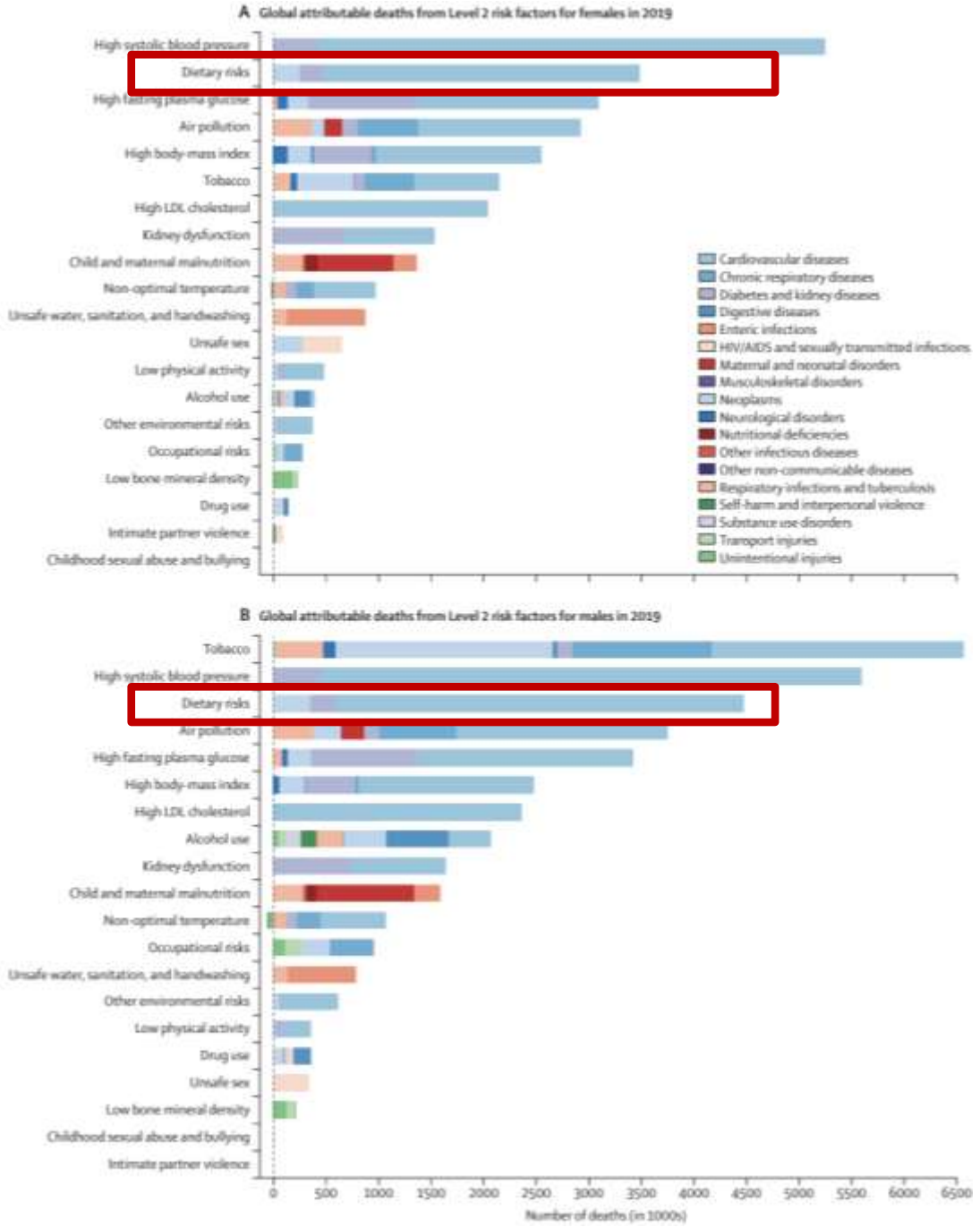
- Global impact of poor diet quality
- Association between dried fruit and nut intake and diet quality
- Results from clinical trials examining how incorporating nuts as a snack affects diet quality
- Use of dried fruits and nuts to promote better diet quality

Globally 22% of Deaths are Attributable to Dietary Risks



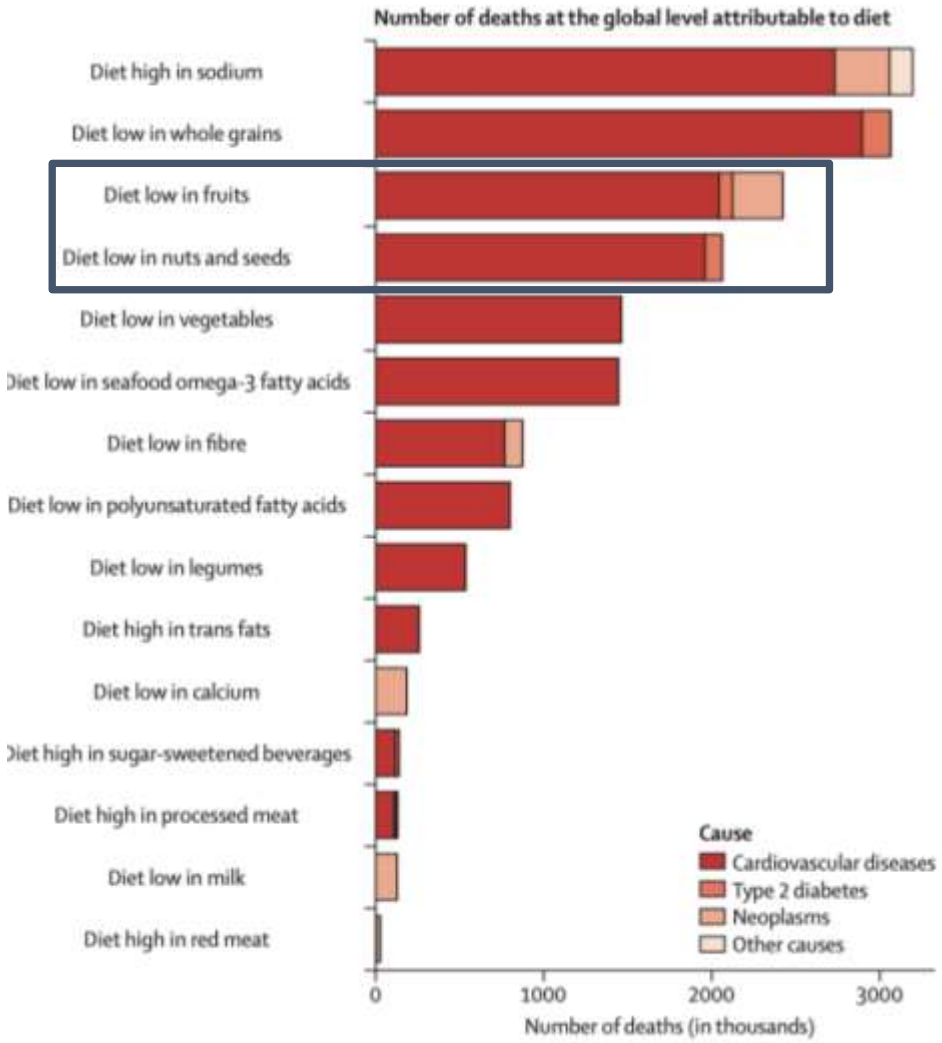
Lancet 2019; 393: 1958–72

Dietary Risks are a Leading Contributor to Mortality



Lancet 2020; 396: 1223–49

Low Intake of Fruits, Nuts and Seeds Related to ~40% of Diet Related Deaths



Lancet 2019; 393: 1958–72

Higher Diet Quality is Associated with Lower Risk of Many Chronic Diseases and Mortality

Systematic review and meta-analysis of 113 prospective cohort studies

Outcome	n studies	Relative risk	95% CI
All-cause mortality	23	0.80	0.79, 0.82
CVD incidence or mortality	45	0.80	0.78, 0.82
Cancer incidence or mortality	45	0.86	0.84, 0.89
Type 2 diabetes	16	0.81	0.78, 0.85
Neurodegenerative	12	0.82	0.75, 0.89
All-cause mortality among cancer survivors	12	0.83	0.77, 0.88
Cancer mortality among cancer survivors	12	0.82	0.75, 0.89

J Acad Nutr Diet. 2020;120(12):1998-2031

Diet Quality: Healthy Eating Index

HEI-2015 & 2020 Component	Maximum Score
ADEQUACY *(higher score indicates higher consumption per 1000 kcal)*	
Total Fruits	5
Whole Fruits	5
Total Vegetables	5
Greens and Beans	5
Whole Grains	10
Dairy	10
Total Protein Foods	5
Seafood and Plant Proteins	5
Fatty Acids	10
MODERATION *(higher score indicates lower consumption per 1000 kcal)*	
Refined Grains	10
Sodium	10
Added Sugars	10
Saturated Fats	10

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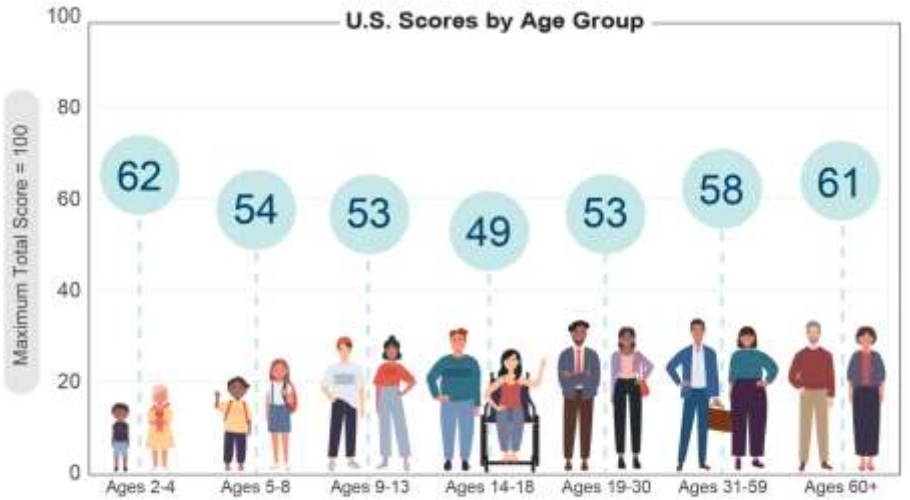

Data source for Healthy Eating Index scores: What We Eat in America, National Health and Nutrition Examination Survey (undated data are from 2017-2018).

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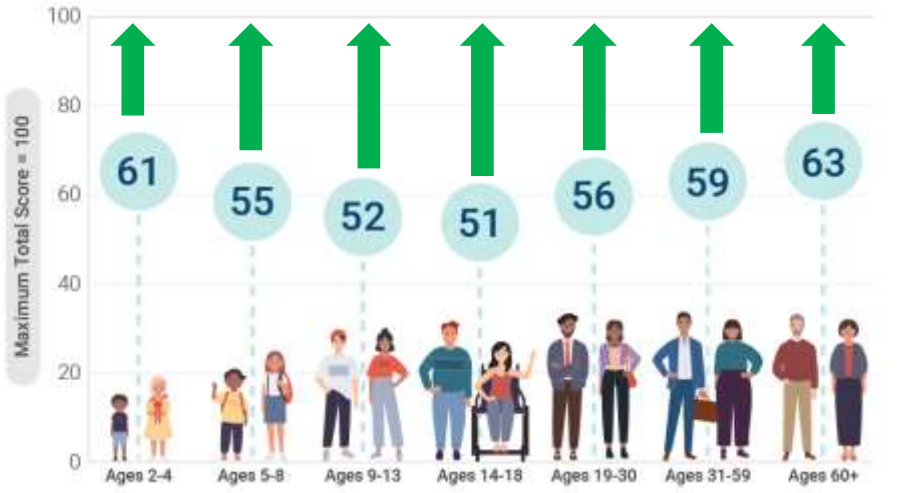
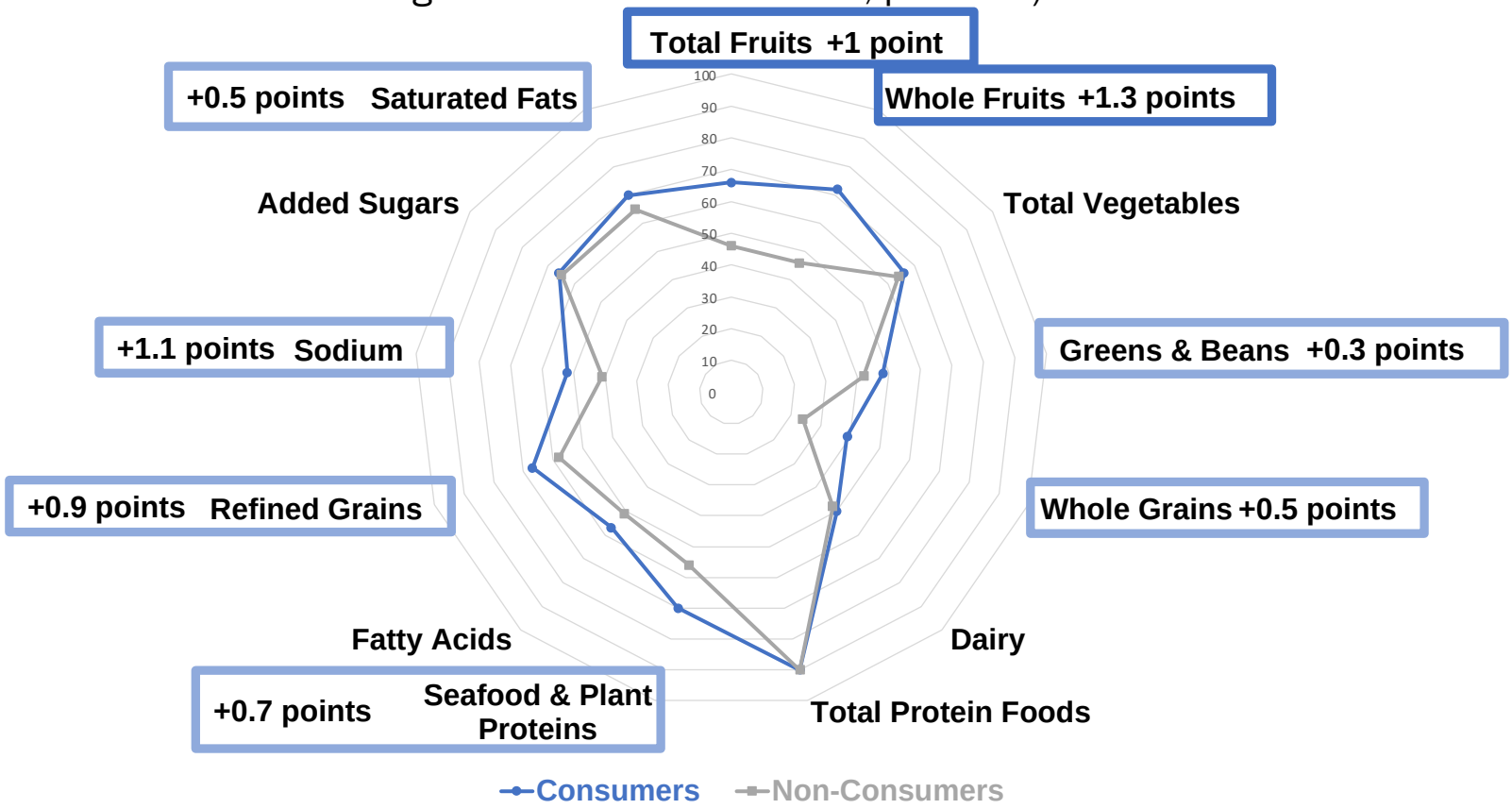


Data source for Healthy Eating Index scores: What We Eat in America, National Health and Nutrition Examination Survey (undated data are from 2017-2018).

U.S. Consumers of Dried Fruit have Higher Diet Quality Compared to Non-Consumers: NHANES 2007-2016

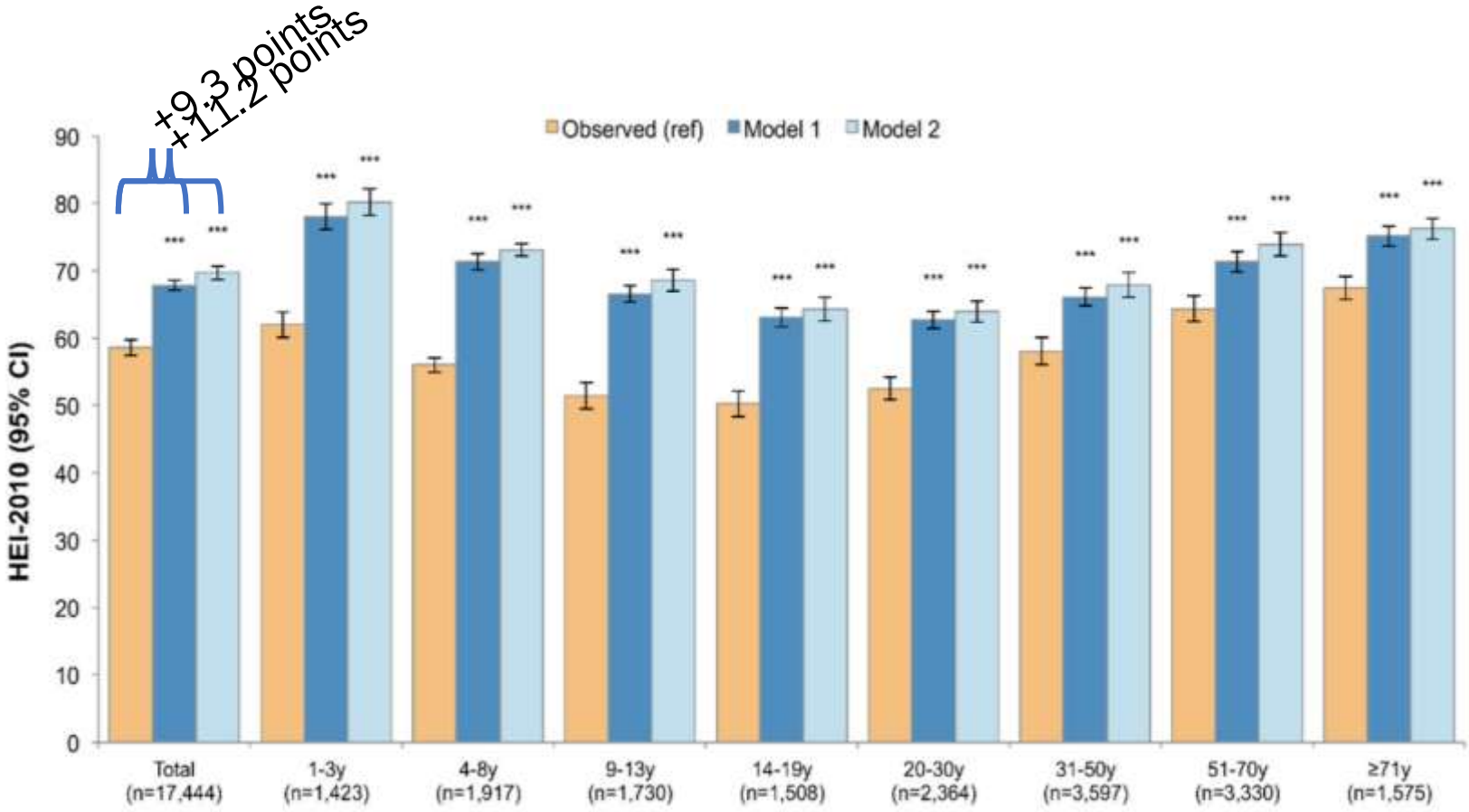
Consumers (7.2% of adults) had higher quality diets than non-consumers (Healthy Eating Index-2015 60.6 vs 52.6; p<0.001)



Model adjusted for age, sex, race/ethnicity, education, family poverty-income ratio, smoking, and self-reported physical activity level

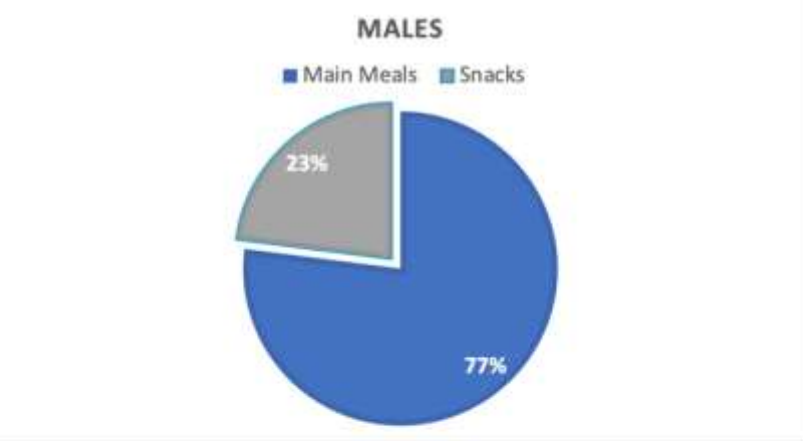
Sullivan VK, …. Petersen KS, J Acad Nutr Diet. 2021;121(7):1258-1272

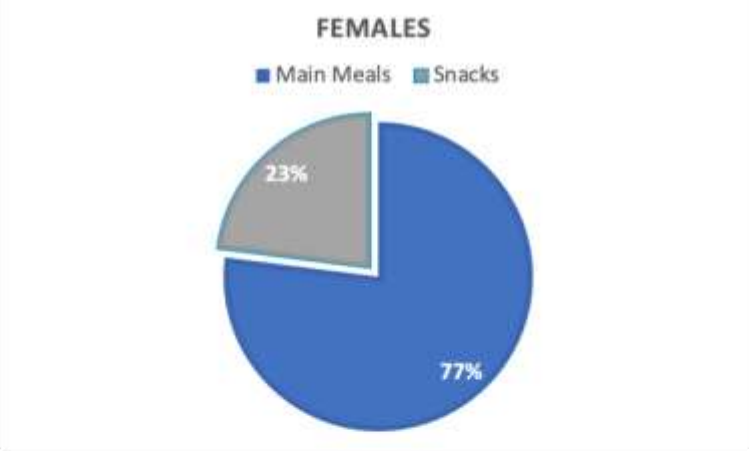
Modeling Analyses Show Substitution of Typical American Snacks with Tree Nuts Increases Diet Quality: NHANES 2009-2012

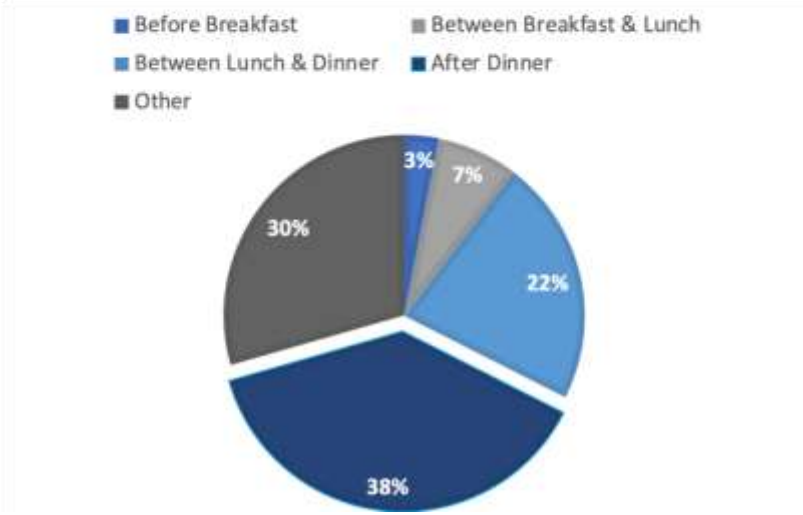


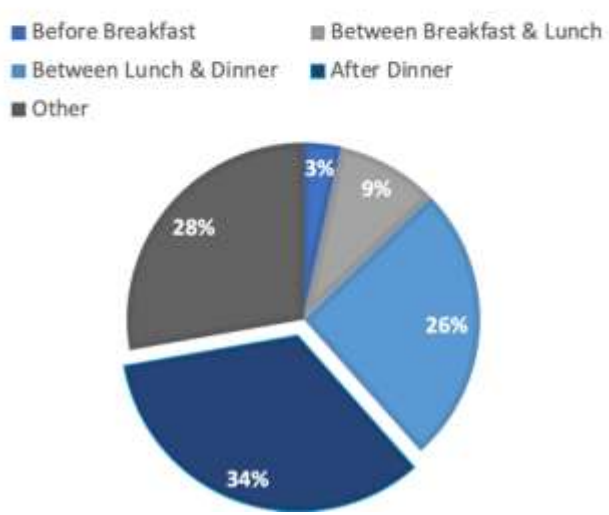
Nutr J. 2017 Mar 7;16(1):17.

Snacks Contribute > 20% of Daily Energy Intake



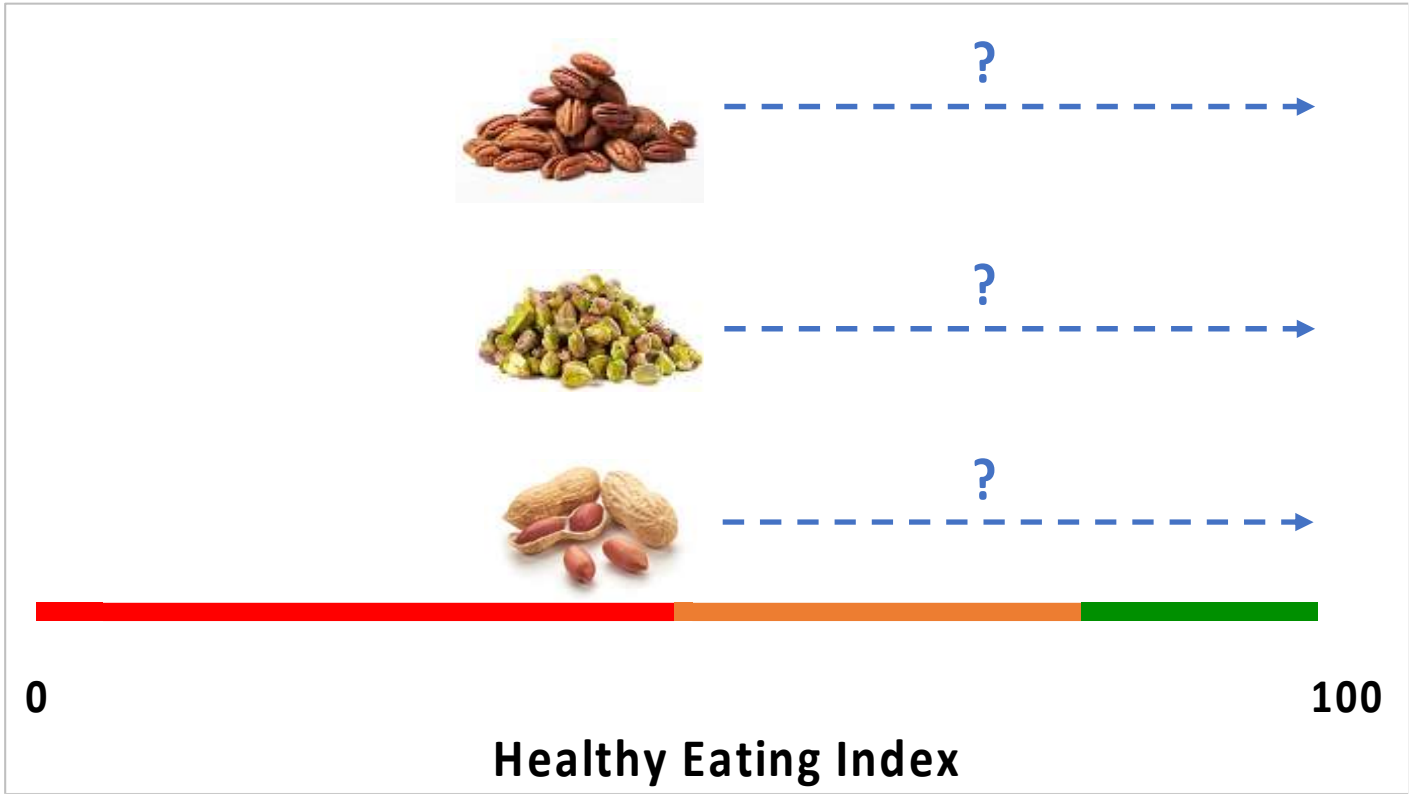






J Acad Nutr Diet. 2015; 115(1): 50–63.

Does Incorporating Nuts as a Snack Improve Diet Quality?

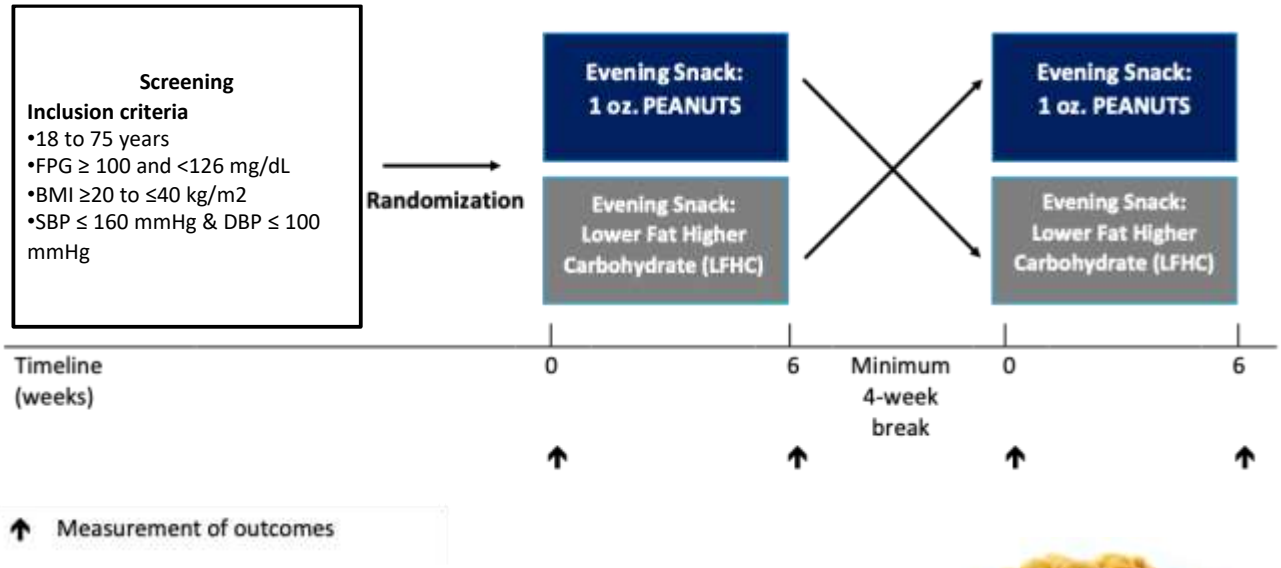


The Journal of Nutrition
Nutrition and Disease

Peanuts or an Isocaloric Lower Fat, Higher Carbohydrate Nighttime Snack Have Similar Effects on Fasting Glucose in Adults with Elevated Fasting Glucose Concentrations: a 6-Week Randomized Crossover Trial

Philip A Sapp,[1] Penny M Kris-Etherton,[1] and Kristina S Petersen[1,2]

[1]Department of Nutritional Sciences, The Pennsylvania State University, University Park, PA, USA; and [2]Department of Nutritional Sciences, Texas Tech University, Lubbock, TX, USA



Sapp PA, Kris-Etherton PM, Petersen KS, J Nutr. 2022, 11;152(1):153-162.

Intake of 28 g/d of Peanuts as an Evening Snack Tended to Improve Diet Quality Compared to a Higher Carbohydrate Snack

Outcome	Peanut		Within-condition difference[3]	LFHC		Within-condition difference[3]	Between-condition effect[3]	Between-condition *P* value
	Baseline[2]	End point		Baseline[2]	End point			
HEI 2015 total score[4]	53.2 ± 1.7	56.5 ± 1.9	3.6 (−1.1, 8.2)	56.9 ± 2.1	52.9 ± 1.9	−2.9 (−7.5, 1	3.6 (-1.9, 9.0)	0.19
Adequacy components								
Total vegetables[5]	3.7 ± 0.2	3.5 ± 0.3	−0.2 (−0.9, 0.4)	3.7 ± 0.2	3.5 ± 0.3	−0.1 (−0.8, 0.5)	−0.0 (−0.6, 0.6)	0.94
Greens and beans[5]	2.3 ± 0.3	2.8 ± 0.4	0.4 (−0.5, 1.3)	3.2 ± 0.3	2.2 ± 0.4	−0.7 (−1.6, 0.2)	0.5 (−0.5, 1.6)	0.32
Total fruits[5]	2.3 ± 0.3	2.3 ± 0.3	−0.0 (−0.7, 0.7)	2.6 ± 0.3	2.3 ± 0.3	−0.2 (−0.9, 0.5)	−0.0 (−0.9, 0.9)	0.96
Whole fruits[5]	2.7 ± 0.3	2.4 ± 0.3	−0.2 (−1.0, 0.5)	2.9 ± 0.3	2.7 ± 0.3	−0.1 (−0.8, 0.7)	−0.3 (−1.3, 0.7)	0.52
Whole grains[6]	3.1 ± 0.4	2.4 ± 0.5	−0.5 (−1.8, 0.7)	4.2 ± 0.6	5.0 ± 0.5	1.0 (−0.2, 2.2)	−2.6 (−3.8, −1.4)	<0.01
Total dairy[6]	5.8 ± 0.4	6.0 ± 0.4	0.0 (−1.1, 1.1)	6.8 ± 0.5	5.9 ± 0.4	−0.8 (−1.9, 0.3)	0.1 (−1.0, 1.2)	0.83
Total protein foods[5]	4.0 ± 0.2	4.7 ± 0.2	0.8 (0.3, 1.2)*	4.2 ± 0.2	4.2 ± 0.2	0.1 (−0.4, 0.6)	0.5 (−0.0, 1.0)	0.06
Seafood and plant proteins[5]	2.7 ± 0.3	3.8 ± 0.3	1.2 (0.3, 2.1)*	2.4 ± 0.3	1.8 ± 0.3	−0.6 (−1.5, 0	2.0 (1.0, 2.9)	<0.01
Fatty acid ratio[6]	4.2 ± 0.5	5.1 ± 0.5	0.8 (−0.5, 2.2)	4.7 ± 0.5	3.6 ± 0.5	−1.0 (−2.3, 0.4)	1.5 (−0.1, 3.1)	0.07
Moderation components								
Sodium[6]	3.2 ± 0.5	4.0 ± 0.5	0.8 (−0.5, 2.1)	2.8 ± 0.5	3.3 ± 0.5	0.5 (−0.8, 1.9)	0.7 (−0.7, 2.0)	0.31
Refined grains[6]	6.9 ± 0.5	6.4 ± 0.5	−0.5 (−1.8, 0.8)	6.2 ± 0.6	7.3 ± 0.5	1.1 (−0.3, 2.5)	−0.9 (−2.1, 0.3)	0.12
Saturated fats[6]	4.2 ± 0.5	5.4 ± 0.5	1.0 (−0.1, 2.2)	4.6 ± 0.5	4.2 ± 0.5	−0.2 (−1.4, 1.0)	1.2 (−0.1, 2.5)	0.14
Added sugars[6]	8.0 ± 0.4	8.9 ± 0.3	0.8 (0.1, 1.5)*	8.6 ± 0.3	8.1 ± 0.3	−0.4 (−1.1, 0.3)	0.8 (0.0, 1.5)	0.04

[1] Data are presented as least squares means and SE unless otherwise stated. *Indicates within-condition significant difference ($P < 0.05$). Statistical analyses were performed with SAS version 9.4 (SAS Institute). The MIXED procedure was used to determine the effect of the conditions on each outcome measure, the between-condition *P* values represent the main effect of condition. The MIXED procedure was also used to assess change from baseline. HEI, Healthy Eating Index; LFHC, lower fat, higher carbohydrate snack.

[2] Values are mean and SE.

[3] Values are least squares mean effect estimate and 95% CI.

[4] Maximum total score = 100.

[5] Maximum score = 5.

[6] Maximum score = 10.

Sapp PA, Kris-Etherton PM, Petersen KS, J Nutr. 2022, 11;152(1):153-162.

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journal homepage: https://jn.nutrition.org/

Nutrition and Disease

Intake of Pistachios as a Nighttime Snack Has Similar Effects on Short- and Longer-Term Glycemic Control Compared with Education to Consume 1–2 Carbohydrate Exchanges in Adults with Prediabetes: A 12-Wk Randomized Crossover Trial

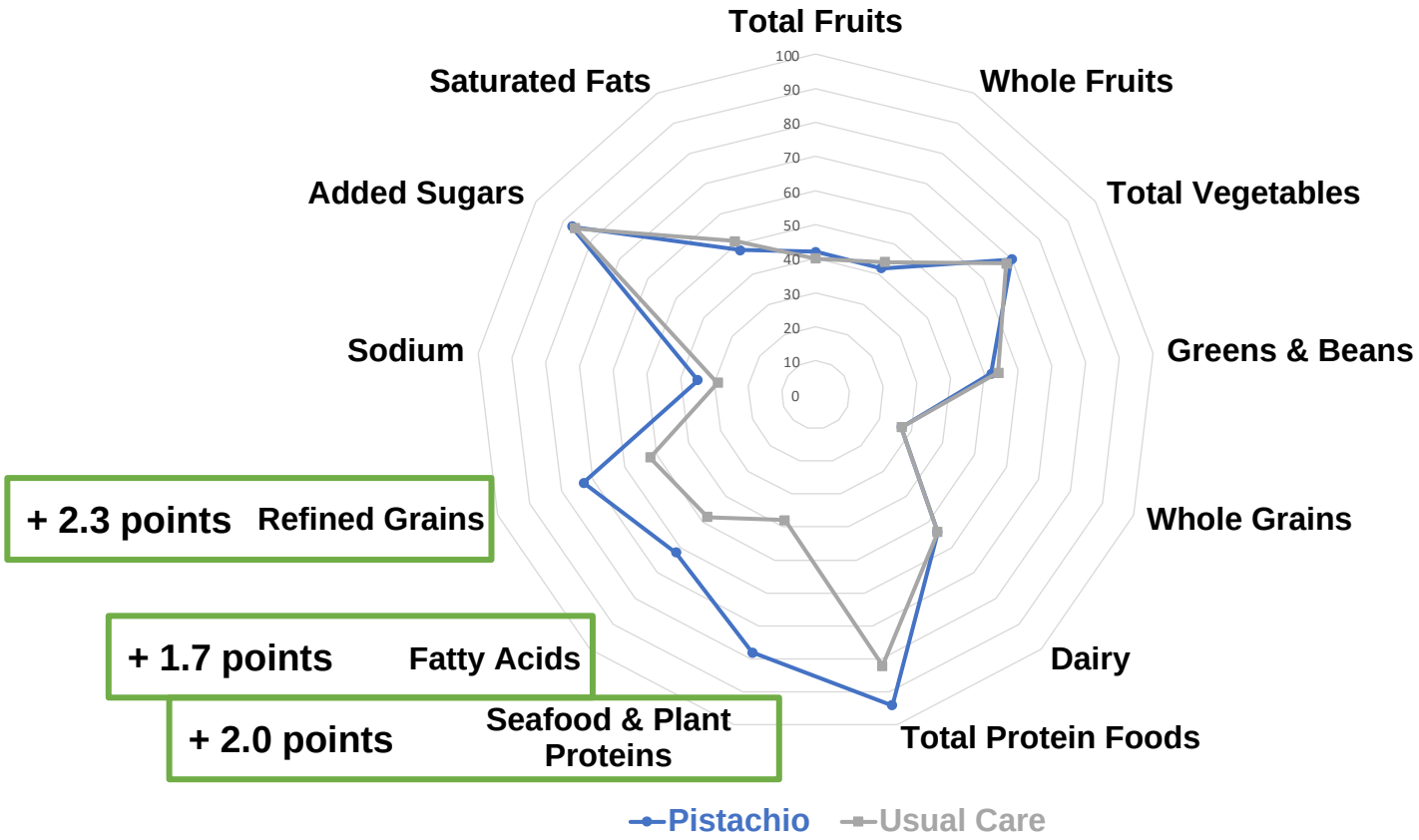
Terrence M Riley, Penny M Kris-Etherton, Tricia L Hart, Kristina S Petersen *

Department of Nutritional Sciences, The Pennsylvania State University, University Park, PA, United States

American Diabetes Association®

Intake of 57 g/d of **Pistachios** as an Evening Snack Improved Diet Quality Compared to Usual Care

Total HEI-2015 improved by **6.8 points** (95% CI 1.5, 12.1) with pistachios vs. usual care



Riley TM, ... Petersen KS, J Nutr. 2024;154(4):1219-1231

Incorporation of Pecans as a Snack in Place of Snacks Usually Consumed

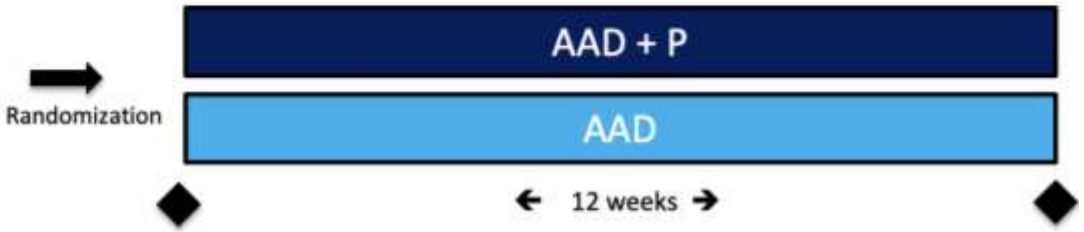
Screening

Inclusion criteria

- 25-70 years
- BMI 25-40 kg/m^2
- ≥1 criterion for metabolic syndrome

Exclusion criteria

- Free from CVD, diabetes, and inflammatory conditions
- Not prescribed medications affecting glucose, lipid, blood pressure, inflammation, or antibiotics
- Blood pressure >160/100 mmHg
- Glucose ≥126 mg/dL
- Triglycerides ≥ 350 mg/dL
- Current smoker
- Pregnant or lactating
- Allergic to study foods

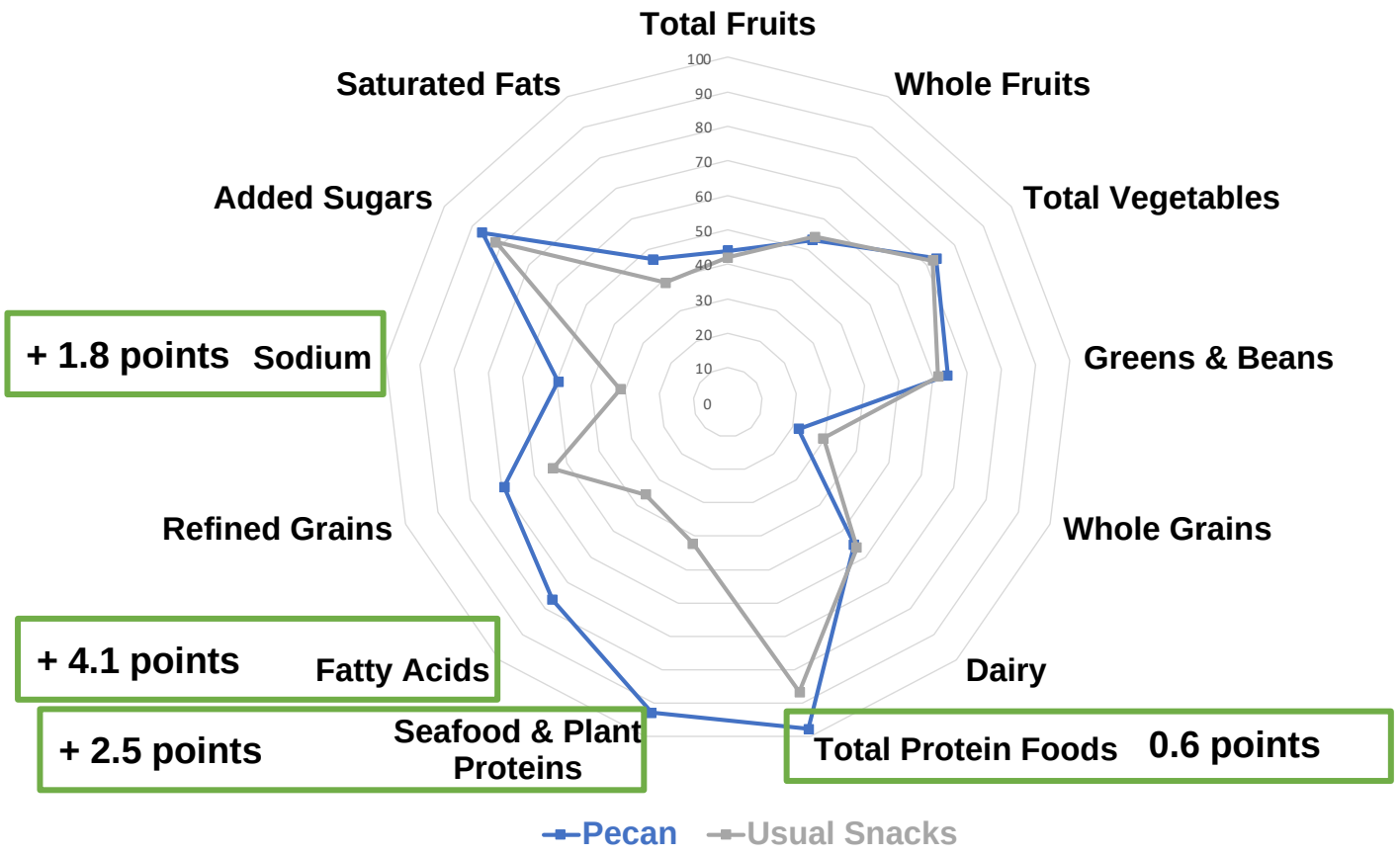


◆ Endpoint testing [blood draw on 2 consecutive days; weight; flow mediated dilation (FMD); pulse wave analysis (PWA); pulse wave velocity (PWV); fecal collection]

AAD + P: Education to eat 2 oz./day of pecans in place of the snacks they usually eat
AAD: Continue consuming their current diet with provision grocery vouchers

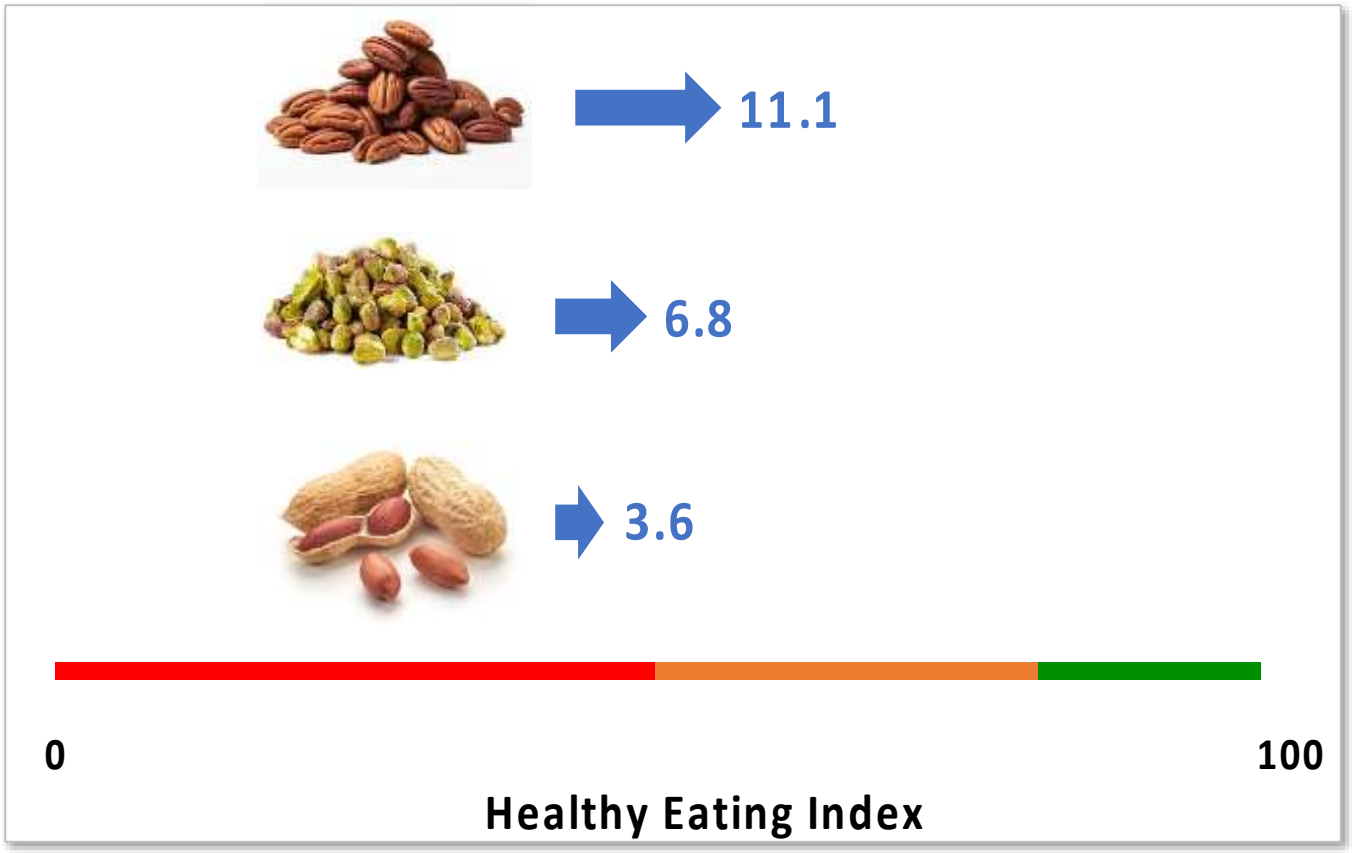
Intake of 57 g/d of **Pecans** as a Snack Improved Diet Quality Compared to Intake of Usual Snacks

Total HEI-2015 improved by 11.1 points (95% CI 5.1, 17.2) with pecans vs. usual snacks

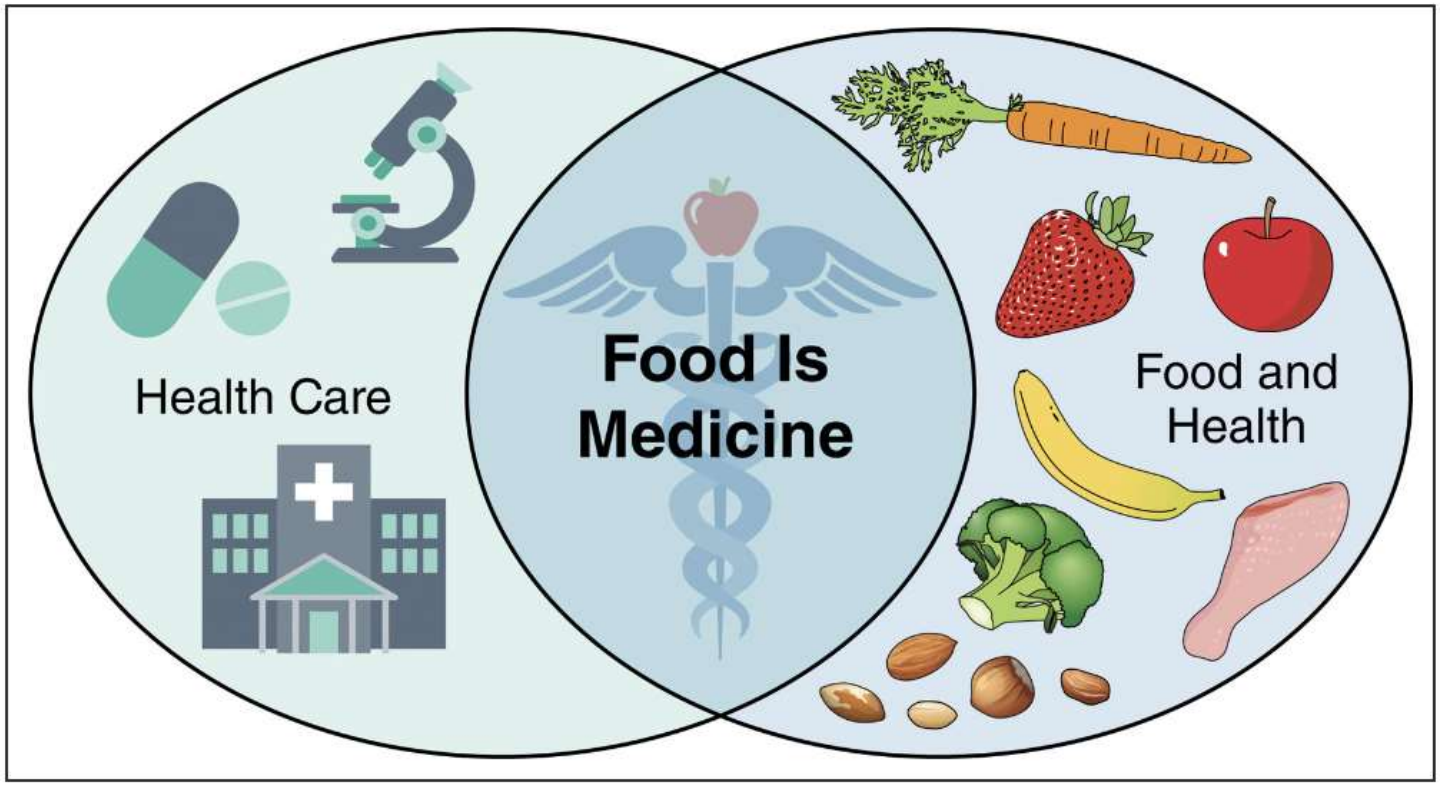


Hart TL, ... Petersen KS, unpublished

Incorporating Nuts as a Snack Improves Diet Quality

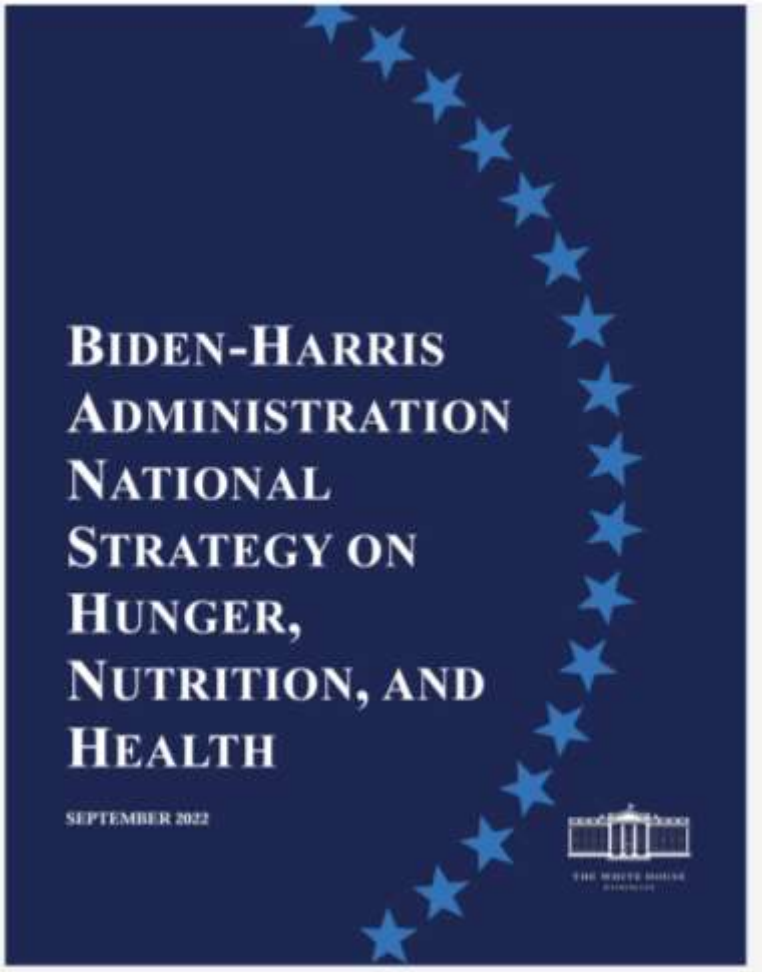


Importance?



Circulation. 2023 Oct 31;148(18):1417-1439.

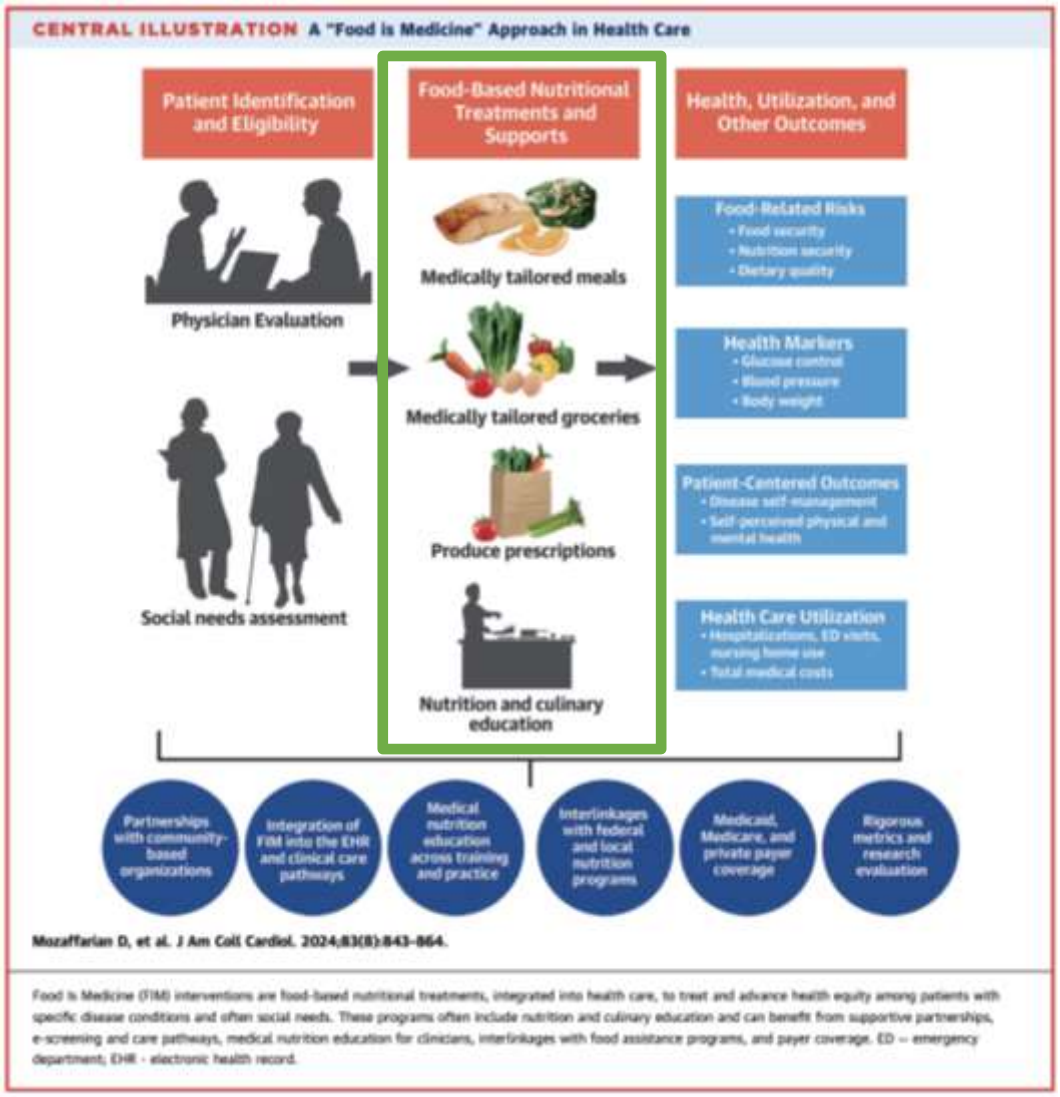
Increasing Interest and Government Support for Food is Medicine Initiatives



Pillar 2—Integrate Nutrition and Health: *Prioritize the role of nutrition and food security in overall health—including disease prevention and management—and ensure that our health care system addresses the nutrition needs of all people*

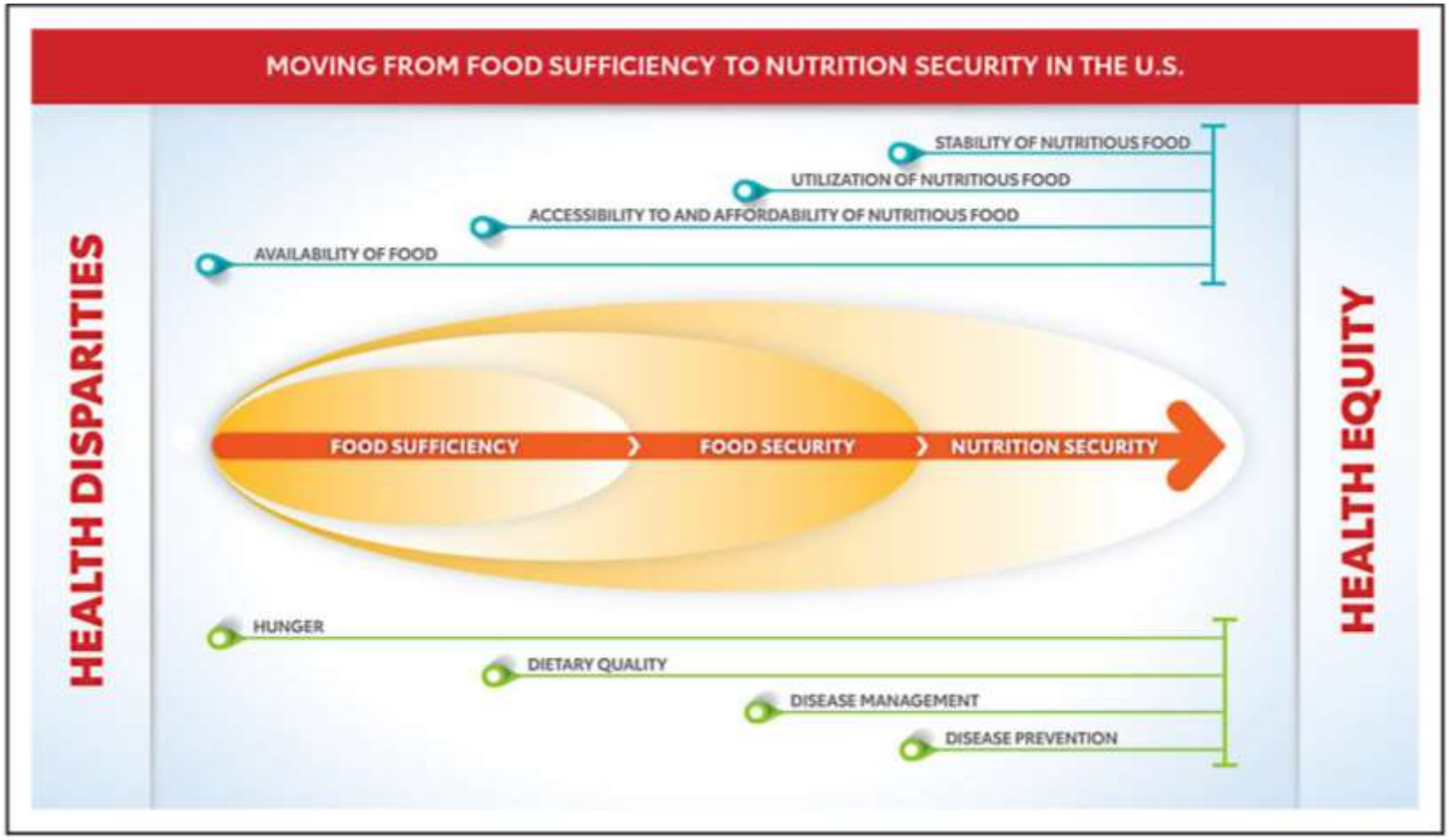
www.whitehouse.gov

Inclusion of Nuts in Food-Based Nutritional Treatments & Supports



J Am Coll Cardiol. 2024;83(8):843–864.

Food Is Medicine Programs Aims to Promote Food and Nutrition Security and Health Equity



Circulation. 2022;145:e1077–e1093

Summary

- Poor diet quality is a leading contributor to death and disability worldwide
- Observational evidence suggests dried fruit and nut intake is associated with higher diet quality
- Evidence from clinical trials shows incorporating nuts as a snack improves diet quality
- Inclusion of nuts in Food Is Medicine programs as part of food-based nutritional treatments may promote improved diet quality

Acknowledgements

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- American Pecan Council
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